THE IMPACT OF PERFORMANCE INDICATORS ON
THE WORK OF UNIVERSITY ACADEMICS: A STUDY OF FOUR
AUSTRALIAN UNIVERSITIES

JEANNETTE TAYLOR
BApSc, MBA

This thesis is presented for the degree of Doctor of Philosophy of
Murdoch University

1999
STATEMENT

I declare that this thesis is my own account of my research and contains as its main content work which has not previously been submitted for a degree at any tertiary education institution.

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ABSTRACT

In 1988, the Australian Federal Government released the document *Higher Education: A Policy Statement* which was intended to improve the efficiency and effectiveness of the higher education sector. This paved the way for the application of performance indicators (PIs) across higher education, most notably the creation of a link between PIs (called the Composite Index) and the research component of the annual government funding to universities. Although PIs for teaching became popular, funding for the teaching component was not directly attached to PIs and remained largely based on student enrolments.

The purpose of this study is to examine the perceptions of university academics in Australia on the effects of research and teaching as a result of the introduction of funding based on research PIs. The academic literature suggests that PIs can bring about desirable effects but it also warns that their imposition, particularly by the government on universities, may lead to unintended and undesirable effects, such as goal displacement and strategic manipulation, which may be designed to enhance apparent research performance. To guide the investigation, it was hypothesised that the government's PIs which focus on research will be integrated into the universities' internal policies; will encourage universities to place a high priority on the research activities funded by the PIs; will lead to significantly more paperwork; will contribute to a significant change in the approach to research but not to teaching; and will result in academics adopting negative attitudes towards PIs.
Two basic sources of information were obtained to evaluate these hypotheses. First, the administrations of selected universities were consulted, and staff interviewed, to gauge the degree of change that had been implemented by the universities. Second, a questionnaire was constructed in order to assess academics' attitude towards Pls, and their perceptions of an association between Pls and their institutional reward system. The questionnaire also assessed changes in research, teaching and paperwork activities.

The universities selected characterised the different kinds of universities found in the Unified National System of the Australian higher education system. One hundred and fifty-two academics from these universities were surveyed by the questionnaire. Thirty percent of these academics participated in a structured interview. The disciplines from which the academics were selected for participation included arts/humanities, science, and professional studies which included a natural science based profession and a social science based profession. In addition, a case study of one of these universities was carried out.

The institutions were found to have reorganised their internal policies to incorporate and focus on the Pls in the government's Composite Index. The academics surveyed were generally found to have negative attitude towards their institutional Pls, although staff of higher rank had relatively more positive views. Reasons for their dissatisfaction
included the inability of PIs to capture the various dimensions of academic work and privileging research over teaching. For a majority of the academics, the introduction of PIs was associated with a rise in paperwork load and a change in the approach to research in terms of focusing on publications and external research grant applications, particularly those counted in their institutional PI-based funding schemes. The time devoted to these activities, as well as the number of publications and grants for which they were expected to apply, have significantly increased. It was found that staff did use various strategies to maximise their PI scores, such as writing shorter papers in order to increase the quantity of publications. The proportion who changed their approach to teaching was also sizeable; most of them were concerned about getting students through their courses with minimum fuss by having lower ambitions for students and pandering to their superficial needs. However, the proportion who changed their teaching was significantly less than those who changed their research. One possible reason could be the lack of special incentives to increase their emphasis on teaching.
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<td>CAUT</td>
<td>Committee for the Advancement of University Teaching</td>
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<td>CQAHE</td>
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<td>CTEC</td>
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<td>Department of Employment, Education, and Training</td>
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<td>DEETYA</td>
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### LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>ARC</td>
<td>Australian Research Council</td>
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<tr>
<td>AVCC/ACDP</td>
<td>Australian Vice-Chancellors Committee/ Australian Council of Directors and Principals</td>
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<td>CAUT</td>
<td>Committee for the Advancement of University Teaching</td>
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<td>CQAHE</td>
<td>Committee of Quality Assurance in Higher Education</td>
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<td>CTEC</td>
<td>Commonwealth Tertiary Education Commission</td>
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CHAPTER ONE: THE RESEARCH PROBLEM

Introduction

Performance indicators (PIs) are playing an increasingly integral role in approaches to the management and assessment of the public sector in many western nations. The Australian higher education system is no exception (Dawkins, 1988; Kemp, 1997a; Kemp, 1997b; Review Committee, 1998). Since higher education in Australia is predominantly funded by the Federal Government,¹ it is scarcely surprising that higher education institutions have been subject to the same drive to measure outputs and outcomes. PIs have been introduced in the late 1980s and reflect, and, in some ways, epitomise the ethos of managing for results. PIs are believed to bring about several benefits, such as better accountability and feedback on work performance, although their greatest claim is probably that of improved efficiency and effectiveness. It appears, however, that, in order to be effective, PIs are required to have an impact not only on institutional behaviour, but also on individual behaviour which, it is assumed, will trigger an improvement in performance and the achievement of organisational goals.

¹ Private higher education institutions include Notre Dame University, Bond University, and Australian Catholic University.
However, there is also a possibility that PIs may not achieve the intended\(^2\) results. They may equally cause dysfunctional effects on human behaviour, particularly when used for ranking the performance of universities which in turn may be tied to government funding. The literature on PIs reveals that just as the introduction of PIs can bring about desirable effects, their introduction from “outside” can also encourage undesirable consequences, such as goal displacement (particularly the rule of quantitative goals over qualitative goals) and strategic manipulation (Cave, Hanney, and Kogan, 1991; Gaither, Nedwek, and Neal, 1994).

In Australia, claims of the potentially unfavourable effects of the introduction of PIs in the higher education system, have been, in most instances, supported either through personal observations of the authors concerned, or from overseas sources. Although empirical studies on the changes in the Australian higher education system in the past decade are plentiful, PIs have not been investigated as a significant contributing factor to these changes. For instance, there have been several reports that the patterns of research and teaching by university academics have altered (e.g., Harman and Wood, 1990; McInnis, 1992), but PIs have not been reported as a causal factor. Given that (1) the application of PIs is now widespread in the Australian higher education sector, (2) the

\(^2\) The term “intended” in this thesis implies objectives intended by the Government and university management.
application of PIs is intended to have an impact on individual work
behaviour, and (3) the debate between the positive and the negative
effects of the introduction of PIs has still not been resolved, it is relevant
and timely to address the following question: What have been the
consequences, both favourable and unfavourable, of the implementation
of PIs in Australian universities?

Overview of the Study Problem

PIs are defined in this study as quantitative and/or qualitative data that
are collected uniformly at regular intervals to monitor the achievement of
specific outcomes. The development of specific PIs for higher education
began in the late 1970s under the Organisation for Economic
Cooperation and Development (OECD) through its Institutional
Management in Higher Education Program (Sizer, 1979)\(^3\). Between that
period and the early 1990s, PIs were rapidly introduced and
implemented across the higher education sector in many western
nations, from the United States of America and the United Kingdom to
Australia, their introduction largely representing pressure on universities
from governments (Borden and Banta, 1994; Dochy, Segers, and
Wijnen, 1990a; Gaither, Nedwek, and Neal, 1994; Spee and Bormans,

\(^{3}\) According to the Canadian Association of University Teachers (1995), the
development of PIs in the United States of America and Europe began as far back as
1910-1920 after the introduction of Taylorism. An essential element of Taylor’s (1911)
philosophy of scientific management is the breakdown of the work task into its
constituent parts or motions, with each worker assigned a specific amount of work and
of a certain quality so that work can be done in the “one best way” (p. 85).
1991). Regardless of the validity of the comparisons, PIs have been largely used in these countries for institutional comparisons of performance (Neal, 1995).

Constraints on public expenditure in the 1970s led to financial cut-backs in governments and eventually in university expenditure. The governments of many OECD countries, including Australia, soon made it clear to the universities that they should pay more attention to better institutional management practices (Marceau, 1993; Moses, 1992). The rationale was that proper management practices could minimise waste in the production process. Labelled as essential management information (Sizer, 1990a) and a management tool (Committee of Vice-Chancellors and Principals/University Grants Committee (CVCP/UGC), 1986), PIs, particularly quantitative PIs, have been seen by governments as beneficial for the internal management of universities. PIs are highly recommended for supplementing the peer review process which has been in operation in the higher education sector (Australian and overseas) for many decades (Sizer, 1990a; Vroijenstijn and Acherman,

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4 It should be noted that “PIs are not novel features of universities” (CVCP/UGC, 1986, p. 2). Before the interest in PIs occurred, many Australian tertiary institutions collected and used performance-related data or statistics to a certain extent (Hattie, 1990), although the Williams Report (Committee of Inquiry into Education and Training, 1979) discovered that this information was in a poor state. Even in 1986, Bourke reported on the absence of a systematic and routine scrutiny of performance at the departmental level. British universities also used an array of information for administration prior to the introduction of PIs (Jarrat, 1985). Thus, to a certain degree, the use of PIs signifies “a systematisation and extension of former practices. In other ways, it is part of wider changes in attitudes towards resource allocation and management of higher education” (Cave, Kogan and Hanney, 1990, p. 47).
An appealing feature of numerical PIs for governments lies in their apparent ability to fill the gap of objectivity left by the “subjective” peer review. They also allow institutional comparisons to be made (Brennan, 1990; Ruppert, 1995). For these reasons, the PIs in use in many countries tend to be quantitative in nature.

The claimed benefits of PIs are plentiful, stemming from their multiple roles to their wide applicability. They can be used for monitoring, for planning, for guidance in the achievement of goals, as a basis for decision-making, as a dialogue between universities and governments, and for evaluating performance. PIs can also be developed for a country, state, institution, discipline, or individual academics (Borden and Bottrill, 1994; Goedegebuure, Maasen, and Westerheijden, 1990a). They can even be used by different levels of university management (Cave, Hanney, and Kogan, 1991). Indeed, the advantages derived from using PIs, as revealed by the literature are impressive. This has led the Australian Vice-Chancellors Committee/Australian Council of Directors and Principals (AVCC/ACDP) Working Party on Performance Indicators (1988, p. 1) to comment that

Something resembling a Cargo Cult seems to have grown up around the notion of performance indicators, so that all manner of powers and virtues are ascribed to them and expectations are aroused that by collecting and using them great benefits will miraculously result.
However, the introduction of PIs in the higher education system of the western developed countries has been far from well-received by university academics. Numerous arguments have been put forward against the application of PIs. The main argument was that “one is not necessarily comparing like with like” (Yorke, 1989, p. 55). Since standardisation was presumed to be necessary for comparison to occur, PIs were thought to be inappropriate for inter-institutional comparisons because universities differ in many aspects, such as goals and environment (Cave, Kogan, and Hanney, 1990; Yorke, 1989). In addition, the critics were sceptical that PIs would have the capacity to capture the true picture of higher education, given that the nature of higher education could not always be measurable and compartmentalised, regardless of whether they were goals or judgements (Barnett, 1988; Cave and Hanney, 1990; Findlay, 1990). Allsop and Findlay (1989, p. 106) observed that “for many it (PI) symbolises the crude application of commercial and industrial models to the educational process”. The introduction of PIs has also been criticised for changing evaluation from “… academic control over objectives and evaluation to control by the system and its managers” (Cave, Hanney, and Kogan, 1991, p. 27), while the criteria of evaluation has shifted from “… those of excellence determined by “internalist” criteria to the academic profession towards criteria related to discernible economic or other social outcomes” (p. 43). The response of many higher education institutions world-wide was to adopt
... a "resist and react" mode, whereby they actively debate the weaknesses of mandated performance systems and attempt to dissuade policy makers through anecdotal evidence or existing data-reporting structures. Only when faced by mandates, which are usually tied to funding mechanisms, do they develop indicator systems in response to external requests (Neal, 1995, p. 7).

The opposition to the introduction of PIs in the higher education system appears to stem mainly from the distaste of

... the possible use of performance indicators first to rank department or institutions in a hierarchy of esteem and then distribute resources among them. Even without the resource allocation aspect ..., it represents - in intention at least - the application of a uniform set of external criteria. When the judgements carry direct resource implications ... performance indicators became even more controversial (Cave, Kogan, and Hanney, 1990, p. 56).

As in countries such as the United Kingdom, the interest in PIs in Australia has been primarily stimulated from "outside" the universities, by the government (Allsop and Findlay, 1989). In its quest for efficiency and effectiveness, the Australian Federal Government released *Higher Education: A Policy Statement* (Dawkins, 1988), which among many things, propelled the rise and spread of PIs across the higher education landscape. Since then, various Government-commissioned reports on PIs (from development to assessment) have been published (e.g., DEET, 1991; Linke, 1995; Martin, 1994). Working parties on PIs have

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5 Unless otherwise stated, the term "Government" refers to the Australian Federal Government.
also been set up: the AVCC/ACDP Working Party on Performance Indicators in 1987-1988, and the Joint Working Party on Higher Education Indicators in mid-1990s.\(^6\)

PIs have been used by the Australian Federal Government to "rank" universities, and are tied to the research component of the annual operating grants.\(^7\) Since the 1990s, the Government's Department of Employment, Education, Training and Youth Affairs (DEETYA)\(^8\) has resorted to releasing frequent publications of the performance of the Australian universities based on selected PIs (e.g., DEET 1994; DEET, 1996). Although it was claimed that the intention of this exercise was to provide "useful information" for the public in choosing courses and institutions, as well as for the universities (Skuja, 1996), the likely outcome is that institutional comparisons would be made which would affect the institution's ability to attract students and staff. In fact, PIs are found in many independent study guides (e.g., The Good Universities Guide) published by various media organisations to assist students in choosing institutions across Australia. It is now quite common for the

\(^{6}\) The members are made up of representatives from Department of Employment, Education, Training, and Youth Affairs, Australian Vice-Chancellors Committee, Australian Research Council, and Higher Education Council.

\(^{7}\) Refer to Appendix 1 for more details about the Australian Federal Government funding to universities.

\(^{8}\) The Department of Employment, Education, Training and Youth Affairs (DEETYA) was formerly known as the Department of Employment, Education, and Training (DEET). DEET became DEETYA in 1996. Throughout this dissertation, documents released by this Department will be referred to their original publisher.
Australian universities themselves to use PIs, such as external research grants, when marketing their specific strengths in the media.

The status of PIs in the Australian higher education sector was particularly strengthened in 1995 when the Federal Government announced that a significant portion (about five per cent) of the annual operating grants to universities, the Research Quantum, would be distributed via the Composite Index. This index is essentially made up of three research PIs - external research income, publications count, and number of higher degree research completions. The Research Quantum is essentially viewed as a "clawback" in that funds for research activities which were provided on a historical basis to institutions are now being withheld and redistributed based on this set of three PIs. By contrast, the teaching component of the Government’s annual operating grants is funded essentially according to student enrolments. Although PIs for teaching, such as graduate employment outcomes, are documented by the Government, they are not directly attached to funding.

Just as the reputation and funds attached to PIs in this period of intense institutional competition and resource constraint can provide powerful incentives for the universities or, more specifically, the individuals within the universities to increase their effort towards an improvement in performance, they can also trigger counterproductive behaviour in people. A common reported dysfunctional effect of PIs is goal
displacement where goals measured and particularly funded by the
indicators are given a higher priority over other equally important or even
more important goals. The result is that goals measured and funded by
the PIs tend to be performed well while those which are not measured
and funded by the indicators tend to be performed poorly or ignored. In
fact, many authors, such as Karmel (1993), have commented that the
use of PIs in ranking universities, particularly when tied to funding would
“almost certainly, produce unintended consequences” (p. 2). The
literature on PIs reveals recurring warnings and predictions on the
unfavourable consequences of the application of PIs, particularly if they
are not properly designed and implemented (Borden and Bottrill, 1994;
Cave and Hanney, 1990). These include improvement in the
performance measured by the indicators by artificial means, either
indirectly (through adaptation in processes or activities under scrutiny) or
directly (through reporting of invalid data). It appears that just as the
literature on PIs shows a positive side to the use of PIs (from their
multiple roles to their wide applicability), there is also plenty of literature
which suggests a negative side to the use of PIs. PIs, it seems, could
provide “the best promise and worst nightmare for colleges and
universities” (Borden and Bottrill, 1994, p. 19). Since the Government is
committed to the use of PIs in the higher institutions regardless of
criticisms (Carter, Klein, and Day, 1992; Hattie, 1990; Hughes, 1994;
Kemp, 1997a), it is important – and a central objective of this study - to
examine the perceptions of academics on the effects on research and
teaching in Australian universities under the Unified National System\(^9\) as a result of the introduction of PIs, particularly funding according to PIs on research.

**Focus of the Study**

In order to construct a theoretical foundation to explain the origins, principal functions, and likely effects of the introduction of PIs in the Australian higher education environment, it necessary for this research to draw upon four theories. These are fiscal federalism theory,\(^{10}\) neoclassical economic theory,\(^{11}\) X-efficiency theory,\(^{12}\) and job motivation theories\(^{13}\). Given that Australia is governed by a federal political system, it is necessary to incorporate the theory of fiscal federalism into this analysis. As public policy, both in Australia and in other Western liberal

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\(^9\) Prior to the formation of the Unified National System in 1988, a binary system existed in Australia. In 1987, there were 19 universities and some 46 colleges of advanced education, including institutes of technology. The universities were funded for both research and teaching while the colleges of advanced education and institutes of technology were funded for teaching only. As a result of *Higher Education: A Policy Statement* (Dawkins, 1988), the colleges of advanced education amalgamated with each other or with another university, and the outcome was 35 (now 36) public universities under the Unified National System. Under the Unified National System, all institutions and employees are claimed to be on the same footing with respect to titles, status, and funding.

\(^{10}\) This focuses on the various fiscal arrangements between the provider and receiver of funds. In the Australian context, this includes the relationship among the Federal Government, the states, and the government agencies.

\(^{11}\) This is based on the assumption that the market is the most efficient allocator and distributor of resources.

\(^{12}\) The underlying principle is that an increase in employees' effort level is required to reduce inefficiency within an organisation.

\(^{13}\) The underlying principle of job motivation theories based on performance-contingent rewards is that individuals will be motivated to improve their performances if their performance are tied to the receipt of extrinsic rewards.
developed economies, particularly since the early 1980s has tended to be based on the ideology of the neoclassical economics, this theory is a necessary building block for subsequent analysis. In addition, neoclassical economics seems to be the only complete and systematic form of analysis for efficiency which, as indicated earlier, is tied to PIs. The predominance of neoclassical economics in the Australian higher education system will be covered in Chapter Three. However, with neoclassical economics, very little is known about the internal workings of an organisation. Accordingly, any explanations about PIs based on the neoclassical framework may not be satisfactory. The X-efficiency theory (1966) developed by Harvard’s professor of economics, Harvey Leibenstein, offers a micro-micro view of the workings of an organisation. With its relatively more comprehensive coverage of the behaviour of individuals working in an organisation, a better framework for analysing PIs can be constructed. Since the Federal Government has tied specific PIs to its funding (notably the Research Quantum), job motivation theories on rewards tied to performance (Deci, 1992; Vroom, 1964) have been incorporated to provide a more complete analysis of the impact of PIs on academics’ job behaviour. The theories on fiscal federalism and neoclassical economics are applied at the macro- and micro-levels while the theories on X-efficiency and job motivation are used to analyse individual academic job behaviour.
Since the release of *Higher Education: A Policy Statement* (Dawkins, 1988), the Australian Government has taken major steps to develop and implement PIs in the higher education system (Australian Research Council, 1994; National Board of Employment, Education, and Training, 1993). The Composite Index was introduced in 1995 to allocate the Research Quantum of the operating grants to universities. The PIs, particularly those of research, were also used in the quality reviews of universities by the Government-initiated Committee of Quality Assessment of Higher Education (1994, 1995a, 1995b). The universities in turn have incorporated PIs for internal management, largely due to pressure from the Government. However, the consequences of the Government's emphasis on PIs for the institutions remains to be investigated.

Empirical studies on the effects of PIs in the Australian universities are not extensive, possibly due to the recency of their introduction. Most of the studies focus on the changes in the distribution of internal resources. For instance, Hattie, Print, and Krakowski (1994) and Hattie, Tognolini, Adams, and Curtis (1991) stated that some Australian universities have directly linked research performance to a component of department funding to urge high performance in research, and provide an incentive to the “under-performing” departments. In his survey of the Australian universities, Piper (1993) revealed that winning competitive research
funds is taken as an indicator of research performance in many universities, particularly those with well-established research records.

There is a general consensus that research and teaching constitute the main objectives, functions, and outputs of the universities (Cave, Kogan, and Hanney, 1990; CVCP/UGC, 1986; Johnes and Taylor, 1990; Segers, Wijnen, and Dochy, 1990; Whittington, 1994). To quote Sir David Derham, the then Vice-Chancellor of the University of Melbourne (cited in Teather, 1990, p. 111), “the purposes of a university are ... to acquire, to preserve, and to disseminate knowledge. Accordingly, this study will focus on the effects of the introduction of PIs on research and teaching in universities.

*Research*: The Federal Government has used many PIs to assess the performance of universities. In particular, three PIs for research - publications count, external research income, and higher degree research completions - make up the Composite Index which is used by DEETYA to allocate the amount of Research Quantum to the universities. In addition, external research income has been used by DEETYA in the form of the National Competitive Grants Index to determine the amount in another Federal research grants called the Research Infrastructure Block Grant. Furthermore, these three research PIs have been used repeatedly by the Government to assess the performance of the universities, such as in the quality reviews by the
former Committee of Quality Assurance in Higher Education (CQAHE) (1995b), and in numerous DEETYA’s reports (e.g., DEET, 1994). Therefore, this study will focus only on the effects of these three PIs for research, namely publications count, external research income, and higher degree research completions.

Teaching: The PIs for teaching used in this survey will be student evaluation of teaching, employment outcomes of graduates, and where appropriate, coursework student completions. The former is chosen because it has been used to assess teaching performance of academics within all four universities surveyed in this study although they may not be identical to each other in all respects. For instance, student surveys of teaching are required in application for promotion in the four universities studied. Employment outcomes of graduates is chosen as a PI for teaching because it is one of the teaching PI used by the Government (DEET, 1994; Kemp, 1998).

Other reasons for the choice of these indicators for research and teaching in this study are: (1) their application in institutional management, as revealed in the former Quality Assurance Programs (CQAHE, 1995a; CQAHE, 1995b), and (2) their popularity as methods of measuring the performance of universities as a whole as suggested in the literature (Cave, Hanney, and Kogan, 1991; Harris, 1989; Johnes and Taylor, 1990).
The study will be carried out at two levels: (1) the university (administration), and (2) the individual academic. The former is important because it has been said that the greatest opportunities and problems for PIs occur at the institutional level where the indicators are closest to the levels at which research and teaching are being shaped and carried out (Borden and Bottrill, 1994; Cave, Hanney, and Kogan, 1991). In order for PIs to result in either desirable or undesirable effects on research and teaching in the universities, they must first affect the individual academic's approach to research and teaching. Universities, just like other service-oriented organisations, are labour intensive. Therefore, the quality and quantity of their outputs, in this case, research and teaching, are heavily dependent on the input of the academic staff. Hanley (1993, p. 261) has pointed out that the academic staff “are the key input element as they form the machinery of production, the majority of the raw materials and they interact directly with the customers as part of the final product”. It is the culmination of individual input from academic staff which is the sum product of research and teaching in universities. Likewise, for PIs to have an impact on the individual academic, they must first be adopted into the university, affecting particularly the internal policies of the institution, including its links to the reward system. For these reasons, this study will investigate the effects of PIs on research and teaching at both the institutional and the individual academic levels.
The four higher education institutions chosen for this study are representative of the types of universities found in the Unified National System. They are a pre-World War II university, a post-World War II university, an ex-College of Advanced Education university, and an ex-Institute of Technology university. The first two institutions enjoy a research tradition while the latter two have a strong teaching tradition.

Apart from the institutional level, this study will examine the effects of the introduction of PIIs on the research and teaching undertaken by academics. Past studies on academics’ work in Australia have indicated changes to the pattern of research and teaching (Currie, 1996; Harman and Wood, 1990, Mahony, 1995). In his nation-wide survey of the work practices of Australian academics between 1977 and 1993, Mclnnis (1992, p. 9) observed that

The basic elements of academic work - teaching, research, administration and public service - have not changed much since the 1960s. But there have been changes to the emphasis given to these activities and to the ways in which they are carried out.

In particular, recent studies of the research activities in the Australian universities have indicated heightened pressures for academics to undertake more research, publish more, and apply for more research grants, particularly in the ex-Colleges of Advanced Education or “newer” universities (Harman and Wood, 1990; Moses, 1992).
Due to the reasons given above, it is therefore necessary to investigate the significance and direction of the effects on research and teaching as a result of the application of PIs, particularly the Composite Index, in Australian universities. The examination will occur at both the institutional and academic levels.

Study Justification

The need for this research can be justified on both theoretical and practical grounds. Specific justifications are given below.

Theoretical

This study provides a description of individual PIs, and the theoretical assumptions on which they have been established, and their application in Government and universities. Essential question addressed to the dissertation is whether the expectations raised by PIs have been matched by reality. The assumption of those who adopt PIs, almost as a matter of faith, is that they will improve performance and efficiency. Whether this is actually so, whether the use of this management tool actually motivates academic staff to work towards institutional goals is the subject of this thesis. It seeks to explain the origins, functions, and effects of the introduction of PIs in the Australian higher education environment, from their application by the Federal Government to the impact on the work activities of university academics. It also includes the
development of a methodology for the empirical assessments of the impact of PIs, the construction of scales, and a detailed description of the analysis.

The findings from this research can provide a strong empirical case for the view that PIs have a significant influence on the work practices of academic and management staff in higher education institutions. It shows that, when matched up with financial resources, PI is an effective tool for ensuring that specific goals and objectives are achieved in universities. However, the present study also demonstrates the detrimental effects of the application of PIs, such as engagement in strategic behaviour by some academics. This study shows that although PIs do affect the work activities of academic and management staff in universities, the consequences are not always positive.

Applied

This study is a response to recommendations for continuous evaluation of PI system (e.g., Cave, Kogan, and Smith, 1990). It has been acknowledged that it is difficult, if not impossible, to develop the “right” kinds of PI immediately (Posner and Rothstein, 1994). The practice of continual assessment is hence necessary for the refinement of PI system. This study is a step in that direction.
The findings from this study also highlight the need for an improved set of PIs. For instance, the fact that some academics have resorted to negative strategic behaviour raises concerns that the present set of PIs applied by the Government should be improved. The present study also covers suggestions by academics on the design and application of PI system in higher education. This study can thus contribute to a better PI system and improved institutional management practices.

Furthermore, the results from this study can provide a firm informational base for further research on PIs in Australia. While researchers in recent years have provided an insight into the use of PIs in Australia, the bulk of the literature on PIs still focus on the United States of America, the United Kingdom, and certain European countries, such as the Netherlands. On the other hand, “while much of this work is country specific, the common origin and heritage of universities in the western world mean that the results of this research have a broader relevance than only a country specific one” (Neumann, 1993, p. 33).

To sum up, the present study has the potential to provide useful knowledge, both in the applied and academic fields. The current interest in PIs is not confined to the higher education system but is manifested throughout the Australian public arena. Furthermore, this occurrence is found in the higher education sector in several western nations. Hence, the findings from the present study can be beneficial to other related
public sectors in Australia as well as to other higher education institutions overseas.\textsuperscript{14} Most importantly, this study has the potential to improve present knowledge about the impact of the use of PIs in higher education.

**Structure of the Dissertation**

This dissertation consists of eleven chapters. Chapter One has provided an indication of the approach to, and significance of, the research question - what have been the effects on research and teaching as a result of the application of PIs in Australian universities as perceived by the academics?

The next chapter addresses the literature on PIs. These include the benefits and limitations of PIs. Chapter Three lays the theoretical groundwork for the introduction, main functions, and likely effects of PIs. Four theories are used: (1) fiscal political federalism, (2) neoclassical economic theory, (3) X-efficiency theory, and (4) job motivation theories. A systematic analysis of the Australian Federal Government policies on higher education is attempted in Chapter Four, with particular reference to the move towards the introduction of PIs.

\textsuperscript{14} PIs have been implemented in the higher education institutions in Austria, Belgium, Canada, Finland, France, Germany, the Netherlands, the United Kingdom, and the United States of America (Gaither, Nedwek, and Neal, 1994; Hattie, et al., 1991; Currie and Newson, 1998).
Chapter Five deals with the framework of the study. Six hypotheses are developed for this study. The next two chapters are on study methodology. Chapter Six covers sample and questionnaire design, while Chapter Seven focuses on statistical methods employed for the study, as well as post-hoc verification of the dimensionality of the scales in the questionnaire.

The next three chapters present the results of the study in which the six hypotheses are tested. Chapter Eight covers the results of the impact of the introduction of PIs at the institutional level. The PI-based internal funding for research among the four universities in terms of the PIs used, and their weightings, are compared. A case study of an Australian university is then used to provide an in-depth analysis of the changes to institutional policies as a result of the introduction of PIs. Policies on PI-based funding to schools and promotions of academic staff are scrutinised in order to reveal the changes brought about by the introduction of PIs. The institutional research management plan has also been examined. Chapters Nine and Ten present the results of the survey of university academics. The findings from both questionnaires and interviews are provided. Chapter Nine provides the results of the questionnaires and the interviews on the attitudes of academics towards PIs in their institutions. The results in Chapter Ten are on the actual impact of the application of PIs on the work activities of the academics –
paperwork load, research and teaching. Chapter Eleven presents an integrative summary of the main findings of the study, concluding remarks, and implications of the results for the development and application of PIs.
CHAPTER TWO: LITERATURE ON PERFORMANCE INDICATORS

Introduction

Performance indicators (PIs) have emerged as a method used internationally to manage and assess higher education (Gaither, Nedwek, and Neal, 1994). PIs have been implemented in many countries, from the United States of America and Europe, to Australia. The OECD, for example, through its Institutional Management in Higher Education Programme has run workshops on PIs in higher education. Working groups on PIs in higher education have also been set up in countries, such as Australia (AVCC/ACDP, 1988), and the United Kingdom (CVCP/UGC, 1986). Labelled as essential management information (Sizer, 1990a) and a management tool (CVCP/UGC, 1986), PIs are expected to be increasingly used by the governments of the future (Carter, Klein, and Day, 1992; Hughes, 1994). Indeed, the push for PIs in the higher education sector has come mainly from governments (Spee and Bormans, 1991), and that includes Australia (Gaither, Nedwek, and Neal, 1994).

Concept of Performance Indicators

Despite world-wide interest, there is still no agreement on a single authoritative definition for PIs (Goedegebuure, Maasen, and Westerheijden, 1990a). When voicing their views on the merits and
demerits of the use of PIs, many authors appeared to avoid the task of defining PIs, preferring to assume that the terminology is universally understood and agreed (e.g., Hughes, 1994). The authors who have attempted to define PIs usually come up with their own individual interpretations. These range from the very general "... any information about the performance of an enterprise or system of management" (Watson, 1994, p. 13) to the more specific "... statements, usually quantified, on resources employed and achievements secured in areas relevant to the particular objectives of the enterprise" (CVCP/UGC, 1986, p. 1).

However, there appears to be some general agreement in five areas. First, PIs are data (Cave, Hanney, and Kogan, 1991; Dochy, Segers, and Wijnen, 1990a). Second, the data can be expressed in either quantitative or qualitative form (Goedegebuure, Maasen, and Westerheijden, 1990a; Osborne and Gaebler, 1992). In practice, however, PIs tend to be mainly quantitative in nature. For instance, the PIs in the Composite Index used to distribute the Research Quantum to universities across Australia fall into this category. One reason for the preference for numerical indicators is that there are difficulties associated with qualitative PIs, from developmental stage to evaluation. In contrast, quantitative PIs tend to be relatively easy to construct and understand. Hilmer (1991, p. 9) remarked that, "there is an understandable tendency when measurement is difficult to 'look where
the light is". In other words, factors that are difficult to identify and measure receive less attention than those that are more visible. Another attractiveness of numerical Pls is that they are comprehensible to a wide audience (Ruppert, 1995). Furthermore, quantitative Pls "... readily lend themselves to comparison ..." (Brennan, 1990, p. 110). This view is also supported by Ruppert (1995, p. 17): "Quantitative data are more amenable to presentation in tabular form and allow for institutional comparisons ...". Another reason for the popularity of quantitative Pls is that numbers are synonymous with objectiveness and hence accuracy. Juran (1995, p. 239) had commented that, "once the human race had invented counting, it learned to make wide use of numbers as a means of precise communication". The image of "hardness" associated with quantitative Pls means that they are more attractive for justifying decisions than the "softer" qualitative information (Cave, Kogan, and Hanney, 1990; Harris and Dochy, 1990). This is particularly relevant in times of resource constraint where the government must be seen to be making rational decisions (Cave, Hanney, and Kogan, 1991). In the Netherlands, Pls are "... seen as a way of providing an incentive to make the qualitative reasoning more precise" (Cave, Hanney and Kogan, 1991, p. 158). However, the temptation to concentrate solely on quantifiable Pls means that attention and priority may not be given to those activities or qualities which are less easily measurable and intangible, but are arguably equally or even more important (Murphy and Cleveland, 1991; Weller, 1994). An emphasis on easily countable
aspects can therefore cause an organisation to lose "... too many shades of reality" (Dochy, Segers, and Wijnen, 1990a, p. 151). This has led Findlay (1990, p. 132) to remark that, "the principle must be to measure what should be evaluated as accurately as possible, rather than to provide information just because it can be easily measured".

The third feature of PIs is their uniform collection at regular intervals (AVCC/ACDP, 1988; Fitz-Gibbon, 1990). Fourth, PIs are usually seen in the light of clearly stated organisational goals and objectives (Ball and Wilkinson, 1994; Vroeijenstijn and Acherman, 1990). To take an example, Cave, Hanney, and Kogan (1991) regarded PIs to be measures of progress relative to objectives. In this respect, PIs are used to monitor performance in relation to goals or objectives. Far from being "hard" and scientific, PIs incorporate value and judgmental uncertainties (Astin, 1991; Patterson, 1988). Even within those features that can be quantified, a decision has to be reached on what to measure, and what not to measure. In this context, PIs are not absolute measures. Indeed, the partial nature of PIs have been differentiated from the absolute measures of simple indicators (Cuenin, 1986), and statistics (Spee and Bormans, 1991). When put together, PIs can be defined as qualitative or quantitative data which are collected uniformly at regular intervals to monitor the achievement of specific objectives.

15 The terms "simple indicators" and "statistics" have been conceptualised as quantitative data of empirical description (Cuenin, 1986; Spee and Bormans, 1991).
Dimensions of Performance Indicators

PIs are often broken up into several categories. A selection of these is presented in Table 2.1.

<table>
<thead>
<tr>
<th>Categories of indicators</th>
<th>Authors' description</th>
<th>Authors</th>
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<tbody>
<tr>
<td>Internal</td>
<td>Used inside an organisation to assess and monitor achievement, and to make changes to ensure that objectives are being met</td>
<td>Mayo (1990)</td>
</tr>
<tr>
<td>External</td>
<td>Reported outside an organisation to indicate how well the overall objective was met, e.g., in annual report</td>
<td></td>
</tr>
<tr>
<td>Prescriptive</td>
<td>Monitor progress toward achievement of objectives</td>
<td>Carter, Klein, and Day (1992)</td>
</tr>
<tr>
<td>Descriptive</td>
<td>Record change</td>
<td></td>
</tr>
<tr>
<td>Proscriptive</td>
<td>Specify things which should not occur</td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td>Relate to the quantifiable inputs and outputs of an organisation</td>
<td>Sizer (1982)</td>
</tr>
<tr>
<td>Progress</td>
<td>Relate to the achievement of objectives</td>
<td></td>
</tr>
<tr>
<td>Input</td>
<td>Relate to human and financial resources employed by institutions</td>
<td>CVCP/UGC (1986)</td>
</tr>
<tr>
<td>Process</td>
<td>Relate to the use of resources by the institutions, and to the management effort applied to the inputs and to the operation of the organisation</td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td>Relate to what has been achieved - the products of the institutions</td>
<td></td>
</tr>
<tr>
<td>Input</td>
<td>Resources needed to produce a service</td>
<td>Carter, Klein, and Day (1992)</td>
</tr>
<tr>
<td>Process</td>
<td>Way in which service is delivered (involve some measurement of quality)</td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td>Activities of an organisation, or the services it provides</td>
<td></td>
</tr>
<tr>
<td>Outcome</td>
<td>Impact of the service, e.g., healthier individuals</td>
<td></td>
</tr>
</tbody>
</table>
The latter two sets of PIs (input-process-output, and input-process-output-outcome) in the above table are linked to the production model in higher education, which will be covered in Chapter Three. The Australian Federal Government has indicated an interest in these sets of indicators (CQAHE, 1995; DEET, 1989). An obvious example is the PIs in the Composite Index of the Research Quantum which are based on inputs and outputs.

Benefits of Performance Indicators

Although the literature reveals a wide range of roles, there continues to be disagreement on the specific purpose PIs are supposed to serve in higher education (Roberts, 1990). PIs have been claimed to be useful for monitoring performance, providing guidance towards achievement of goals (including feedback on performance, and achievement of efficiency and effectiveness), evaluating performance, and allocating resources.

Monitoring performance

One of the assumed advantages of using PIs is that they assist in monitoring performance. PIs can be utilised to monitor the performance of universities or departments, trends in performance within universities, and fulfillment of contractual obligations (Ball and Wilkinson, 1994; Sizer,
1990a). In this way, PIs improve the transparency of universities and the higher education system (Sizer, 1991; Sizer, Spee, and Bormans, 1992). This can in turn assist in improving accountability (Cave, Hanney, and Kogan, 1991; Jowett and Rothwell, 1988). This might be useful not only for the institutional management but also for employees who can use PIs to indicate that they have carried out their responsibilities successfully.

Guiding towards goal achievement

In addition, it has been suggested that PIs are useful as a guide to the achievement of objectives or goals. The attractiveness of this role is that "departments would at least know the rules and goals to strive towards" (Hattie, et al., 1991, p. 67). Because of their linkage with goals and objectives, PIs can be used to identify areas which are doing well, and areas which require further enquiry (Mayo, 1990). On this basis, they are identical to "tin-openers", as explained by Carter, Klein, and Day (1992, p. 49): "by opening a "can of worms" they do not give answers but prompt interrogation and inquiry, and by themselves provide an incomplete and inaccurate picture". They thus serve as an aid to judgement (Cave and Hanney, 1990).

By serving as a guide to goal achievement, PIs provide the necessary feedback to assist in developing and improving organisational activities (Pollitt, 1990; Spee and Bormans, 1991). Again, this is likely to benefit
the institution as well as the employees. As an example, regular feedback (from both students and peers) is essential for improvement in university teaching (Kennedy, 1993).

Where the goals are the improvement of efficiency and effectiveness, PIs have been perceived to be useful for making national comparison in efficiency and effectiveness in higher education (Gaither, Nedwek, and Neal, 1994; Sizer, 1990b; Spee and Bormans, 1991; Whittington, 1994), including the identification of areas in which efficiency and effectiveness can be improved (Borden and Bottrill, 1994; Ruppert, 1995). PIs have been described as being able to signal areas of potential cost savings by comparing patterns of inputs and outputs among universities, or within a university over time (Pollitt, 1987; Pollitt, 1990).

Evaluating performance

Another role suggested for PIs is in evaluation. This involves assessing the ultimate impact of the actions taken (Mayston, 1985; Pollitt, 1990). The assumption is that the actual performance of the university or department will be evaluated against the objectives which are likely to be expressed in quantitative terms to facilitate or enhance such measurement (Gaither, Nedwek, and Neal, 1994; Spee and Bormans, 1991). In this situation, PIs are presumed to operate as “dials”, providing more or less accurate measures of the inputs, processes, outputs, and
outcomes of higher education (Carter, Klein, and Day, 1992). As dials, PIs are argued to be capable of serving a direct role in the regulation of resources (Cave and Hanney, 1990).

Allocating resources

A controversial yet popular role for PIs lies in the allocation of resources. PIs are seen to be useful for assisting, justifying, and even improving resource allocation (Brennan, 1990; Cave, Hanney, and Kogan, 1991; Spee and Bormans, 1991). At all times, the government must be seen to be making rational decisions, particularly in the fair allocation of resources. This becomes crucial in times of shortage in funds where it cannot afford to deal in abstractions or make arbitrary cuts but must find rational bases upon which its judgement can be justified (Cave, Hanney, and Kogan, 1991; Polster and Newson, 1998). PIs have been claimed to provide a relatively firm and rational basis for selective decision-making (Goedegebuure, Maasen, and Westerheijden, 1990b).

Other benefits

Other benefits of the application of PIs include assistance in planning (Tognolini, Adams, and Hattie, 1994), and in development of policies (Dochy, Segers, and Wijnen, 1990b; Teather, 1990). PIs may also be used to retain control over operations or implementation of policies
(Carter, Klein, and Day, 1992; Jowett and Rothwell, 1988). They can be
used to obtain early warning signs of a deterioration in performance so
that corrective action can be taken (Burningham, 1990).

Limitations of Performance Indicators

However, it is possible that PIs will not achieve their intended results
(Bowerman, 1995; Day and Klein, 1987; Humphrey, Miller, and
Scappens, 1993). Just like any other tool, PIs have their limitations. A
common complaint about PIs is their inability to capture the full
complexities of work performance in university academics (Rutherford,
1987). PIs have been associated with an increase in control by the
Government over the university academics (Currie and Newson, 1998).
Furthermore, when used outside a proper frame of reference, PIs may
bring about dysfunctional effects (Cave and Hanney, 1990). The three
main unfavourable consequences of the introduction of PIs cited in the
literature are an increase in the amount of paperwork, goal
displacement, and strategic manipulation.

Ineffective representation of work performance

A common shortcoming of PIs, pointed out by their critics, is their
inability to capture the true picture of higher education given that the
goals of higher education and judgements made about higher education,
cannot always be measured and compartmentalised (Barnett, 1988; Cave and Hanney, 1990; Findlay, 1990). Accordingly, the representation of academics' work performance may be incomplete or misleading (Rutherford, 1987). Taking research as an example, there are several ways to evaluate research performance, as shown in Table 2.2.

**Table 2.2**

<table>
<thead>
<tr>
<th>Dimensions of research performance</th>
<th>Some suggested performance indicators</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>Publications count</td>
<td>Phillimore (1989)</td>
</tr>
<tr>
<td>Impact</td>
<td>Citation count</td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td>Government grants, research studentship, peer review, awards</td>
<td></td>
</tr>
<tr>
<td>Utility</td>
<td>External income, patents, licenses</td>
<td></td>
</tr>
<tr>
<td>Quantity</td>
<td>Publications count</td>
<td>Harris (1990)</td>
</tr>
<tr>
<td>Quality</td>
<td>Peer review</td>
<td></td>
</tr>
<tr>
<td>Importance</td>
<td>Peer review</td>
<td></td>
</tr>
<tr>
<td>Impact</td>
<td>Citation count</td>
<td></td>
</tr>
<tr>
<td>Quantity</td>
<td>Publications count</td>
<td>Linke (1995)</td>
</tr>
<tr>
<td>Quality</td>
<td>Citation count</td>
<td></td>
</tr>
</tbody>
</table>

In determining the amount of Research Quantum to be distributed to universities in Australia, the Federal Government uses the Composite Index consisting of publications count, external research income, and higher degree research completions. While publications count and external research income are more or less widely accepted in the academic community as some of the relevant PIs for research, they can
only capture certain aspects of research performance, as shown in Table 2.2. It is also apparent from the table that "there is clearly room for dispute as to what aspects of research performance are most important and how they should be measured" (Smith, 1987, p. 311).

The challenge of finding suitable PIs for teaching is even more problematic. Teaching is believed to be a complex activity, comprising different dimensions, such as teacher interaction with students, clarity, and knowledge of the subject (Marsh and Roche, 1994). In fact, there is a deep-seated conviction among researchers and practitioners that PIs for teaching are insufficiently refined to capture the whole picture of teaching quality. Barnett (1989, p. 26) had remarked that "it is as if, at the moment, there is a barrier between performance indicators and teaching quality, so that teaching quality is something of a mysterious entity". The most probable explanation is that, at present, there is no universal agreement on a clear and specific criterion of effective or good teaching (Lally and Myhill, 1994; Marsh, 1987). Furthermore, like research, the assessment of teaching performance is influenced by both individual and environmental factors.

This leads to the assertion that there is no uniform basis for comparison (Yorke, 1989). Since standardisation is presumed to be necessary for comparison to occur, the fact that universities, disciplines, and academics differ in many respects means that PIs cannot be used to
compare their performance (Cave, Kogan, and Hanney, 1990; Yorke, 1989). For instance, universities differ in their goals and environment, disciplines differ in their research tradition and publishing mode, and academics differ in their personal characteristics. Moreover, the results obtained from PIs can reflect circumstances other than improved performance. For instance, success in winning external research grants when used as an indicator of research performance

... may measure (a) the fact that particular kinds of research are very expensive, or (b) the fact that a particular research field is currently fashionable and so can draw on ample sources of funds, rather than the fact that a department has an exceptionally high standing in the market (Klein, 1979, p. 314).

Similarly, publications count

... may compare counts from disciplines with many publication outlets with those from disciplines with few outlets. They may count the contributions of coauthors the same as contributions of single authors and consider the value of a shorter paper to be the same as that of a longer paper. And they may give more weight to the "operator" who produces quantity than the scholar who produces quality (Creswell, 1985, p. 10-11).

The advantages and limitations of selected PIs for research and teaching are contained in Appendix 2.
Increased control by the government and university management

Another common limitation of PIs is their association with increased control by the government and university management. For instance, although the role of PIs mentioned earlier of the ability to retain control over operations or implementation of policies is perceived to be a benefit by the government and university management, the literature on PIs has indicated that PIs have more often been regarded as an obstruction to the autonomy of academics' work. In the United Kingdom, Carter (1994) had demonstrated that, instead of being a tool of "hands off" control by government, PIs have amounted to an unwelcome form of "backseat driving" because of obstacles, such as, uncertainty with service objectives, and difficulties with measurement of outputs and outcomes. In the Netherlands, Vroeijenstijin and Acherman (1990) labelled this phenomenon as "remote control driving" by the government. In Australia, Currie (1996) pointed out that although the "steering from a distance" mechanism increased devolution, it also increased central control. More importantly, PIs are believed to serve the interests of the "top" - government and management - to the exclusion of the rank and file (Currie and Newson, 1998; Newson and Buchbinder, 1988; Zifcak, 1994). Accordingly, PIs have been disfavourably regarded by the university academics as a weapon of control, intruding into the autonomy of their work.
Increased paperwork load

The term "paperwork" is defined as the administrative work resulting from the introduction of PIs. This includes the administrative work involved in providing information on the PIs as well as the administrative work associated with these activities (ie. publications, external research grant applications, and supervision of higher degree research students), such as the administrative work required to apply for external research grants.

Post-1987 studies on Australian universities have revealed that the amount of paperwork undertaken by the academics has increased (Mahony, 1995; Marginson, 1995; Meek and Wood, 1997: Vidovich and Currie, 1998). The implementation of PIs is likely to be one of the contributing factors. A survey carried out by Harman and Wood (1990) reported one academic's complaint of "too much paper shuffling masquerading as administrative accountability" (p. 66). Anderson (1993, p. 430) predicted that in the case of academics, "more time would be devoted to administrative activities, thereby leaving less time to spend on research and teaching endeavours". Vidovich and Currie (1998, p. 206) referred to these accountability mechanisms as "distractions from the "main game"".
The rise in the amount of paperwork can also be due to specific PIs. External research income is an example. Coupled with a fixation on the "search for money" in a period of tight budgets, the introduction of external research income in the Australian higher education sector as one of the PIs used to determine selected Federal funding - the Research Quantum in the operating grants, and the Research Infrastructure Block Grants - means that pressures to undertake research and apply for research grants may rise. In addition, in its report, the Industry Commission (1995) pointed out that there has been a progressive reduction over the years in the success rate in one of the major sources of research funding for Australian universities, the Australian Research Council. Thus, it is likely that an academic will expend considerable effort in preparing and applying for research funds. This has been mentioned, for example, in the *Campus Review* (Quest for research funds, 1996, p. 9):

> The creation of a successful research grant application has become time-consuming and anxiety-provoking... Today even researchers with excellent research records are learning that their grant proposals may not be funded. This uncertainty has encouraged academics to submit multiple applications to different research funding agencies.

Williams (1992, p. 138) also argued that

> Competitive resource allocation results in excessive amounts of academic staff time and other resources being devoted to preparing proposals and accounting for the ways in which funds are used.
Moreover, since some schemes have their own areas of interest or priorities, such as the identified areas of national priority in the Government’s National Priority Fund\(^{16}\), there is a fear that the goals pursued by the universities will change in accordance to those of their main sponsors.

Goal displacement

There is a sharpening concern that the application of PIs can contribute to organisational behaviour that maximises performance on those aspects emphasised and measured by the indicators to the neglect of other objectives of the organisation (Corbett, 1992; Poister, 1992). Since public universities are highly dependent upon the government for funding, there is a strong possibility that the government’s goals and objectives will occupy a higher priority than those of the institutions. Barnett (1992, p. 89) concluded that

Performance indicators are not, therefore, just measures which those on the outside of the academic world use to judge institutions. They also become the means by which institutions organize and direct themselves, and judge their own performance. And the intrinsic character of PIs is such that they will tend to divert institutions’ attention away from their essential purposes, values and continuing processes.

\(^{16}\) This annual fund was set up in 1989 from funds in the annual operating grants (one per cent) "... to support projects of a non-recurring or short-term nature" (Dawkins, 1988, p. 81) and allocated based on "... institutions’ responses to specific Commonwealth initiatives or the identified areas of national priority" (ibid).
This view is shared by other authors. In the Netherlands, Vrolijkstijin and Acherman (1990, p. 97) warned that “the risk of indicators becoming criteria is very real”. In the United States of America, Porter (1988, p. 505) voiced his concern that “indicators could become more than just objective data about the health of the education system; they could become working definitions of what constitutes good health”.

In Australia, there are over forty competitive Federal Government grant programs accessible to the universities (Industry Commission, 1995). Marginson (1995) saw these competitive schemes as part of the Federal Government’s steering mechanisms. In many cases, the bidding institutions have to adapt their bids and activities to meet the requirements of the government. This, he maintained, would result in conformity with a range of government policies. Although universities have a choice not to participate, those which abstain will lose money, and “in practice, no institution and department can abstain from all such exercises” (Marginson, 1995, p. 8). He coined this type of autonomy “freedom to follow someone else’s agenda” (p. 9). The end-result of goal displacement is that aspects of the job which are measured tend to be performed well, while aspects of the job which are not measured but are just or even more important tend to be ignored or performed poorly (Steers and Porter, 1991).
Research over teaching dilemma

The fact that the Federal Government has tied PIs to research funding with no similar scheme for teaching can lead to a focus on research at the expense of teaching.¹⁷ In its report on the Australian higher education system, the OECD (1997) warned that the establishment of Composite Index-Research Quantum allocation

... has implications for teaching, not just because research activities can claim that they earned the money, but also because the use of performance-based funding for research but not for teaching sends a message to staff that the former should be given priority (p. 25).

Indeed, Piper’s (1994, p. 11) observation of an Australian university led him to comment that “departmental effort and expenditure on research has grown, some say at the expense of teaching ... the change in formula was principally a policy signal about how departments were expected to behave ...”. Anderson (1988) explained the dichotomy between research and teaching in the following way:

... many staff are encouraged to undertake research not because they anticipate contributing in a very significant way to their discipline, but rather because they see research publication per se as a means to a promotional end. In my

¹⁷ Research occupied a superior position to teaching even before the introduction of PIs in the Australian higher education, at least in the pre-World War II universities. The ex-colleges of advanced education and ex-Institutes of Technology were funded only for teaching before the formation of the Unified National System. The importance attached to research (in Australia and overseas) has a great deal to do with money and prestige: “money talks in academia as elsewhere, and what that money says on most campuses is “do research”” (Sowell, 1990, p. 68).
experience it is rare to see either excellence in teaching, or excellence in scholarship, rewarded significantly for its own sake. In my judgement that is a serious commission of error on the part of university administrations, stemming from the fact that research productivity can provide relatively simple performance indicators compared with the acknowledged difficulty of assessing performance in teaching and/or scholarship (p. 71).

Kerr (1989, p. 406) echoed this view:

Society hopes that teachers will not neglect their teaching responsibilities but rewards them almost entirely for research and publications... Rewards for good teaching usually are limited to outstanding teacher awards, which are given to only a small percentage of good teachers and which usually bestow little money and fleeting prestige. Punishments for poor teachers also are rare. Rewards for research and publications, on the other hand, and punishments for failure to accomplish these, are commonly administered by universities at which teachers are employed. Furthermore, publication-oriented resumes usually will be well received at other universities, whereas teaching credentials, harder to document and quantify, are much less transferable. Consequently, it is rational for university teachers to concentrate on research, even if to the detriment of teaching and at the expense of their students.

The quality dilemma

The displacement of goals can also mean the adoption of a short-term outlook by the institutions at the expense of long-term benefits, possibly because financial pressures will induce those institutions to choose projects that are less risky, and which produce quick but trivial results (Carley, 1988; Taylor, 1987). The outcome is that quality will be sacrificed (Cave, Kogan, and Smith, 1990; Jackson and Palmer, 1989).
Taylor (1987) predicted that the quality of research output may suffer from pressures to produce research results quickly. He believed that a short-term approach would have a detrimental effect on basic research (which tends to run for longer periods), and may result in more academics to undertake income-generating project work and consultancy over fundamental research. Likewise, Williams (1992, p. 139) stated that

More difficult to be optimistic about is the concern that much teaching and research with long-term value may be lost if higher education institutions have to show clear evidence of immediate value for money in all their activities. Much of the most worthwhile research and inspiring teaching is done by unworldly academics who are not at their best in a world of glossy prospectuses, public relations presentations and rigid adherence to detailed budgets.

A short-term vision will not only prompt an emphasis on research projects in which the risks are lower, but it may also encourage a shift toward those projects where the outcomes are more measurable (Cave and Hanney, 1990). As discussed earlier, not every goal or activity is quantifiable. The implication of a focus on numerical PIs is that goals and objectives which are less easily measurable but which are important for the effectiveness of an organisation, such as quality, can be overlooked because they are difficult to measure (Morrison, Magennis, and Carey, 1995). There is thus a concern that quantitative PIs may be endowed with unwarranted importance. In the United Kingdom, the development of PIs has been "... accompanied by an insistence on the
over-riding virtue of precise measurability which precludes consideration of many crucial activities which are resistant to numerical reduction” (Allsop and Findlay, 1989, p. 107).

Hence, the general concern among the higher education sector appears to be that PIs will set the criteria for performance, and, in the process, will encourage institutions to direct their efforts away from their functional objectives to concentrate on those measured and funded by the indicators. This concern is exacerbated by the measurability mentality of some governments where goals and PIs are reduced to numbers, mainly to make inter-institutional comparisons possible.

Strategic manipulation

It is also widely believed that the introduction of PIs can invite behaviour that “scores”, that is, persuades individuals to cheat directly (through presentation of invalid data) or indirectly (through adaptation in processes) (Goedegebuure, Maasen, and Westerheijden, 1990a; Morrison, Magennis, and Carey, 1995). Strategic manipulation arises when the employees are pressured or motivated “to behave in ways which are dysfunctional from the point of view of organizational effectiveness but which assures good scores on the measures” (Porter, Lawler, and Hackman, 1975, p. 325). Findlay (1990, p. 131) had commented that “the introduction of indicators from outside always
prescribes a specific value system which will bring about changes, adaptations and distortions in the process under scrutiny’. Cave, Hanney, and Kogan (1991) also agreed that “... the partial nature of most indicators leaves ample scope for strategic behaviour on the part of the unit being appraised” (p. 27), particularly in

... higher education, where departments or institutions have considerable scope for determining their input and output mix, and where in many cases members of the institutions themselves largely determine the “quality” of their output by determining students’ degree classes or the completion rate of research degrees (p. 27).

Manipulation and even goal displacement arise for two principal reasons: income and reputation.

The income factor

The universities’ aim to maximise revenue arises from the fact that in this period of financial constraint, “having a few million or even just a few thousand extra can generate an operational flexibility not otherwise possible ...” (Wilson, cited in Maslen, 1995, p. 6). Since the government is often the major source of income for the higher education institutions, the latter’s aim to maximise revenue will contribute to “the cosmetic nature of activities that can result from anxiety to make the right impression” (Kogan, 1989, p. 23). Similarly, within an institution, the introduction of PIs, particularly when linked to the institutional incentive
system, can encourage goal displacement and strategic behaviour among the employees. As pointed out by Porter, Lawler, and Hackman (1975), organisations often end up motivating the kind of behaviour they reward.

The status factor

Apart from the attractiveness of income, strategic manipulation can arise because of the status attached to favourable comparisons. Inevitably, PIs will be used to make comparisons, “against oneself, a norm, or others” (Gaither, Nedwek and Neal, 1994, p. 24). The publication of PIs in Diversity in Australian Higher Education Institutions 1994 (DEET, 1996) is an example. The presentation of data among similar organisations, such as the higher education institutions, will ultimately amount to comparisons being made, even in the absence of formal ranking. Such comparisons are likely to facilitate the identification of departments or institutions as above par (the “winners”) or below par (the “losers”), and will thus affect public reputation (Gaither, Nedwek and Neal, 1994). No institution likes to be compared with others if the exercise is going to make it look bad (Cave, Hanney, and Kogan, 1991; Mertens and Bormans, 1990). Skuja (1996, p. 6) remarked that although DEETYA stressed that its

... set of institutional comparisons was intended to be just “useful” information ... who can resist an official publication
that compares the performance of institutions in a competitive environment like the higher education sector? Even if ranks are not specifically tabulated in such a report, the most compelling questions for many readers are - who is best, who is worst and how does A compare with B?

Taking the former Quality Assurance Programs (QAPs) in the Australian higher education sector in 1993 and 1994 as examples:

... the fact that the six ranking categories of the first QAP round were collapsed into three in the second round and is likely to be made multi-dimensional in the third round cannot conceal the reality that institutions will still be given rankings which, for good or ill, will be used to influence the public's perception of the quality of individual institutions (Harrold, 1995, p. 9).

Universities will view institutional ranking as important because of the prestige and publicity attached to them, particularly as it relates to national and international access to students and staff (Harrold, 1995; Maslen, 1995). In government policies on higher education, such as Higher Education: A Policy Statement (Dawkins, 1988), the universities were reminded and encouraged to seek alternative sources of funds. With the introduction of full fees for overseas students in 1990, students outside Australia became a valuable source of income. Similarly, with the removal of regulations for fees charged to them, postgraduate students provide an additional source of revenue for the universities since 1994. Marginson (1995, p. 8) noted that

Higher education always was a quasi-market competition for high-scoring school leavers, but specifically economic
markets are now established for international students, postgraduate education, and continuing professional education …

The implication that university ranking will somehow be used to affect the student’s choice of university means that “... where a university was placed suddenly counted a great deal” (Maslen, 1995, p. 6). This was also expressed by Skuja (1996, p. 8): “for prospective students, the indicators, through publications such as the Good Universities Guide, provide information that can assist in selecting the “best” university to attend”. Likewise, in 1993 and 1994, Professor Brian Wilson, the Chair of the former Committee of Quality Assurance Program reported that, “… when we started out, money was the big incentive. But after the first report, there were institutions that would have been quite happy to give the money up if they could have got into group one!” (Maslen, 1995, p. 6). This became more pronounced in 1997 with the Coalition Government’s cut to higher education expenditure. Across Australia, universities were reported to have renewed their income-earning efforts from non-government sources (Maslen, 1996). Therefore, reputation and the ability to obtain external funds are regarded as essential matters for higher education institutions. Similarly, the introduction of PIs in an institution can motivate its members to make their performance look better than it actually is. This can be due to their desire for external rewards, such as promotion, and peer recognition. Indeed, Johnes (1994) applied Goodhart’s (1975) law to explain this phenomenon:
Once an indicator of performance is defined and used to influence resource allocation, those whose performance is being evaluated will seek out ways of improving their position as measured by the chosen indicator; this need not imply a genuine improvement in productivity. For example, in the case of publications analyses, researchers will target their activity in such a way as to maximise measured output (p. 213).

The possibility of abuse with specific performance indicators

Strategic manipulation or “gaming” may arise in response to the introduction of specific performance indicators. These include publications count, external research income, and completion rate (both coursework and higher degree research).

Publications count

Publications count may be taken as an example. A common suggested undesirable effect of using publications count as a PI for research is the pursuit of quantity over quality as a result of heightened pressure to publish, or the “publish or perish” syndrome (Whitely and Frost, 1971). It is a fact that papers “... vary in quality and in what they contribute to a subject” (Johnes and Taylor, 1990, p. 149). Publications count has thus been condemned for providing “... equal credit to poorly conceived papers appearing in badly edited journals as well as to well-written papers in quality journals” (Creswell, 1985, p. iv). The application of a
weighting scheme to reflect the relative merits of the different forms of publication, as done by the Australian Federal Government\(^\text{18}\) can reduce some categorical bias. However, since disciplines have their own preference modes of publication (Cave, Kogan, and Hanney, 1991; Ramsden, 1994),\(^\text{19}\) the use of weights for different types of publications still fails to address the disparity in performance within each category (Linke, 1995). The fear is that by concentrating on publications count, quality may be overlooked and sacrificed as academics strive to maximise their number of publications (Barnett, 1992; Collini, 1989). A study undertaken by Moses (1986) in an Australian university found that when academics perceived that their university wanted them to do more research, particularly more publications, they were tempted to publish insignificant data, and submit sub-standard publications. Furthermore, the use of publications count has been seen as a contributing factor to the length of publications (Creswell, 1985), encouraging the publication of short articles in an attempt to maximise research output (Johnes and Taylor, 1990).

Another possible danger of the selection of publications count as an indicator for research is that the pattern of publication can change (Cave and Hanney, 1990, Hattie, 1990). This was acknowledged by the Smith

\(^{18}\) A weight is assigned to different types of publications, e.g., refereed versus non-refereed journals.

\(^{19}\) For instance, medical researchers tend to favour journal articles while computer scientists usually opt for refereed international conference proceedings (CQAHE, 1995b).
Committee (DEET, 1989, p. 104): “The establishment of performance indicators, if linked explicitly or implicitly with funding, carries the risk of changing the pattern of output, particularly with respect to publications”.

Johnes (1994, p. 213) provided an illustration: “if the performance indicators used is the total of refereed journal articles authored, researchers would switch their activity from writing books to writing articles”.

Another dysfunctional result of using publications count to measure research performance is the adoption of a strategy by academics to submit multiple, similar papers to as many journals as possible. The reasons for this have been identified by Klein (1979, p. 313):

The entrepreneurial academic has every incentive to serve up the same meal with different sauces: to re-use his material, slightly reworked perhaps, in a variety of contexts. It is depressingly frequent - as one reads through the various learned journals - to find slightly revamped versions of the same article popping up again and again. The strategy seems to be: if you have got nothing new to say, then say it in a new journal - hoping that you will also be addressing a new audience. The growth in the number of learned journals may thus be as much an index of the expanding need to multiply publications for career advancement as of expanding knowledge.

Similarly, in Australia, Maslen and Slattery (1994, p. 118) indicated

... the habit of researchers of presenting a series of brief and often preliminary findings in a variety of journals, rather than continuing the research for a lengthy period to obtain a complete and accurate picture. The aim, according to cynics, is to produce the “minimum publishable unit” using the least
amount of research possible that can still justify publication. Such a splintering of publications ... makes it difficult for others to obtain an accurate and comprehensive view of the research, clutters the journals and penalises those who publish only after completing a lengthy research program. Yet this is standard practice and to survive in the competitive research game, scientists feel obliged to participate.

External research income

Similarly, the adoption of external research income as a PI for research can produce undesirable effects. An implication of using a “dollars count” on research output is that pressures to apply for external grants will intensify. Reports of changes to the research activities of the Australian academics have included more competition for resources and more work involved in preparing research proposals (McInnis, 1992). There is now not only pressure for academics to undertake more research and publish more, but also to apply for more research grants, particularly in the “newer” universities (Harman and Wood, 1990). In her study on the Australian universities under the Unified National System, Moses (1992, p. 7) reported that

... the institutional pressure on staff in universities to obtain external research funds and particularly competitive funds from the Commonwealth, (has) accelerated in the old universities and is oppressive in some of the newer ones.

By concentrating on applying for research grants, academics can be diverted away from their other duties, such as research and teaching
(Cave, Hanney, and Kogan, 1991). West, Hore, and Boon (1980, p. 33) had observed that

... most professional academic organisations in the USA provide training courses in grant-getting techniques. This indicates that there are skills that can be learned that aid in gaining grants, skills that are not necessarily research skills.

It has even been postulated that some academics may be encouraged to over-fund their research grant applications even if they can carry out the research satisfactorily on fewer resources, in a bid to obtain a higher ranking on research performance (Johnes and Taylor, 1990).

Completion rate

The use of another PI, the completion rate is also plagued with problems. Student (coursework) completion rates have been used as a PI for teaching in many Australia universities just as higher degree research student completion rate has been applied as an indicator of performance for research. While the practice of influencing the completion rate is restrained both by "... a sense of academic and professional responsibility and by the system of accreditation and the external examining of undergraduate and postgraduate degrees and research theses" (p. 100), the adoption of completion rate as a definition of success may increase the chance that academic judgements become distorted (Cave, Hanney, and Kogan, 1991). In a bid to minimise the time of completion, the quality of research can be affected. Cave,
Hanney, and Kogan (1991, p. 99) provided an illustration of doctoral degree programmes under which: "students would be admitted to undertake narrow, superficial or barely original research assured of completion within four years". The Smith Committee (DEET, 1989) also suggested that the linkage of PIs to funds may affect teaching in terms of pass rates and hence graduations.

The quality dilemma

Just as one of the effects of goal displacement is a deterioration in quality, the application of specific PIs may not only encourage the occurrence of dysfunctional work behaviour but could also have a negative effect on the quality of research and teaching. For instance, the publications count which is used by the Australian Federal Government does not consider the quality or significance element of different journals within each discipline, and instead assumes that all refereed journals are equal in quality. Hence, quality may suffer as the quantity of publications is pursued (Barnett, 1992; Collini, 1989).

In addition, the current incentive scheme in several Australian universities which rewards one activity of academics (research) while ignoring other activities (e.g., teaching and community services) can mean that the quality of the latter activities may suffer. As an example, Cave, Hanney, and Kogan (1991, p. 77) remarked that
Teaching quality would decline as institutions become aware that it had no impact on allocations. There is evidence from a number of countries of both increasing the pressure to appraise teaching, and yet, increased emphasis being given to performance in research... This creates the danger that unless teaching is also assessed all available effort will be diverted to “grant earning” research activities and teaching will receive less attention.

The fear that the application of PIs will have a negative effect on quality extends to PIs for teaching. For instance, the use of student surveys of teaching has heightened concerns that it may encourage an undesirable catering to popularity (Everett and Entrekin, 1994; Vidovich and Currie, 1998), and a reduction in academic standards (Henkel, 1997).

Coupled with the fact that the current PIs used for research (publications, external research income, and higher degree research completions) and teaching (student surveys on teaching, graduate employment outcomes, and coursework student completions) do not in any way represent the full dimensions of an academic’s work performance in research or teaching respectively, the outcome can be a reduction in the quality of performance if academics decide to concentrate on these activities in order to maximise their rewards. The effect of PIs on quality is summed up by Bruneau (1995, p. 1):

In the United Kingdom, New Zealand, and perhaps now in Alberta, one effect of PIs has been that university teachers and students produce the numbers government wants. No one has shown that PIs improve teaching or research.
In summary, just about everything connected with PIs is subject to debate. Just as there are advantages gained from using PIs, there can also be undesirable effects resulting from using them. It is apparent that PIs will have an impact on organisations, or more precisely, the individuals within them, intended or unintended.

**Conclusion**

The development and application of PIs have become an integral part of the Australian Government’s approach to the management of the higher education system. Although much has been written about PIs, the same cannot be said about the theoretical aspects of PIs. Having presented the literature on PIs, it is now appropriate to go one step further to provide a theoretical explanation of the origins, primary functions, and effects of the introduction of PIs in the Australian higher education system. In doing so, a better and more complete understanding of PIs, from their introduction to their effects, can be achieved. Furthermore, the development of a more comprehensive theoretical framework will assist in later explanation of the results of the study. It is thus the purpose of the following chapter to lay the theoretical framework for the study of PIs in an empirical university context.
CHAPTER THREE: A THEORETICAL APPROACH TO PERFORMANCE INDICATORS

Introduction

The purpose of this chapter is to provide a theoretical framework to explain the origins, primary functions, and likely effects of PIs in the Australian higher education system. Although the literature on the development, roles, and impact of PIs are plentiful, very little has been done on the theoretical aspects of PIs. This section of the thesis is a move towards a more detailed and complete conceptual explanation of the origins, main functions, and effects of PIs. Four theories are used: fiscal federalism theory, neoclassical economic theory, X-efficiency theory, and job motivation theories. The former two theories are applied at the macro- and micro-levels while the latter two theories are used to analyse the individual academic’s job behaviour. Relevant details of each theory and justification for its incorporation are provided in the subsequent sections.

Fiscal Federalism and Performance Indicators

Australia’s constitutional, financial and political and administrative system can be analysed as a fragmentation of power between the Federal Government and the states. The impact on public policy as a result of these characteristics has been documented by several authors
(Holmes and Sharman, 1997; Painter, 1987, Painter, 1998; Wood, Williams, and Sharman, 1989). Successive governments led by Gough Whitlam, Malcolm Fraser and Bob Hawke have shown how important federalism was to their policy objectives by attempting to introduce their own “new” version of Australian federalism (Fletcher and Walsh, 1991). Accordingly, it is necessary to draw upon the theory of fiscal federalism into this research.

One of the dominant characteristics of federalism is the vertical fiscal imbalances experienced between the states and the Federal Government, which, in many instances, has generated frictions in their relationships. Vertical fiscal imbalance in the Australian context can be simply defined as the imbalance between revenue-raising powers and expenditure responsibilities of the various levels of governments (Henderson, 1986). This imbalance arises because the Federal Government has revenue resources in excess of its expenditure requirements while at the state and local government levels, independent revenue sources fall short of those required to finance expenditure commitments. For instance, judicial interpretation has allowed the Federal Government to assume a predominant role in the collection of personal and company income tax. The Uniform Tax Case of 1942 and subsequent supplementary decisions have ensured that state governments have not recaptured the income tax field. In return,
the states receive funds from the Federal tax reimbursement grants which cover the loss of income tax collection.

As the Federal Government controls the most lucrative of revenue sources, grants from the Federal to state governments are a major feature of the fiscal aspects of federal-state relations. In addition to the political wrangling between the Federal Government and the states, the Australian Constitution (such as Sections 51, 96, and 109)\textsuperscript{20} has been used to a considerable extent by the Federal Government to increase its political muscle. Having acquired financial dominance in 1942, successive Federal Governments have found it much easier to move into areas which were previously the responsibility of the states (Holmes and Sharman, 1997; Wood, Williams, and Sharman, 1989). This has been helped by the extensive use of Section 96 of the Constitution which allows the Federal Government to make specific-purpose grants, given on the condition that the states spend the monies according to the terms laid down by the Federal Government. Such grants are often tied or ear-marked. In many cases, these special purpose grants are subjected to rigid and detailed conditions set by the Federal Government in order to check on any irresponsible expenditure.

\textsuperscript{20} For instance, Section 96 of the Constitution enables the Federal Government to allocate money to the states on whatever terms and conditions it thinks fit. If the grant is conditional, the implication is that it is to be used only for the purpose specified, and the details of the service are to conform to certain universal standards for the states set by the Federal Government.
These specific purpose grants have also been used in the higher education system. In the process, the power of the Federal Government over the institutions has increased and, in turn, enabled it to intrude or intervene into the internal affairs of the higher education institutions. As will be shown in the following chapter, the former Labor Government’s higher education reforms witnessed massive structural changes to the management practices of the universities, one of which is the introduction of PIs. The allocation of the Federal Government’s Research Quantum based on the Composite Index to universities may be taken as an example. From this perspective, PIs are viewed as monitoring devices developed and implemented to administer or divert resources as determined by the Federal administration. Therefore, based on fiscal federalism theory, the introduction of PIs by the Government is associated with maintaining and increasing the control of the Federal Government over the universities. In fact, PIs have often been looked at disfavourably as a weapon of control used by the Government over the institutions of higher learning. The application of PIs is consequently intended to have an impact on the priorities, operations, and outputs of the universities.

Fiscal federalism theory, however, does not provide a complete and satisfactory analysis of the rationale for PIs. Public policy, both in Australia and other western liberal developed economies, tend to be based on the ideology of neoclassical economics, particularly since the
early 1980s. Neoclassical economics theory also provides the most comprehensive and systematic analysis of efficiency which itself has often been linked to the introduction of PIs (Morrison, Magennis, and Carey, 1995; Taylor, 1987; Teather, 1990). There has been strong influences from the neoclassical school in the decision-making process in Australia, particularly at the level of Cabinet and among senior bureaucrats, with the objective in mind of attaining economic efficiency (Pusey, 1991). The emphasis on accountability, the interest in a change in the operations and management structure of the higher education institutions to improve efficiency, and the justification for the Federal Government’s initiatives to cut public expenditure to these institutions, all draw upon the neoclassical economic conceptualisation of efficiency. For instance, the implication of the release of the National Competition Policy, Microeconomic Reforms Policy and the Clever Country Policy by the former Labor Government is that the Australian higher education system is based on the polemic of neoclassical economics. Therefore, neoclassical economic theory has been chosen to supplement fiscal federalism theory to explain the origin and primary functions of PIs.
The Polemic of the Neoclassicists

Constraints in Government spending since the late 1970s have led to the justification for the promotion of efficient usage of resources. The supporters of budget cutting (e.g., Jackson, 1982; Niskanen, 1973) argued that there is often excess in social services because these services tend to be provided free of charge or are priced below the marginal costs of supply. The demise of Keynesian economics, which had dominated public policy since World War II, was claimed to be a result not only of the unsustainable nature of their expansionary policies, but also the doctrine's poor empirical predictions (Blinder, 1988). This provided the necessary platform for neoclassical economists such Friedman (1968), Phelps (1968), and later Lucas (1980) to attack the methodology of Keynes. The neoclassicists argued that economic planning is impossible and that bureaucracies are inferior to market forces in managing resources efficiently. These assumptions, accompanied by enormous faith in the market system, has encouraged the restructuring of the public sector, including the higher education system. Changes in the public sector include the incorporation of corporate sector management techniques (under the banner of "managerialism"), corporatisation, and privatisation. The shift towards

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21 The two primary factors which contributed to constraints in Government spending are the world oil crisis of the 1970s and 1980s, and the liberalisation of the state economic structure leading to a shift from a welfare state to a market-oriented system with efficiency as the prime driving force (Henderson, 1995).
this new form of public sector management or managerialism has in turn involved the introduction of PIs.

The obsession with PIs in the restructuring of the management system of the Australian higher education institutions can be traced to the quest for economic efficiency. Economic efficiency, in this context, centres upon the technical relationship between input and output. In the neoclassical economic framework, it is postulated that efficiency is attained when either a given level of input produces a maximum level of output, or a minimum level of input produces a given level of output. Hence, by applying the input-output production function, each dollar allocated by the Federal Government to the higher education institutions is believed to have achieved allocative efficiency. From this simplistic assumption, economic goals came to dominate higher education spending, and in doing so, education came to be treated as an economic cost. The focus on efficiency in higher education policies tends to centre on reducing "... inputs by manipulating the process of production — for example, by reducing labour, capital or running costs" (Marginson, 1993, p. 114). The neoclassical production function will be discussed later in this chapter.
Efficiency: A neoclassical economic definition

Economic efficiency, in general, is often analysed through the neoclassical methodology of allocative and technical efficiency. In the neoclassical world, allocative efficiency is achieved when resources are allocated optimally, taking into consideration the opportunity costs based on cost and benefit analysis. This is founded on the assumption that alternative methods of input allocation have varying effects on output levels. The basis of this concept of efficiency is “Pareto Optimality”.

Pareto (1920) postulated that an efficient allocation and distribution of resources can be achieved when the welfare of an individual is maximised without making another individual worse off. This notion of Pareto efficiency has a significant impact on the restructuring process in the public sector. The implication is that “...if two results can be obtained with the same expenditure the greater result is to be preferred” (Simon, 1994, p. 43). In the higher education system, allocative efficiency exists where, given technical efficiency, no economies can be realised through switching the allocation of resources from one university to another.

On the other hand, the neoclassicist’s concept of technical efficiency is based on the mechanical relationship between input and output in determining the production of output. It pertains to the firm’s ability to gain the maximum possible output from a given set of resources. The fundamental phenomenon that underlines the neoclassical production
function analysis is the cost of production. Costs are dependent upon the quantities of inputs needed to produce output. If output can be increased with only a small increase in input (such that, for example, a 10 percent increase in output requires only a 1 percent increase in input), then cost per unit of output will fall when output rises, and vice versa. In order to decrease the cost of production, it is argued that the market system should be incorporated into the public sector. The rationale is constructed on the notion of perfect competition, where the optimum output can be achieved at the lowest possible average cost. In the higher education system, technical efficiency exists where, given the allocation of resources across the institutions, each university uses its resources to the fullest capacity without waste (Johnes, 1994). Thus, economic efficiency of production is determined both by the technique or manner of application, and the levels of application of inputs.

In Australia, the impact of the neoclassical ideology can be traced to the Task Force on Efficiency (Royal Commission on Government Administration, 1975). According to this task force (1975, p. 4),

Efficiency has been interpreted as doing things right, that is, prudent administrative management as opposed to financial management. It has been employed as the search for higher productivity, greater returns from a given input, the relationship between ends and means, and more simply, value for money and more proficient use of all resources, not just finance but human resources, organisation, information, capital plant, and supplies.
In 1983, the former Labor Government embarked on a series of restructuring programmes of the organisation and management of public institutions (Bell, 1997; Committee of Inquiry into Competition Policy in Australia, 1993; Quiggin, 1996). All these reforms were pursued with the main objective of improving the efficiency and accountability of the public sector. The corporatisation and privatisation of the public sector was seen as a prime example of embracing the virtue of the market system. The belief in the market system led to the justification of the use of competition as a standard which could be consistently applied from an efficiency point of view. For instance, in the Government’s National Competition Policy (Independent Committee of Inquiry into Competition Policy, 1993, p. 6), it was emphasised that

The engine which drives efficiency is free and open competition...Competition policy encompasses all policy dealing with the extent and nature of competition in the economy...it seeks to facilitate effective competition in the interests of economic efficiency or conflicts with other social objectives”.

Efficiency based on inputs and outputs

In order to simplify the understanding of the neoclassical concept of efficiency, it is necessary to construct a simple input/ output model of the neoclassical production function model. In this model, output is defined as a function of the factors of production. This can be written as follows:

\[ Y = f (L, K) \]
where $Y$ is level of output, $L$ is quantity of labour, and $K$ is quantity of capital.

By adopting the neoclassical production function framework, it is possible to construct a simple input/output model of the Australian higher education system.

$$Y = f(L, PK_1, K_2)$$

where $Y$ denotes the output of the university which in this case is composed of research and teaching,\(^{22}\) $L$ is labour, $P$ stands for PIs, $K_1$ is specific performance-based funding such as the Research Quantum, and $K_2$ denotes other capital, such as the other components of the operating grants, funds, and so forth. Therefore, based on the equation, when PIs are linked to performance-based funding $K_1$, they are believed to increase the effectiveness of labour $L$, and therefore will raise output, $Y$. It should be noted that only quantifiable output can be estimated or measured in this model.

In summary, the domination of neoclassical economics in Australian economic policy since the 1980s has fuelled the interest in efficiency, which has in turn led to the introduction of quantitative PIs. However, in order for the above neoclassical model to estimate satisfactory the

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\(^{22}\) It is recognised that there are other outputs of the university, such as community services. However, it is beyond the scope of this study to focus on them.
output for a given set of inputs, there are a few rigid assumptions which this model has to satisfy. These are covered in the next subsection.

Limitations of neoclassical economic framework

Neoclassical economic theory, on which the development of PIs is based, is subject to several assumptions. They include: (1) homogenous labour, (2) homogenous outputs, (3) treatment of time as a static affair, and that (4) individuals (which in this case is labour) always maximise their utility functions.

The ability of the neoclassical method to estimate output satisfactorily hinges on the homogenisation of the labour factor. In reality, no two persons are alike in all respects. For instance, individuals learn in different ways and at different speeds (Deming, 1993). Organisational theorists such as Robbins (1993) have stressed that an employee’s behaviour is a reflection of many factors, such as personal values and perceptions, and hence are likely to differ among individuals. In the higher education sector, an academic’s approach to work may vary with discipline, rank, mode of employment (for example, an academic who is employed to do research only, compared to another who is employed to do both research and teaching), and so forth.
Outputs must also be homogenous if the neoclassical approach is to work. Outputs which are multi-layered, as in the case of the higher education sector, cannot be measured accurately with this method. Under the homogenous production function, output change can be predicted by a proportionate change in the scale of input used.

The treatment of time in the neoclassical production function as a static affair is also problematic. Robinson (1980, p. 222) gave an illustration: "But if we are to introduce decisions into the model, we must introduce time. Decisions are taken in the light of beliefs about their future consequences". Thus, the failure of the neoclassical theory to take time into account means that it is unable to stand up to empirical testing in dynamic reality because of its static characteristics. This is particularly so with the open-ended nature of academic’s work. First, there is the management of time by the academics among their work activities, such as research, teaching, and community services. Second, there is the self-generation of work in research, teaching, and other work activities.

Another limitation of the neoclassical framework is that it makes no attempt to analyse the internal behaviour of a firm. It assumes that firms are internally efficient, i.e., firms are producing at their production frontier (allocative efficiency) with maximum output for given inputs (technical efficiency), and therefore are cost minimisers (Frantz, 1988). Employees are assumed to be rational and therefore maximising their utility
functions, ie. they produce maximum output with a given level of input.
This allows the neoclassicists to ignore the internal operations of the
firm, which is the internal efficiency of the firm, and to focus on the
efficiency of the market. Both allocative and technical efficiency theories
are based on exogenous factors which indicate that the competitive
nature of the “market” is the optimum factor for both the allocation and
use of resources. Such an assumption can only hold if the market is
perfectly competitive, is operating under the ceteris paribus condition,
and the movement of resources from one industry to another is costless,
and the information required is reliable and correct (perfect information).
However, in reality this may not be the case because of the existence of
market failure. For instance, incomplete information or uncertainty of the
market can hinder the production of the level of output which is optimal
for the firm. The exogenising of the internal workings of an institution
means that any explanations of the functions of PIs based on the
neoclassical economic framework will not be satisfactory. In this thesis, it
is argued that the introduction of PIs by the Australian Government in
the higher education system, particularly the establishment of the
Composite Index in the distribution of the Research Quantum, is
intended to alter the internal workings of higher education institutions,
including academics’ work. However, with neoclassical economics, very
little is known about the internal workings of a firm. Therefore, for all
these reasons, neoclassical economic theory may not provide a
satisfactory explanation of the functions of PIs.
Comparison between neoclassical economics and X-efficiency theories

The above stated weaknesses in the neoclassical analysis of the production process led behavioural economists such as Professor Harvey Leibenstein to offer an alternative method of explaining efficiency. Leibenstein's X-efficiency theorem (1966) is such an attempt. In a neoclassical paradigm, both allocative and technical efficiencies assume that firms are operating at their optimal levels on the basis that firms are utility and profit maximisers. X-efficiency, on the other hand, is an attempt to understand the loss at which an organisation is operating (deviation from the optimum) which cannot be due to allocative and technical incompetence (Perlman, 1990). In other words, X-inefficiency is an intrafirm inefficiency. This inefficiency can arise from the environment (which affects the organisation and in turn the employees), management practices, and/or the employees. Thus, while the amount to be gained by increasing allocative efficiency was reported to be trivial, "...frequently no more than 1/10 of 1 percent" (Leibenstein, 1966, p. 397), "... the amount to be gained by increasing X-efficiency is frequently significant" (p. 413). Unlike neoclassical economics, X-efficiency theory does not ignore the internal operations of the organisations. Another strength of this theory is that it attempts to analyse workers' behaviour. Furthermore, X-efficiency theory never assumes all individuals to be fully rational. Instead, individual behaviour is postulated to vary as a result of personality, background, organisational, and environmental
determinants. The dichotomy between X-efficiency theory and neoclassical economics is illustrated in Table 3.1.

Table 3.1

<table>
<thead>
<tr>
<th>Components</th>
<th>X-Efficiency Theory</th>
<th>Neoclassical Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit of analysis</td>
<td>Individuals</td>
<td>Households and firms</td>
</tr>
<tr>
<td>Psychology</td>
<td>Selective rationality</td>
<td>Household - maximisation of utility</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Firm - Maximisation of profit or minimisation of costs</td>
</tr>
<tr>
<td>Contracts</td>
<td>Incomplete</td>
<td>Complete</td>
</tr>
<tr>
<td>Effort</td>
<td>Discretionary variable</td>
<td>Assumed given</td>
</tr>
<tr>
<td>Inert areas</td>
<td>Important variable</td>
<td>None</td>
</tr>
<tr>
<td>Agent-principal</td>
<td>Differential interests</td>
<td>Identity of interests</td>
</tr>
</tbody>
</table>

Adapted from Leibenstein, 1978, p. 329

For the reasons listed above, X-efficiency theory is applied to the effort-dependent service-oriented higher education sector. X-inefficiency, according to Leibenstein, is often associated with lack of effort by individuals. The effort put forth by individuals is in turn an outcome of their personality and background determinants, as well as the nature of their organisations and external environment. It is true that organisational managers and even governments cannot fully control their members' behaviours. While the X-efficiency theory never suggests that the effort of individuals can be completely controlled by management, it provides an insight into some elements, particularly
those which influence the motivational structure, that can be manipulated to encourage high effort.

The Theory of X-efficiency

In X-efficiency theory, labour effort is viewed to be the essential element of human inputs. As Leibenstein (1976) explained, when it comes to labour, firms can only buy labour time. Labour effort which is critical to production, including decision-making, cannot be purchased. Individuals are assumed to have their own effort-utility functions, as illustrated in Figure 3.1.

Figure 3.1
Effort-utility function

Up to point A, higher utility is associated with higher levels of effort. The assumption is that an individual prefers to be doing something rather than nothing at all. Beyond point A, additional effort leads to utility
losses, that is, it is assumed that beyond some point, an individual prefers less effort to more (Leibenstein, 1976). At equilibrium, an individual will occupy an effort point or position\textsuperscript{23} in his/her optimal inert area. Inert areas are upper and lower bounds within which behaviour is habitual. An individual may choose to remain in an effort position and not move to a superior effort position if the utility cost or "inertial cost" outweighs the anticipated utility gain. In most cases, as a result of reasons, such as maximising/non-maximising behaviours, incomplete contracts, and the conflicting interests of agents and principals (which are presented in Table 3.2), it is likely that the effort decisions of employees are less directed towards their organisations' objectives and, consequently, costs will rise.

\textsuperscript{23} Leibenstein (1976, p.111) distinguished effort position from effort point by defining the former as "... a set of effort points or a neighbourhood of effort points which are adjacent to each other and within which an individual is willing to extend his effort without any significant change in the motivations involved".
Table 3.2
Assumptions of X-Efficiency Theory

1. Individuals are the basic unit of analysis. "It is people ... that carry out decisions and put them into effect" (Leibenstein, 1986, p. 4).

2. Individuals are selectively rational. Individual behaviour contains elements of both rational and non-rational behaviours. On this basis, it is possible for human decisions to reflect elements of both maximisation and nonmaximisation. Since individuals are assumed not to maximise profits all the time, they are also presumed not to be constantly concerned with costs minimisation, and can therefore make sub-optimal decisions.

3. Human behaviour is sometimes characterised by inertia.

4. The interests of the agents are not always consistent with that of their principals. Although agents have an obligation to act in their principals' interests, they are likely to strike a balance between pursuing the interests of their principals and their own interests.

5. Labour contracts are incomplete. Although the payment side is assumed to be well-specified, the effort side is likely to be largely unspecified. The ambiguity associated with property rights means that the employer does not own the employee who happens to sell his/her labour in exchange for wages, nor does the employee owns his/her job. The outcome is that "... the agreeing and doing are not necessarily the same" (Frantz, 1988, p. 75).

6. Effort is a discretionary variable. Individuals have a certain amount of effort discretion to choose how to behave "... rather than being genetically or otherwise forced to be the fully rational 'economic man' of economic theory" (Frantz, 1990, p. 379).

7. The production function is not completely specified or known. An organisation may not always know in advance the quantity of an output produced from given inputs and input ratios. It is likely that given inputs are associated with a variety of output rates.

8. Not all the inputs are marketable, or if marketable, are not equally accessible to all buyers. For instance, certain types of market information may be available to some individuals but cannot be purchased in the market.

9. Imperfect competition. Organisations are assumed to be sheltered from competition to some extent.
The impact of pressure

According to Leibenstein, one way to increase effort, and reduce X-inefficiency is through a rise in pressure. Pressure alters the utility associated with effort by shifting the entire effort-utility function towards the upper right corner. Alternatively, the inertial space can be redefined, pushing individuals out of their inert areas, and encouraging them to choose more suitable effort positions from the viewpoint of X-efficiency.

Using the Yerkes-Dodson law (1908), Leibenstein hypothesised that at low pressure levels, individuals will not put much effort into decision-making and performance. In other words, the ratio of optimal to nonoptimal decisions is low (Leibenstein, 1987). As the intensity of pressure builds up, they will move towards more maximising behaviours and more effective decision-making. This continues up to the point where “calculatedness is as complete as possible for the person involved. This type of behaviour approximates utility maximization” (Leibenstein, cited in Aoki, 1984, p. 338). Beyond this point, increasing the amount of pressure results in disorientation. The ratio of optimal to nonoptimal decisions declines, and performance will deteriorate. Hence, “while personality will determine one’s Yerkes-Dodson curve, it is the amount of pressure that will determine behaviour” (Leibenstein, 1982, p. 872). This is presented in Figure 3.2.
At point A, the level of effort is at $E_0$, and pressure is at $P_0$. An increase in pressure subsequently raises the effort level of the individual. This continues until point B which represents the optimal level of effort, $E_1$, for the pressure, $P_1$. At point B, any further rise in pressure will cause effort to fall. An increase in pressure, from $P_1$ to $P_2$, causes effort to drop from $E_1$ to $E_0$.

There are basically two main types of pressure which affect X-efficiency. They originate from (1) within an individual as a result of moral, cultural, or religious factors (grouped as the personality factor), and (2) the environment in which the organisation and individual are situated (Frantz, 1990). The latter is itself sub-divided into pressure
from within the firm and applied by others on the individual, and pressure from outside the firm (e.g., competition) and transmitted into the firm by intrafirm decision-makers (Leibenstein, 1983).

The impact of motivation

Although Leibenstein (1976, 1987) did not elaborate extensively on the subject of motivation, he did indicate that motivation is valuable in raising effort and productivity. Incentives, such as group approval, are suggested to be important in motivation (Leibenstein, 1976). He (cited in Aoki, 1984, p. 336-337) recognised that

The basic idea is that a good deal of X-inefficiency arises as a consequence of low motivations offered by firms and low effort levels by employees. The system is determined in part (1) by the motivational forces within the firm, and (2) in part by the motivational forces (such as degree of competition) outside the firm, which in turn penetrate the firm, which in turn, if strong enough, causes changes within the firm.

In summary, the X-efficiency theory postulates that in order to solve inefficiency, there is the need to enter the “black box” to examine the behaviours of individuals. X-inefficiency is argued to arise as a consequence of low motivations offered by firms and low effort levels offered by employees. Since Leibenstein did not provide a detailed

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24 This includes interpersonal relations. Membership in a group often causes individuals who identify strongly with group aims to seek signs of group approval and avoidance of group disapproval. Group approval can thus increase the utility of the approved-of individual (Leibenstein, 1976; Leibenstein, 1987).
description of the motivation forces required to raise effort level of employees, it is the purpose of the next section to cover psychological theories of job motivation which are appropriate to PI-based funding. These are job motivation theories which relate to performance-based rewards.

**Theories on Job Motivation**

Job motivation essentially involves the process of energising and directing human behaviour (Deci, 1992; Mitchell, Ortiz, and Mitchell, 1987; Porter, Lawler, and Hackman, 1975). In particular, rewards tied to performance (or performance-contingent reward) is a popular method advocated by many researchers for shaping workers' behaviour. For instance, “for any reward to be a motivator, it must be tied to performance” (Lawler, 1994, p. 170). Most importantly, a performance-based reward system has been reported to motivate high performance in the workplace (Parnell and Sullivan, 1992).

**Performance-contingent rewards**

The reliance on performance-contingent rewards to influence employee's behaviour can be justified by various psychological

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25 The theories and definitions on motivation are wide and varied. See Steers and Porter (1991) for a selection of the definition. Not only is motivation conceptualised differently by different researchers but several researchers reported a wide range of factors for motivating individual's behaviour (e.g., Adams, 1963; Maslow, 1943; Vroom, 1964).
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theories. There are, for example, Thorndike's Law of Effect (1913)\(^{26}\) and the principle of reinforcement in operant theory (Skinner, 1953). The central tenet of operant theory is that the consequences of a behaviour determine the likelihood that this behaviour will be performed in the future. The rationale is that individuals engage in behaviour because that behaviour was reinforced in the past, and because of the presence of a stimuli, known as contingency of reinforcement. Reinforcement occurs by the introduction of a desirable stimulus (positive reinforcement) or the removal of an undesirable stimulus (negative reinforcement).\(^{27}\) In other words, in order to change any behaviour, the consequences of the particular behaviour must also be changed (Hamner, 1992; Skinner, 1969). Based on the operant theory, human behaviour is under the control of external reinforcement. If reinforcements (rewards) are to work effectively, they should be tied directly to specific behaviour and given in close succession to the desired behaviour (Deci, 1992).\(^{28}\)

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\(^{26}\) Behaviour which leads to a positive consequence (reward) tends to be repeated while behaviour which leads to a negative consequence (ignored or punished) tends not to be repeated.

\(^{27}\) This is in contrast to punishment which occurs by the presentation of an undesirable stimulus or the removal of a desirable stimulus (Mitchell and Larson, 1987).

\(^{28}\) It should be noted that operant conditioning is demonstrated most easily in controlled conditions, such as laboratory experiments. However, it has been shown to be limited in its applicability in non-laboratory conditions (Modgil and Modgil, 1987; Protor and Weeks, 1990). One of the issues surrounding operating conditioning is the need to consider the internal state of an organism as a moderating factor in the relationship between the environment and behaviour (Brown, 1987). For instance, Hall (1987) pointed out Skinner's neglect of an organism's genetic predisposition in determining its behaviour. Several authors also commented on other limitations in the theory, such as Shettleworth (1975) who found that properly applied reinforcement procedures could sometimes fail to work.
The formation of a close association between performance and rewards has also been supported by expectancy theories (Georgopoulos, Mahoney and Jones, 1957; Porter and Lawler, 1968; Vroom, 1964). The underlying assumption in these theories is that human behaviour is goal directed (Deci, 1972). Individuals engage in behaviour because they expect the behaviour to lead them towards the achievement of their goals or desired outcomes. There are three variables which combine together to determine an employee’s job motivation. The first, referred to as the effort-performance linkage, is the individual’s subjective probability that the exertion of a given amount of effort will lead to performance. The second variable, the performance-reward linkage is the individual’s perception that performing at a particular level will lead to the attainment of a desired reward. The third variable is the reward value (valence) or the importance that the individual places on the reward. Expectancy theories essentially argue that employees will choose that level of effort perceived to produce the maximum level of rewards (Mitchell and Larson, 1987).

The theories discussed so far are extrinsic in orientation, that is, the rewards which are part of the job situation and are given by others

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29 For this reason, if any one of the variables is low or non-existent, no motivation is said to be present (Lawler, 1969).
The most popular form of extrinsic rewards in many organisations, including universities, is monetary rewards: "Monetary rewards of a direct nature play a major role in most faculty incentive programs" (Bowen, 1985, p. 37). Money is needed to attract and retain employees as "without it few if any employees would come to work. But money alone is not always enough to motivate high performance" (Latham and Locke, 1979, p. 198).

Intrinsic job motivation: Academics

Indeed, the literature on academic job motivation tends to reveal that academics choose their careers for reasons other than monetary rewards. Veysey (1965) remarked that the greatest source of academic motivation is the academic work itself. He stated that an academic is motivated "... in the belief that he was influencing other minds, either in the classroom, in his public investigations, or in both" (Veysey, 1965, p. 335). About a decade later, McKeachie (1979) reported similar findings; academics enjoy the association with students and the opportunity to contribute to student development, and the intellectual exchange and autonomy derived from their profession. This has been confirmed in the 1990s. Froh, Menges, and Walker (1993, p. 87) found that academics "... enjoy working with younger people, they find the

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30 Rewards are often classified into intrinsic and extrinsic rewards. There are many definitional distinctions given between these two types of rewards as can be seen in Guzzo (1979), Lawler (1969), and Mitchell, Ortiz, and Mitchell (1987).
vigour of scholarly activity stimulating and the work with colleagues in their disciplines challenging, and they love teaching”. Like other academics, Australian academics are also influenced by the intrinsic rewards of their work (McInnis, 1992). Therefore, it would be incorrect to imply that all academics would be motivated to exert higher levels of effort in their work simply because higher education institutions raise the size of extrinsic rewards. The intrinsic rewards received from their work can be just as important or even more important than the extrinsic rewards. This was pointed out by Ramsden and Martin (1996, p. 313): “There is a limit to the theory that “what is rewarded gets done better”. Equally important is considering what motivates academics … is the theory that “what is rewarding gets done better””.

It would, however, be naive to suggest that extrinsic rewards do not play a role in academic motivation. Despite the fact that academics can be motivated by rewards other than extrinsic rewards, the massive reforms in the Australian higher education system in recent years, particularly the financial cut-backs (including staff) and highly competitive environment, make it impossible to dismiss the impact of extrinsic rewards on academic job motivation. The fact that academics have to “do more with less” in their workplace means that the presence of monetary rewards will provide them with the choice to concentrate on certain activities over

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31 There are several motivational theories which hypothesize that factors other than extrinsic rewards are effective in shaping workers' behaviour (Hackman and Oldman, 1976; Herzberg, 1966; Maslow, 1943)
others (Tuckman, 1979). It is also possible that monetary rewards have an indirect impact on job motivation through its symbolic value - communicating the values of an academic's colleagues and those of the institution (McKeachie, 1979). For instance, the university promotion system provides knowledge to academics that they are esteemed by their peers (Baldwin and Krotseng, 1985). In his survey of faculty members and senior administrators across several campuses in the United States, Schuster (1985) revealed that a significant percentage of the faculty members surveyed regarded the receipt of fiscal rewards as an indication of how they were esteemed. Adequate fiscal rewards were found to enable academics to feel good about themselves. Since "recognition of good work is important for everyone - faculty members included" (Bowen, 1985, p. 41), an institution's reward structure can be a significant force in shaping the direction and magnitude of academics' work.

Theoretical Model in the Study

In summary, the decision-making process of the Australian Federal Government is influenced by fiscal federalism and neoclassical economics. The recommendations and implementation of Government policies are in turn carried out by public servants in Government departments. In the case of higher education, the relevant body is the Department of Employment, Education, Training, and Youth Affairs
(DEETYA). Its policies are based on fiscal federalism and neoclassical economics and include the introduction of PIs in the higher education system. The policies adopted by the Government, according to the theory of fiscal federalism, are designed to have an effect on the management of higher education institutions. The subsequent change in the internal institutional policies on funding and promotion in particular are likely to have an impact on the individual university academic’s approach to his/her work, as explained by X-efficiency theory and theories of job motivation on performance-contingent rewards. The theoretical model for PIs in the Australian context is summarised in Figure 3.3.
Figure 3.3

Theoretical model for the introduction of PI s in Australian higher education

- Fiscal Federalism
- Neoclassical economics

Australian Federal Government (decision-making)

Department of Employment, Education, Training & Youth Affairs (DEETYA)

Performance indicators (PIs)

Australian higher education institutions

University academics

Recommendations & implementations

Internal institutional policies (funding & promotion)

X-efficiency theory
Motivation theories (performance-based rewards)
Conclusion

It is apparent that the introduction of PIs in the Australian public sector, including the higher education sector, is primarily a result of the influence of neoclassical economics ideology and fiscal federalism theory. In particular, the pursuit of the neoclassical concept of efficiency has contributed to the popular construction of input-output/outcome types of PIs. The application of PIs by the Government on universities, particularly the Composite Index for the allocation of the Research Quantum, is in turn likely to affect the universities in terms of their internal policies, as explained by fiscal federalism theory. The effects of the introduction of PIs on the work behaviour of the individual academic can be clarified with X-efficiency theory and job motivation theories of performance-contingent rewards. Having reviewed the literature of PIs and developed a theoretical framework to explain the origins, primary functions, and effects of PIs, it is now necessary to examine the actual situation in the Australian higher education system. This is attempted in the following chapter where the Australian Federal Government policies on higher education are examined.
CHAPTER FOUR: AUSTRALIAN FEDERAL GOVERNMENT POLICIES ON HIGHER EDUCATION: A MOVE TOWARDS PERFORMANCE INDICATORS

Introduction

The pace of the evolution of the Australian higher education system, particularly the shift to PIs, has been mainly dependent upon the external pressures (such as, economic milieu, student demand, and Federal Government policies) which are placed on the internal structures (the objectives and operations of the institutions) (Karmel, 1989). Since they are mostly public institutions, the standing of Australian universities is heavily determined by the government of the day and its policies. For instance, Marginson (1995, p. 8) noted that during the era of the former Labor Government,

Labor changed the way we practice research, as well as the way we define and value it. It changed the place of teaching, the modes of delivery and the relations between sectors, the pattern of rewards and incentives, and the main lines of accountability.

Although the internal mission of the university has remained largely unchanged – “production, evaluation, and dissemination of knowledge” (OECD, 1987, p. 20) - the management and the goals pursued by the typical Australian university under the Unified National System is now a far cry from those of the pre-World War II university.
Interplay Between External and Internal Forces

The shifting and balancing of forces between the internal structure (such as, the goals of the universities), and the external pressures, in terms of government policies, student demand, and economic constraints, have been the driving forces in the evolution of the Australian higher education system, at least for the last twenty years (Karmel, 1989). The pace of the evolution of the higher education system is predominantly dependent upon the intensity and frequency of the external pressures which are placed on the internal structure. It is a fact that a university, just like any other organisation, does not exist in isolation from its environment, and external forces will affect its operations (Hanley, 1993). Although weak in comparison to the external forces, there are also some internal forces which have generated momentum of their own in the restructuring process. As an illustration, a drop in government funding creates pressure to reduce expenditure within the institutions, which can stimulate actions to improve the productivity of functions, such as research and teaching (Tuttle, 1994).

Together, the external and internal forces have shaped and changed the internal structure of the Australian higher education institutions, particularly in the domain of institutional management. Prior to the sixties, the external forces were generally mild. The institutions were
mainly left to themselves in terms of internal governance. The university was then viewed as a community of scholars. The collegial structure was intact. According to Karmel (1989, p. 1), “the university sees itself as a kind of private club whose members decide who is to join and what should be done in it”. However, he also stated that the internal structures of the universities were constantly evolving during this period although at a slower rate. It was during the late 1970s when the pace of change in the internal structure began to quicken in response to the external forces of economic constraints, rising student demand, and cost minimisation measures taken by the Federal Government.

The pressures for internal restructuring intensified when the Labor Government came into power in 1983. The Government appeared to be convinced that the higher education institutions were unlikely to push for changes unless it was externally forced upon them. Karmel (1989, p. 24) commented that

For good or ill, higher education will never be the same again. Behind the reforms lies a conviction that the higher education institutions have only a limited capacity to promote change internally and to adjust to changing external forces, and that change will have to be imposed on them.
Budget constraint and ideological influences

The most acute external forces which changed the Australian higher education system and the institutions during the former Labor regime were fiscal constraints and ideological influences. Fiscal constraints in public expenditure from the 1970s onwards provided justification for the financial cut-back to the public sector as well as to institutions of higher learning. Ideologies in this context took the form of the increasing influence of neoclassical economics or economic rationalism in the policy development and implementation processes of the Federal Government. Against the supposed virtues of the neoclassical economics framework, public institutions were labelled inefficient. Central to the polemic of the neoclassical economics is the notion of government failure and thus inefficient allocation and distribution of resources. The domination of economic rationalism in the decision-making process (Pusey, 1991) has, to a great extent, altered the politics of fiscal federalism, particularly during the Hawke and Keating era, where the application for grants or other financial resources were based on the rationale of neoclassical economics. Market forces are applied to the management process of these institutions of higher learning. The outcomes are increased competition among universities, schools/departments, and academics for resources, particularly grants.
Emphasis on efficiency and effectiveness

The resulting pressures of resource constraints and the influence of the neoclassical economics in the decision-making process precipitated an interest in efficiency and effectiveness. The Department of Employment, Education, and Training (DEET) (1993a, p. 24) acknowledged that the "Government concern with efficiency and effectiveness in higher education and rationalisation and reallocation of resources has been a recurring theme throughout the decade". Calls for improvement in the efficiency of the higher education sector can be traced to the Williams Report (Committee of Inquiry into Education and Training, 1979), and the Hudson Report (Commonwealth Tertiary Education Commission (CTEC), 1986). Higher Education: A Policy Discussion Paper (Dawkins, 1987, p. 3) picked up on this issue: "... the efficiency of the higher education system has to be considered". In the subsequent Higher Education: A Policy Statement (Dawkins, 1988), the Government insisted that "... the present climate of restraint in overall public expenditure will require continuing attention to the efficient use of resources in higher education" (p. 4), and "... measures will be implemented to encourage institutions to be efficient, ..." (p. 10).
Reforms in institutional management practices

A major way in which the Labor Government sought to improve the efficiency and effectiveness of Australian higher education institutions was through reforms in institutional management. In their DEET report, Little and Peter (1990, p. 45) had commented that, "emerging concerns with the effectiveness and efficiency of academic institutions are leading in Australia, to changes in the operation of universities". The collegial mode of governance was condemned for being inefficient, and outdated (Marginson, 1995). The inadequate evaluation procedures of the Australian institutions uncovered in *Review of Efficiency and Effectiveness in Higher Education* (CTEC, 1986) became an impetus for change to the governance of institutions. DEET insisted that "higher education institutions need to assess their performance over the full range of their activities ..." (Martin, 1994, p. 1). As a result of policies such as, *Higher Education: A Policy Statement* (Dawkins, 1988) and *Higher Education: Quality and Diversity in the 1990s* (Baldwin, 1991), terminologies such as corporate management, strategic management, and quality management appeared in the universities. The adoption of these private sector management practices encouraged an interest in the evaluation and reporting of performance in higher education. In particular, "... there has been a peak in interest in one facet of evaluation, the use of performance indicators" (DEET, 1993a, p. 295).
Historical Background

In order to obtain a better understanding of the interest in PIs, the analysis of the Federal Government’s higher education policies will incorporate their historical developments - the Australian higher education system cannot be divorced from its history.

Pre-war period

Prior to World War II, the Federal Government's participation in higher education was minimal. Its only financial contribution to the higher education institutions was in the form of assistance for research (DEET, 1993a).\textsuperscript{32} The higher education institutions were mainly left to themselves in terms of internal management.

The Menzies era

The modern era in higher education in Australia actually began under Sir Robert Menzies (DEET, 1993a). Under Menzies’ administration, two important higher education policies were released: the Murray Report (Committee on Australian universities, 1957) and the Martin Report (Committee on the future of tertiary education in Australia, 1964). The former report indicated that the Federal Government’s involvement in

\textsuperscript{32} Higher education was mainly funded by state grants (made up over a third of the universities’ recurrent funds), and student fees (about a third), while the rest came from donations, endowments and other sources (Matthews, 1972).
higher education was necessary and vital for the upgrading and expansion of higher education (Lindsay, 1982). Under the direction and encouragement of the Australian Universities Commission, universities around Australia began to implement expansion plans to meet the rise in demand (partly as a result of large numbers of returned service personnel), and to ensure an appropriate output of qualified people. From 1958 to 1960, there was an annual rise in enrolment in universities of more than thirteen per cent (DEET, 1993a).

By 1961, it was apparent that the rise in demand for university places had exceeded the supply in the universities (Mahony, 1994). The growth in students demand meant that an increase in Federal funding was required to create more places. However, an economic recession in Australia in 1960 began to have its impact on both the federal and state budgets. In Menzies’ own words (Davis, 1989, p. 33),

…it is our view that the money which would be required is very likely to be completely out of reach. Therefore, the Cabinet takes the view that, beginning now and over the next 12 to 18 months, the most vital task of the commission will be to address itself, and find solutions, to the problems of providing the necessary amount of tertiary education within financial limits which are very much more modest than under our present university system.

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33 This is a statutory body recommended by the Murray Committee to advise the Federal Government on university matters.
The subsequent Martin Report (Committee on the future of tertiary education in Australia, 1964) advocated and legitimated major changes to the structure of the Australian higher education system (Lindsay, 1982). One of its most significant proposals was the diversification of the Australian higher education system through the establishment of colleges of advanced education offering sub-degree courses with strong technological and vocational emphasis. The rationale behind this recommendation was not only to increase diversification and recognise that traditional university education might not be appropriate for everyone, but, most importantly, that it managed to contain costs in the wake of higher education expansion. While the universities were funded for research and teaching, the colleges of advanced education were funded one third less for teaching only (Mahony, 1990). "The colleges were, in the words of some cynics, supposed to be 'equal to', but 'cheaper than' the universities" (Smart, 1990, p. 12). In 1987, on the eve of their dissolution, the colleges of advanced education had a student body of 18 200 greater than the universities (Dawkins, 1987).[^34]

The years of Whitlam and his successors

The dependence of the Australian higher education institutions on the Federal Government intensified when the Whitlam Labor Government

[^34]: The college sector totalled 201 300 while the university sector totalled 183 100 (Dawkins, 1987).
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\(^{34}\) The college sector totalled 201 300 while the university sector totalled 183 100 (Dawkins, 1987).
was elected to office. In 1973, as an election promise, tuition fees for higher education were abolished, and replaced with a national student assistance scheme. The Federal Government took over full funding responsibility for higher education.\textsuperscript{35} The abolition of fees set the foundation for profound changes to the higher education system in the years to come. The institutions were unable to charge tuition fees on students, thus leading to their dependence on the Federal Government for funds.

Since the late 1970s, the balance between the internal and external forces had been rapidly changing. As the external pressures increased in the form of economic constraints and rising students' demand, the internal structures of the higher education institutions began to evolve in response to such forces. This was clearly the case in 1975 when the Australian economy experienced a major economic recession. The economic downturn brought about a funding constraint which in turn acted against any strong expansion in the higher education sector. Smart (1990, p. 12) coined the period between 1975 to 1989 as the "era of tertiary neglect" where the provision and maintenance of capital buildings and research equipment, and student demand were unmet, and academic morale deteriorated severely. In addition, the government

\textsuperscript{35} Under the Whitlam Government, the state education department-controlled teachers' colleges were identified as colleges of advanced education for funding purposes. The teachers' colleges had to become independent of the state department of education to qualify for Federal funding (Meek, 1993).
became more concerned about waste minimisation by identifying and removing duplication of functions. An example is the formation of Commonwealth Tertiary Education Commission to replace the former three commissions who were responsible for funding and coordinating post-secondary affairs for universities, colleges of advanced education and technical colleges (DEET, 1993a). Another example is the mergers of several colleges of advanced education and the absorption of some colleges of advanced education by universities (Mahony, 1992).

It was around this time that the Federal Government showed an interest in institutional performance evaluation. The Committee of Inquiry into Education and Training (1979) reported on the poor state of university management (including the information gathered), and emphasised the importance of adequate and reliable information to assist governing bodies in decision-making. In a bid to encourage self-reviews among tertiary institutions, the Commonwealth Tertiary Education Commission established the Evaluations and Investigations Program.

The Dawkins' revolution and beyond

The Labor Government between 1983 to 1995 transformed the Australian higher education system more than any government before it (Marginson, 1996). In particular, it was changed by the actions of John
Dawkins, the then Minister of the Department of Employment, Education and Training. In *Higher Education: A Policy Statement* (1988), he outlined his vision of the "new" higher education system, as summarised in Table 4.1.

Table 4.1

The principal objectives of *Higher Education: A Policy Statement*

<table>
<thead>
<tr>
<th>Macro level</th>
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<tbody>
<tr>
<td>To raise participation in higher education</td>
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<td>To improve access</td>
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<tr>
<th>Micro level</th>
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<tbody>
<tr>
<td>To improve institutional efficiency and effectiveness</td>
</tr>
<tr>
<td>To increase the responsiveness of institutions to Australia's economic and social needs</td>
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</tbody>
</table>

Source: Karmel, 1989, p. 8

A significant outcome of the reforms by Dawkins and his successors was the introduction of PIs into the higher education system. Around the mid-1980s, two of the government's reports, *Review of Efficiency and Effectiveness in Higher Education* (CTEC, 1986), and *Quality Measures in Universities* (Bourke, 1986), proposed the implementation of systematic and regular evaluation of performance in universities, and PIs were mentioned. However, it was the release of *Higher Education: A Policy Discussion Paper* (1987) and *Higher Education: A Policy Statement* (1988) which clearly paved the way for PIs:

"The Government supports the development of a funding system that responds to institutional performance ... It intends to develop funding arrangements that take into
account a range of output, quality and performance measures ... As soon as practicable, indicators which are agreed to be useful and appropriate will be incorporated into the Commonwealth’s general funding arrangements for higher education (Dawkins, 1988, p. 85-86)

The interest in PIs prompted the establishment of the AVCC/ACDP Working Party on Performance Indicators in 1988 by the Australian Vice-Chancellors’ Committee (AVCC) and the Australian Committee of Directors and Principals in Advanced Education (ACDP). Several government-commissioned studies were subsequently undertaken to develop PIs for application to and within the Australian universities, (Australian Research Council (ARC), 1994; DEET, 1991; Hattie, et al., 1991; National Board of Employment, Education and Training (NBEET), 1993). In 1994, the Joint Working Party on Higher Education Indicators was formed, with members from Australian Vice-Chancellors’ Council, Australian Research Council, Department of Employment, Education and Training, and Higher Education Council.

The application of PIs in Australian higher education system is directly tied to funding in research. Dawkins (1988, p. 28) asserted that “no institutions will be guaranteed funding for research across all its fields of study, and only those with a demonstrated capacity will be funded for research across the broad range of their programs”. This view was shared by the Australian Research Council (DEET, 1989, p. 12): “...
research funds, which should be allocated competitively, should go to those institutions and individuals best able to make the most effective use of them”. The Smith Committee (DEET, 1989, p. 38) also insisted that

... the evaluation of performance of institutions in education and research should become an integral part of the implementation of any higher education funding program. Evaluation of the research performance of higher education institutions should be based on a set of input and output indicators, including reputational analysis and peer assessment.

In 1995, a new Composite Index was constructed for the Research Quantum of the operating grants. This index was revised to incorporate research outputs (publications and higher degree completion) although a dominant weight still rests on inputs. Instead of using success in winning Federal Government grants as the sole criteria for inputs, the inputs comprise of success in winning nationally competitive research grants, including those from the public sector (e.g., state Government), and industry. The new Composite Index was supposed to raise progressively the emphasis on outputs to 30 percent by 1997, and simultaneously drop the weight on inputs.\textsuperscript{36} Furthermore, as part of the educational profile-funding mechanism, universities in Australia are required to develop research management plans in which PIs for research are specified.

\textsuperscript{36} In 1998, input PIs were weighted at 82.5 per cent, publications at 17.5 per cent, and higher degree research completions at 12.5 per cent.
As a result, both universities and researchers now have to compete for funding for research. This was noted and endorsed by the Industry Commission (1994, p. C40): "recent approaches to funding of university research ... have seen a shift away from use of the operating grant towards funding institutions and projects on a selective basis". Wood (1990, p. 81) pointed out that "successful competition for such funds will depend on universities developing and implementing appropriate research management plans and on the overall research performance of their academic staff".

Indeed, with the release of Higher Education: A Policy Statement (Dawkins, 1988), pressures for performance begun to spread right down to the individual academics. The Government indicated that staffing policy should "... provide an environment in which individual excellence in teaching, research and other related functions can be recognised and rewarded, and in which inadequate performance is not protected ..." (Dawkins, 1988, p. 105). The development of PIs was supported to assess a range of matters, including the quality of teaching, and "... academic staff performance in various aspects of research ..." (Dawkins, 1988, p. 86).
The quality movement

Another significant policy of the former Labor Government was *Higher Education: Quality and Diversity in the 1990s* (Baldwin, 1991). It contributed to the promotion of teaching through specific funds. The Committee for the Advancement of University Teaching (CAUT) was formed to improve the quality of teaching through the promotion of good practice and innovation in teaching. In addition, funds were provided from the Reserve Fund to enable institutions to improve teaching quality and encourage and reward good teaching practices.

Another consequence of the above policy was the establishment of the former Committee of Quality Assurance of Higher Education (CQAHE) in 1993, independent from but reporting to the Federal Government. The quality assurance program rewarded institutions which could demonstrate both excellent quality assurance procedures and outcomes. The original offer of about $80 million saw every university under the Unified National System participate in the exercise. Although participation was voluntary, the fact that universities are running on a tight budget means that “even two percent of the operating grant is very large proportion of the discretionary funds available in organisations with high commitments to salaries, buildings and equipment” (Piper, 1994,

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37 However, these funds differ from the Research Quantum in that they are not allocated on the basis of PIs for teaching nor are the amount equal to or more than that of the Research Quantum.
The outcome of the quality reviews was the placing of universities into separate bands, with those institutions located in higher bands receiving more Federal funds. Despite denials from the quality committee, the media reported this to be a ranking exercise (Maslen, 1995). PIs were used to assist the committee in reviewing the quality assurance procedures and outcomes of the universities, particularly in research. This "... stimulated the interest of institutions in deriving a workable and reliable set of performance indicators which allow them to support statements of excellence in their areas of activity" (DEET, 1994, p. 1). Furthermore, it has been claimed that the desire to be ranked highly has led to uniformity among the institutions in terms of quality assurance procedures and practices. Meek and Wood (1997, p. 23) pointed out that although

... the universities were encouraged to determine their own definitions of "quality", in developing quality procedures and practices, institutions have danced in unison more to the tune of the Committee than followed their own inclinations.

The Howard government and performance indicators

The election of the Coalition Government to office in 1996 saw the continued application of PIs. The Government indicated an interest in quantitative PIs to assess the performance of institutions (Kemp, 1997a), and the quality of institutions (Vanstone, 1996). For instance, Dr David Kemp (1998, p. 13), the Minister for DEETYA specified that, "I am
requiring that all institutions include the outcomes of the annual Graduate Destinations Survey and the results of the graduate satisfaction survey using the Course Experience Questionnaire. In fact, DEETYA's interest and effort in the development of PIs for application at the system-wide level appeared to be on-going (Kemp, 1997a).

A prominent policy released since the Coalition Party took office was Learning for Life: Review of Higher Education Financing and Policy (Review Committee, 1998). Amongst other things, the committee reported that the current regulatory framework did not promote diversity or innovation among universities. Instead, institutional policies on resource allocation and quality were claimed to be driven by Government funding decisions. The institutions were also described as being poorly managed. In particular, the committee concluded that "present incentives encourage institutions to undertake research activity at the expense of pursuing excellence in teaching" (p. 87). It went on to elaborate that

Research is the only area of activity in which variables the institutions control relate directly to public funding. It is also the area of activity in which there is the greatest opportunity to gain marginal increases in revenue. This stands in contrast to the allocation of operating funding for teaching, which does not directly reflect the demand for places at a particular institution or the quality of teaching and learning provided. (p. 89)

38 These two PIs pertain to teaching. Course Experience Questionnaire will be covered in Chapter Six.
The committee therefore recommended that the Committee for University Teaching and Staff Development \(^{39}\) promote an enhanced teaching culture in universities with the assistance of additional Government funding. It also asked for a review of the size of the Research Quantum as well as a review on the Composite Index.

The recommendation in the West Report (Review Committee, 1998) for a review on the Composite Index was partly based on the high error rates in publications data. In 1996, an audit report of the 1994 publications data submitted by the universities to DEETYA revealed an error rate of fifty nine per cent. The result was that the 1997 Research Quantum was provisionally allocated using only 1995 publications data (instead of both 1994 and 1995 data). In addition, the universities were required to resubmit their 1995 publications data with clearer instructions and guidance on data collection practices by DEETYA. This time, an error rate of thirty four per cent was found. The main types of errors reported were incorrect inclusions of publications, misclassification of publications, and incorrect weightings of publications (Harman, 1998).

Prior to the West Report (Review Committee, 1998), the Government had made an attempt to elevate the importance of teaching in higher education. The Australian Awards for University Teaching were

\(^{39}\) This committee replaced the former Committee for the Advancement of University Teaching in 1996.
introduced in 1997 in an effort to raise the status of teaching by recognizing and rewarding excellence. Awards of $40 000 were given in each of the eleven discipline categories in 1997. An additional $35 000 was awarded to the Australian University Teacher of the Year.

In summary, since the Coalition took office in 1996, it has accelerated the New Right approaches to public sector restructuring evident under the former Labor Government, which had held onto remnants of a more social democratic orientation. The Coalition Government has continued to utilise (1) quantitative PIs, for instance to judge the performance of institutions, (2) the Composite Index to distribute the Research Quantum (despite reported high error rates in publications data), and (3) teaching awards to promote a teaching culture in higher education. The Coalition Government has also initiated a massive cut-back on public spending to higher education, as well as initiated a move towards permitting universities to offer undergraduate fee-paying positions (Kemp, 1997b).

Conclusion

In the history of Australian higher education, only three governments have engaged in radical restructuring of the tertiary system: Labor under Whitlam, and under Hawke and Keating, and the current Coalition under Howard. While Whitlam initiated the universities’ dependence on the Federal Government for funds with the abolition of tuition fees, the
opposite could be said for the Howard administration with its significant
cuts in higher education expenditure, and the introduction of fee-paying
programmes from which the revenue goes directly to the universities.
However, the reconstruction under Dawkins during the thirteen years of
the last Labor Government has been unprecedented in terms of
changing "the essence of higher education, the university within"
(Marginson, 1996, p. 8). The prominence given to PIs in the
management and assessment of higher education is one facet of this
change. Having reviewed the literature of PIs, developed a theoretical
framework to analyse PIs, and examined the higher education policies in
Australia, the next step is to construct a conceptual schema for the
study. This is undertaken in the following chapter which presents the
framework of the study including the hypotheses.
CHAPTER FIVE: FRAMEWORK OF STUDY

Introduction

The public sector of many western nations, including Australia, have for the past two decades experienced massive cuts in fiscal expenditure, partly due to fiscal constraints, and partly due to the influence of economic rationalism. In Australia, economic rationalism acquired its prominence after the formation of the Hawke-Keating government in 1983. For instance, the Hilmer Report (Independent Committee of Inquiry into Competition Policy, 1993) highlighted the importance of microeconomic reforms based on the economics of the rationalists. The higher education system in Australia, in many instances, experienced the same fate as other public sector agencies, and in the process underwent the most drastic restructuring since Federation in 1901.

The structural changes experienced by Australian higher education institutions clearly point to the conclusion that the Federal Government has in many instances used fiscal rewards to either force changes on the tertiary institutions, or cajole them into adopting the preferred direction of the Government. The attractiveness of financial resources is heightened by the fact that these institutions are largely dependent on the Government for funds, and that there have been cuts in fiscal expenditures to these institutions. The linkage of PIs to funding, namely
the construction of the Composite Index to determine the Research Quantum of the block operating grants to universities, is such a type of incentive funding used by the Government. An institution which scores higher on the PIs in the Composite Index tends to receive more money from the Research Quantum than one with a lower score. Hence, an institution which receives more external research income, for instance, has a better chance of getting more funds from the Research Quantum than another with a lower income, assuming that their number of publications and higher degree research completions are similar.

On the academic level, a similar approach based on financial rewards has been used extensively by the university administration to motivate university academics to work towards the desired direction of the university which basically is a reflection of the Federal Government’s policies. The rewards that are taken into consideration in this study are PI-based funding and promotion. The research funding within institutions which are allocated on the basis of PIs are essentially set up to encourage and reward research among academic staff, as will be reported in Chapter Eight. Thus, PI-based funding is regarded as a reward in this study. When it comes to promotion, the institutions’ values are conveyed to the applicant through the promotion procedures and outcomes (Moses, 1986). At the same time, academic staff are able to see who gets promoted within their institutions and in turn adjust their perceptions. Therefore, academics who are extrinsically motivated will
adjust their behaviour accordingly because they perceive promotion to be an important part of the incentive system. For instance, even before PIs were introduced into the Australian higher education sector, Moses (1986) found out that a significant portion of the university staff in her study put more effort into research than teaching because they were influenced by the promotion system and an institutional climate which favoured research over teaching. In a survey on thirty-two Australian universities, Ramsden and Martin (1996) reported that, apart from confirmation of appointment, promotion is the most central aspect of reward for academic staff. Thus, university promotion is another reward system to be examined in this study. Figure 5.1 gives a simplified summary of the process which leads to modifying behaviour initiated by the Federal Government's higher education policies.

Figure 5.1
A simplified version of the modification process
The Federal Government is responsible for the development and implementation of higher education policies. Due to the fiscal political relationship between the Government and universities, the policies of the Government are essentially adopted by the universities. This includes the application of PIs, as explained by fiscal federalism theory. The fact that the Research Quantum constitutes about five per cent of the block operating grant leads the institutions, in the face of cut-backs of Government funding, to want to maximise the amount of Research Quantum they might receive. However, the final outputs of the university are determined to a large extent by university academics. In order to bring about change at the university level, this will then require a modification of the behaviour of the academics in the direction desired by the university. Essentially, this entails a change in the reward system of the institution to incorporate the PIs of the Government's Composite Index.

The implication of the incorporation of these PIs for research into the university reward system (funding and promotion) is that academics who perform well on these PIs will be rewarded accordingly, while those who choose not to focus on the activities measured by the PIs will not have access to the funds specifically set up for the purpose. Nor will they have a high chance of being promoted. This line of reasoning is based on several motivation theories on performance-contingent rewards - Law of Effect (Thorndike, 1913), principle of reinforcement in operant theory.
(Hamner, 1992), and expectancy theory (Vroom, 1964) - where individuals will be motivated to higher performance if performance is tied to extrinsic rewards.

The importance placed on PIs by the university as witnessed in its change in policies (particularly funding and promotion) means that not only will there be pressure on the university academics to concentrate on the activities measured by these PIs but the academics will also be pressured to raise their performance on these activities. This application of external pressure to raise performance of individuals has been earlier explained by Leibenstein's X-efficiency theory (1976, 1978, 1987). In linking the university reward system to PIs, the receipt of funds from the Research Quantum is perceived by the university to be assured. The final outcome is that the goals of the university academics will be those that are desired by the university administration, which in the first place is a reflection of the Government's goals.

University Administration Level

The introduction of PIs by the Federal Government, particularly the construction of the Composite Index to determine the Research Quantum in the Australian higher education system is likely to have an impact on the individual university. By applying the theorem of fiscal
politics into this analysis, two hypotheses can be formulated on the probable impact of the introduction of PLs at the university level.\footnote{Formal comparisons will not be made in order to protect anonymity. Only the common reactions to the introduction of PLs will be highlighted.}

Adoption of performance indicators

It is suggested that the PLs used by the Federal Government will be adopted by the universities. There are two reasons for this hypothesis. First, the Federal Government has on many occasions encouraged the higher education institutions to implement a PI system for their internal management (e.g., Dawkins, 1988; Kemp, 1997a).\footnote{For instance, "... the performance indicators will add to the information that prospective local and international students, their parents, school counsellors and others can use in choosing courses and institutions ... will facilitate benchmarking and inform future developments in the delivery of education services" (Kemp, 1997a, p. 23-24).} Second, the PLs for research in the form of the Composite Index and National Competitive Grants Index have been used by the Government to determine specific funds, namely the Research Quantum and the Research Infrastructure Block Grant respectively. In other words, the fiscal political relationship between the Federal Government and the universities is a powerful influence on the incorporation of PLs into the internal management of the universities. Ultimately, institutional survival will rest upon the ability of the universities to incorporate PLs into their internal management, particularly those used by the Federal Government.
This hypothesis on the universities’ adoption of the PIs used by the Federal Government also include the replication of the Federal Government’s PI-based funding for research at the institutional level.\footnote{There is currently no PI-based Federal funding for teaching.}

As the Federal Government is the main source of funding for the Australian tertiary institutions, it is likely that the way in which the latter receive these funds from the Government will be replicated at the institutional level in order for the institutions to maximise their funds. In other words, “the mechanisms by which higher education institutions receive their funding have a powerful influence on their internal resource allocation mechanisms” (Williams, 1992, p. 26). In his nation-wide study of Australian universities, Piper (1993) reported that the research PIs in the Composite Index of the Research Quantum were incorporated into the internal funding formula in several universities. It is also likely that Weale’s (1990) observation of the change in the resource allocation within the universities in the United Kingdom as a result of alterations in the University Funding Council funding formula is applicable to the Australian environment.

**Emphasis on activities measured by performance indicators**

It is postulated that the introduction of PIs by the Federal Government will encourage universities to place a high priority on the activities measured by the PIs. Again, the implication of the universities’
dependency on the Federal Government for funding, as explained in fiscal politics, is that the goals of the government will occupy a higher priority over those of the universities. Furthermore, the publication of the “performance” of universities based on PIs by DEETYA (e.g., 1994, 1997) is likely to affect the reputation of the institutions. PIs can become “the means by which institutions organize and direct themselves, and judge their own performance” (Barnett, 1992, p. 89). Indeed, “the use of performance indicators is intended to influence the quality and direction of institutional activities - and they are of no real value if they don’t …” (Linke, 1992, p. 185). Since the introduction of the Composite Index in the Research Quantum, Australian universities have been reported by Anderson, Johnson, and Milligan (1996) to increase their emphasis on research, particularly on winning research grants and concentrating on the types of publications that are given heavy weighting in the Composite Index.

The effect of the introduction of PIs is particularly prominent in the case of the research PI, external research income. The use of this indicator has led to many Australian institutions “... encouraging, indeed exhorting, their staff to apply for more external research money” (Quest for research funds, 1996, p. 9). This has been earlier reported in several studies (e.g., Harman and Wood, 1990; Moses, 1992). One Australian university even rewarded every academic for submitting an Australian
Research Council application (Piper, 1995). The extent of the pressure applied on academics is revealed by Henry and Ross (1991, p. 95):

On Day One of amalgamation (to Queensland University of Technology), Heads of Department of the former BCAE (Brisbane College of Advanced Education) were apprised of some of the implications of new “program budgeting” procedures: manage your own resources, go out and raise funds, or sink.

Legally trained research contract officers are appointed for the research grants offices in the universities in order to assist with the application and negotiation of industry-focused competitive research grants schemes (Johnson, 1993). Wood, Meek and Harman (1992) observed that the research grant offices are now actively involved in the research process of their universities, a far cry from their previous primary clearinghouse or administrative role. They continued that “it is of no surprise that the universities which consistently rank in the top positions regarding the percent of total ARC (Australian Research Council) funds they receive have very active research grants offices” (p. 21).

Similarly, the use of publications by the Federal Government as another common PI for research has led universities to urge their academic staff to publish more. In their study of academics in five Australian universities in the state of New South Wales, Harman and Wood (1990) noted that academics under the Unified National System are under intense
pressure to publish. Thus, for the reasons and examples given above, it is likely that the introduction of PIs by the Federal Government will see the universities place a high emphasis on the activities measured by these indicators.

In summary, it is proposed that tertiary institutions in Australia are being cajoled and/or coerced to use a set of PIs which mirrors those of the Federal Government. The PIs which are associated with specific Federal funding are likely to be incorporated into the management of the universities, and included in their internal funding formulae. At the same time, the university management will place a high emphasis on the activities measured by these PIs, primarily because these PIs determine a significant amount of their future Federal funds. The underlying rationale for the previous two hypotheses is to show that the introduction of PIs has actually increased the control over the universities in terms of conformity to the Government’s directives. It is possible that the introduction of the PIs, in particular, the Composite Index, has contributed to conformity among the universities in their priorities for research as well as in their design and management of internal research policies. The above two hypotheses are likely to contribute to a change in the university’s internal policies, which in turn may affect the work of the academic staff within these institutions.
University Academic Level

Academics are the basic strategic element in universities. They determine the final quantity and quality of research and teaching. And the academics’ approach to their work, is, just like any other employee, affected by, among other factors, their organisations’ policies, in particular the reward system. Based upon the motivation theories on performance-linked rewards covered in Chapter Three (e.g., Hamner, 1992; Vroom, 1964), it is likely that the university reward structure (promotion and funding) will determine the magnitude and direction of an academic’s approach to work, which in turn will affect the outcomes of research and teaching in the universities. Therefore, as university policies change in response to changes in Federal Government’s policies on PIs, particularly the incorporation of PIs by the university management to specific internal funding and academic promotion systems, it is likely that the extent and way in which the university academics carry out their research and teaching will be affected.

In addition to the previous two hypotheses made at the institutional level, four propositions are made at the university academic level. Of these four hypotheses, the first relates to the academics’ attitude to the PIs currently in use in their universities. The other three hypotheses deal with the impact of PIs on academics’ work: the paperwork load, approach to research, and approach to teaching.
Negative attitude towards performance indicators

It is hypothesised that university academics in general have a negative attitude towards the PIIs currently in use in their universities. The literature on PIIs in Chapter Two has indicated that PIIs have been perceived to be used by the Government and, in turn, the university administration to increase their control over academics’ work activities. In addition, the literature reveals several limitations of the application of PIIs, such as an increase in paperwork load, and engagement in strategic behaviour. Prima facie, the academics are likely to be adversely disposed to the introduction of PIIs because of their concerns with these issues. The research seeks to show that academics are not supportive of the PIIs in use in their universities because of specific problems rather than because of PIIs per se. It is also possible that the fact that PIIs have been tied to Federal funding for research but not for teaching may contribute to the discontent felt by the university academics towards PIIs, as the institutions tend to mirror the funding mechanisms of the Government’s.\footnote{It should be pointed out that the introduction of PIIs has taken place at a time when other significant changes have also affected universities and academics, such as the effects of prolonged under-funding, the emergence of managerialism, and the moves toward commercialising research and teaching activities. In questioning academics about their work activities then, PIIs are only one of the possible ways of accounting for some of the disaffection and changes in their activities. It should be recognised as possible that the changes attributed to PIIs may also be attributable to these other factors, or the more likely possibility, that they are attributable to all of them together, in interaction.}
Increased paperwork

One of the problems associated with the use of PIs, as revealed in the literature, is the paperwork load. For instance, the use of external research income as one of the determinants of Federal Government research funds, together with the competitive nature of external research funding and pressures from the university to apply for external grants, have caused several academics to expend considerable effort in submitting multiple applications to various funding bodies (Quest for research funds, 1996). With the reported progressive reduction in the success rate in the ARC grants (Industry Commission, 1995) which constitutes one of the major sources of research grants for universities, it is likely that a significant amount of academic time will be devoted to preparing proposals and accounting for the ways in which the funds are used (Williams, 1992). Therefore, it is postulated that the introduction of PIs has contributed to more paperwork for university academics. Only research PIs are examined here as to the author’s knowledge, there is no paperwork involved with student evaluations on teaching and employment outcomes of graduates at this stage.  

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44 As an example, in 1997, Osmond reported that the Australian Research Council Large Grants has a success rate of only 23.55 per cent.

45 Subsequent to the study has resulted in more paperwork for academics.
Change in the approach to research

It is hypothesised that the introduction of PIs has been associated with a change in the approach to research of academics. According to several researchers in Australia (Anderson, Johnson, and Milligan, 1996; Mahony, 1995), research is now more narrowly defined, particularly in terms of publications and seeking external research grants. In his study carried out across the Australian higher education system, McInnis (1992) reported on the changes given to the emphasis on research and teaching, and to the ways in which they are carried out. Therefore, the change in research by the academics in this study can be analysed in terms of both an emphasis on the activities measured by the PIs, and an increase in the quantity produced in these activities.

Emphasis on the activities measured by the performance indicators

It is expected that PIs, particularly when linked to the university reward structure, will encourage university academics to focus on those activities measured by the PIs. Indeed, PIs “can be used to coerce, cajole, or convince departments ... that certain directions are more profitable ...” (Hattie, 1990, p. 270). It has been stated that “... the allocation of economic resources determines the structure of the university and, the academic work being carried out in it” (Blau, 1973,
p. 278). This departmental focus translates into an impact on individual academics. Thus, it is expected that academics are under pressure to reorganise their research and teaching to suit the PIs (Bruneau, 1995), both indirectly through pressure from their departments and directly through their institutional reward system.

On the other hand, the literature on academic job motivation reveals that academics, including those in Australia, are motivated by the intrinsic rewards of their work, such as, contact and intellectual exchange with students and colleagues (Froh, Menges, and Walker, 1993; McInnis, 1992; McKeachie, 1979; Veysey, 1965). However, the economic upheaval in Australia and other western nations in the past two decades, particularly the high unemployment rate and massive reforms in the higher education system including financial cut-backs, make it impossible to dismiss the impact of extrinsic rewards on academic job motivation. Although intrinsic rewards are highly valued by university academics, there is also a strong likelihood that extrinsic rewards are an important element in academic motivation, and, in particular, are a reflection on how they are esteemed (McKeachie, 1979; Schuster, 1985). For instance, the promotion system is an indication of whether academics are esteemed by their peers (Baldwin and Krotseng, 1985). Thus, the incorporation of PIs into the institutional promotion and funding mechanisms can provide an incentive for some academics to focus strategically on the activities measured by the indicators.
Increase in quantity produced

It is also expected that PIs can motivate or cajole university academics to higher work performance on those activities measured by the research PIs in terms of quantity. One of the functions of PIs reported by Jowett and Rothwell (1988) is improvement of job motivation. On the other hand, Hattie, et al. (1991, p. 65) stated that “It is not obvious that using performance indicators will necessarily enhance and stimulate research”. However, the incorporation of PIs into the reward structure of the university will, in most cases, in this climate of cut-backs in both resources and labour, increase pressure for university academics to increase their performance strategically in terms of quantity (as the current PIs do not incorporate quality or significance element) on the activities measured by the PIs. Roe and Moses (1986, p. 73) summed up the effects of PIs:

Once a set of performance indicators had been formalised and had become the official measuring instrument for department performance, departments would inevitably tailor their performance to fit. At worst they would be confined within a strait-jacket, all effort devoted to scoring well on each indicator, in much the same way as many student efforts are confined by and directed towards whatever is laid down by examination requirements.

More specifically, there is a possibility that the number of publications and applications for external research grants will rise significantly.
Another indicator is the completion rate of students, and in the context of research, higher degree research students. The weight allocated to it in the Composite Index is considered to be relatively low. It is unlikely that the supervision of higher degree students will be affected to the same extent as publications or external research grant applications. First, there is a limit to how much an academic can do in order to ensure that the research students complete their higher degrees in the minimum time period. In other words, while academics can directly control their own actions, for instance, in the quantity of publications and external research grant applications, it would be difficult for them to control directly the actions of others, namely their students, to ensure early completions. Second, based on the assumption that one of the reasons for joining academia is intellectual exchange and contact with peers and students, it is unlikely that academics will pressure their research students to the point where it would be unfair to them.

No significant change in approach to teaching

As mentioned earlier, although the Australian Government has linked PIs to a proportion of its annual funding in research, the same does not apply to teaching. Federal funding on teaching is still largely based on student numbers. Since the resource allocation mechanisms of universities are expected to reflect that of the Government (as discussed in the first hypothesis of this study), the absence of the Government’s PI-
linked teaching funding will mean that the institutions either will not have internal PI-linked teaching funding schemes or the significance of such schemes will be comparatively less than their internal PI-linked research schemes, particularly in terms of financial rewards. It is therefore postulated that the introduction of PIs has not been associated with a significant change in the approach to teaching. A probable explanation is that the academics in this study may not be convinced that teaching is rewarded to the same extent as research in terms of funding and promotion. Thus, based on motivation theories on performance-linked rewards (e.g., Vroom, 1964), it is unlikely that the approach to teaching will change substantially compared to that of research.

The hypotheses

The above expectations are summarised in the following six hypotheses in Table 5.1, and diagrammatically shown in Figure 5.2.
Table 5.1
Study hypotheses

H1: PIs used by the Federal Government will be adopted by the universities.

H2: The introduction of PIs by the Federal Government will encourage universities to place a high priority on the activities measured by the PIs.

H3: University academics in general have a negative attitude towards the PIs currently in use in their universities.

H4: The introduction of PIs has contributed to significantly more paperwork for university academics.

H5: The introduction of PIs has been associated with a significant change in the approach to research by university academics.

H6: The introduction of PIs has not been associated with a significant change in the approach to teaching by university academics.

Figure 5.2
The proposed model for the study

<table>
<thead>
<tr>
<th>University level</th>
<th>Academic level</th>
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<tbody>
<tr>
<td>Introduction of PI-linked funding by the Government</td>
<td>Adoption of similar PIs by the university</td>
</tr>
<tr>
<td>Emphasis on the activities measured by the PIs</td>
<td>Negative attitude to PIs</td>
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<td>Increased paperwork</td>
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<td>Change in the approach to research</td>
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<td></td>
<td>No change in the approach to teaching</td>
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</tbody>
</table>

Conclusion

Given that the study framework has been constructed and hypotheses formulated, it is now appropriate to proceed to the methodology used in this study. This is covered in the next two chapters.
CHAPTER SIX: SAMPLE AND QUESTIONNAIRE DESIGN

Research Setting

The present study was conducted in four state Australian universities under the Unified National System within the state of Western Australia. Time and cost considerations made it impossible to attempt a nationwide study. However, the four universities chosen in this study are representative of the types of institutions found in the Unified National System of Australian higher education system. In other words, their characteristics are essentially the same as that of other universities found across Australia. They constitute a pre-World War II university (University of Western Australia), a post-World War II university (Murdoch University), an ex-Institute of Technology university (Curtin University of Technology), and an ex-College of Advanced Education university (Edith Cowan University). Under the binary era, the former two universities enjoyed a strong research tradition while the latter two institutions had a high teaching profile.

Within the universities, different disciplines have different research traditions and can be affected by the use of PIs in different ways. For instance, medical researchers usually favour journal articles while computer scientists tend to prefer refereed international conference proceedings (CQAHE, 1995). Different disciplines and areas of research within a discipline also vary in their requirements for research funds.
(Johnes and Taylor, 1990; Smith, 1987; West, Hore, and Boon, 1980). In many cases, research costs less to carry out in Arts/Humanities compared to Natural Science and Engineering disciplines, which may require equipment and research assistants. This is consequentially likely to affect the amount of external research money required. Similarly, in some cases, it is probable that abstract and theoretical work require less resources than those which need experiments or the collection and analysis of large amounts of data (Cave, Hanney, and Kogan, 1991). Thus, the following disciplines chosen in the study are intended to provide a representation of the views of PIs as well as the impact of PIs across disciplines. They are as follows: (1) Arts/Humanities, (2) Science, (3) Professional.\footnote{The original intention of this study was to survey four disciplines. Arts/Humanities and Natural Sciences were chosen as non-professional disciplines, and Social Sciences and Physical Sciences as professional disciplines. However, the poor response rate from Social Sciences and Physical Sciences meant that the respondents from these disciplines had to be grouped together.} Table 6.1 presents the disciplines surveyed in the four different universities, but the universities are not identified by name.
Table 6.1
Disciplines surveyed

<table>
<thead>
<tr>
<th>Universities</th>
<th>Disciplines</th>
<th>Professional</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Arts/Humanities</td>
<td>Science</td>
</tr>
<tr>
<td>University A</td>
<td>English</td>
<td>Physics</td>
</tr>
<tr>
<td>University B</td>
<td>History</td>
<td>Chemistry &amp; Zoology</td>
</tr>
<tr>
<td>University C</td>
<td>English</td>
<td>Human Biology</td>
</tr>
<tr>
<td>University D</td>
<td>English</td>
<td>Physics &amp; Chemistry</td>
</tr>
</tbody>
</table>

Subjects

As the objective of this study was to report on the changes to research and teaching as a consequence of the introduction of PIs, only university academics who have witnessed these changes were selected to participate in the survey. The release in 1988 of Dawkins' *Higher Education: A Policy Statement* heralded in the PI movement across the Australian higher education system. Therefore, it is presumed that current academics who have worked in an Australian tertiary institution prior to 1988, particularly before 1987 (when Dawkins' *Higher Education: A Policy Discussion Paper* was released), should be in a good position to notice any changes to research and teaching brought about by the introduction of PIs. 1986 was accordingly chosen as the cut-off point for "before the introduction of PIs" period. However, one possibility considered that the number of academics who met this criterion in the
selected disciplines would not be sufficient, particularly if the response rate to the questionnaire was poor. Furthermore, it was only in the period between the early to mid-1990s that most of the Australian tertiary institutions took steps to incorporate PIs in their internal management, such as the establishment of PI-based funding for research. Accordingly, 1991 was taken as the period of the early stages of change in the institutions. Hence, a decision was reached that university academic staff who had been in an Australian institution since at least 1991 would be invited to participate in the study. The academic staff in this study represent all levels of appointment, from Level A to Level E.\textsuperscript{47} The demographic details of the participants in this study are shown in Table 9.1 in Chapter Nine which presents the results of this study at the academic level.

Data Collection

The data in this study were derived from two sources: (1) university administration, and (2) university academics. In the former case, the relevant policies relating to research and teaching were collected from specific personnel in the university administration and/or through the website. In addition, a case study was carried out on one of the universities surveyed. The case study provides a rich and holistic

\textsuperscript{47} A Research Fellow was also surveyed because that individual was in a university department which has its own database system and that individual was responsible for maintaining it.
account of the impact of the introduction of PIs on the internal policies relating to research and teaching with respect to PIs in the university.⁴⁸

Data from the academic staff were collected using a questionnaire and/or an interview. The literature on research methodology reveals that the disadvantages derived from using a mailed questionnaire tend to be offset by those in a personal interview, and vice versa (Franfort-Nachmias and Nachmias, 1992; Krathwohl, 1993; Oppenheim, 1992; Sekaran, 1992; Selltiz, et al., 1965; Tudd, Smith and Kidder, 1991). For instance, the lack of the opportunity to clarify or probe in a questionnaire is compensated by an interview. On the other hand, an interview is time-consuming and costly to carry out when the subjects are geographically dispersed, unlike a questionnaire which can cover the study population across a wide area with minimum time and costs.

Therefore, a majority of the subjects were surveyed through a mailed questionnaire in an effort to minimise costs and time and a semi-structured interview was arranged for a sub-set of the group. The statements in the interview (in Appendix 4) are mainly similar to those in the questionnaire (in Appendix 5) except that they are designed to obtain a more in-depth response.

⁴⁸ Merriam (1988) and Yin (1993, 1994) provide more detailed information regarding the rationale for case studies, and the methodological opportunities they provide.
Procedures

Before the questionnaire was distributed to the respondents, permission was sought from Murdoch University's Human Research Ethics Committee. Upon its approval, a letter was forwarded to the appropriate personnel in the central administration of the other universities in order to ask for permission to carry out a survey of their academic members. A letter was also written to the Heads of Departments or Schools in all four universities in an effort to obtain their consent to approach the academic staff within their units. Upon their approval, an attempt was made to establish the identities of the academic staff who had been employed in an Australian university since at least 1991, in most cases through the School/Department secretaries. As far as possible, academic staff who were away on study or long service leave during the period of data collection were eliminated from the survey.

Within each discipline and each level, the university academics who were interviewed were randomly chosen. The exceptions were Heads of Departments or Schools. An effort was made to interview all of them (except three who were overseas during the period of data collection) in order to obtain their views and observations on the effects of PIs, particularly on the academic members within their unit. The academics were contacted by telephone and/or electronic mail, and were invited to cooperate in the study. Upon their approval, a date and time was made
to interview them at the convenience of both the interviewee and interviewer. The academics from Murdoch University were interviewed first, followed by those at the University of Western Australia, Edith Cowan University, and Curtin University in that order. Each academic was interviewed individually except in one case where two academics were interviewed at the same time at their suggestion. Apart from one interview conducted on Murdoch campus with an academic from another institution, all the interviews were carried out in the academic's office. The interview, lasting between half to one hour, covered the questionnaire and seven interview statements. Upon the approval of the participant, the interview was taped and transcribed.

The rest of the academic staff in this study were sent the questionnaire along with a personalised letter explaining the importance of the research. They completed the questionnaires in their own time and returned them in the return-addressed stamped envelopes supplied. Participation was voluntary, and the respondents were assured of confidentiality of results. All respondents were also required to complete a consent form (see Appendix 7).

Of 287 questionnaires sent out, 152 were completed and returned. This represents a response rate of fifty-three per cent. Details of the response

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49 The letter is found in Appendix 6.
rates from both the mailed questionnaire and personal interview are provided in Table 6.2.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Questionnaire</th>
<th>Interview</th>
<th>Proportion of respondents who were Interviewed (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>Murdoch</td>
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<td>11</td>
</tr>
<tr>
<td>UWA</td>
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<td>51</td>
<td>10</td>
</tr>
<tr>
<td>ECU</td>
<td>36</td>
<td>55</td>
<td>8</td>
</tr>
<tr>
<td>Curtin</td>
<td>52</td>
<td>48</td>
<td>14</td>
</tr>
<tr>
<td>Discipline</td>
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<td></td>
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<tr>
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<td>Science</td>
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<td>Professional</td>
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<td>D</td>
<td>32</td>
<td>70</td>
<td>9</td>
</tr>
<tr>
<td>E</td>
<td>19</td>
<td>66</td>
<td>9</td>
</tr>
</tbody>
</table>

UWA = University of Western Australia, ECU = Edith Cowan University
* exclude one Research Fellow who was interviewed and completed the questionnaire.

Nature and Structure of Questionnaire

Both open-ended and closed-ended statements are found in the questionnaire. It was anticipated that the academics surveyed would give different responses. Closed-ended statements anticipate all the possible responses. However, it was possible that the academics surveyed would give new insights or unexpected responses. In Australia
and overseas, research devoted to the study on the consequences of PIs on academic’s work are not extensive, probably due to the recency of their introduction even though much anecdotal evidence on the effects of PIs on academic’s work is available. Accordingly, open-ended statements allow the respondents to comment on the effects of PIs on their research and teaching that may not have been covered or inadequately covered in the questionnaire (Sekaran, 1992). Open-ended statements also provide the opportunity to probe, such as how strongly a respondent feels about a certain issue, or an explanation for their response (Oppenheim, 1992). As it was the intention of this study that the data would be analysed qualitatively (as well as quantitatively), open-ended statements are therefore highly relevant to this study.

On the other hand, closed-ended statements are attractive to this survey for three main reasons. First, as the response rate affects the quality of the data collected in a questionnaire, any factors which improve the response rate are taken into consideration. An obvious advantage provided by closed-ended statements is their relative ease of completion compared to open-ended statements (Oppenheim, 1992). The implication is that the respondents will take less time to complete a questionnaire containing the former than one containing the latter. Therefore, closed statements can have a better impact on response rate than open statements. Second, closed statements ensure that the answers are given in a frame of reference relevant to the purpose of the
study (Selltiz, et al., 1965). Third, closed statements allow data to be analysed quantitatively. Furthermore, the literature reveals that the advantages offered by closed statements more or less complement the disadvantages of open statements, and vice versa. For instance, unlike closed-ended statements, open-ended statements permit freedom and spontaneity of the answers. On the other hand, open statements are time-consuming in terms of data collection, processing, and analysis, whereas closed statements require relatively less time (Oppenheim, 1992). This has led authors, such as Selltiz, et al. (1965) to recommend the use of combination of open and closed statements in the collection of data, as was carried out in this study.

A Likert scale was employed for the closed-ended statements. Authors such as Sekaran (1992) have pointed out that it is a more powerful scale than the nominal and ordinal scales. In particular, it determines the differences, order, and the equality of the magnitude of the differences in the variable. The Likert scale was used in the questionnaire to assess the degree of (1) agreement or disagreement, or (2) change (increase as opposed to decrease), or (3) increase, to the statements provided. Respondents were required to tick their responses in the boxes provided.

In terms of structure, the questionnaire is made up of seven sections. Apart from the last section, each section represents a scale that is
assessed with a series of related statements. In order to ensure that the
data collected were of high quality, several definitions were given at the
beginning of the questionnaire. PI was defined in detail and it was
explicitly pointed out that the term referred to the PI in actual existence
in the participant’s university. Activities which were regarded as teaching
as well as those which were considered as research were given with
specific emphasis that supervision of postgraduate research students
was classified as a research activity in this study. Similarly, in an effort to
avoid any misunderstanding, in the second scale of the questionnaire,
the term internal fund was defined to include performance-based
funding.

Section 1: Attitude to PIs scale

This scale was designed to test the hypothesis that academics have a
negative attitude towards PIs. The respondents were asked to indicate
their degree of agreement or disagreement with each of eighteen
statements, ranging from “strongly agree” to “strongly disagree” on a
four-point Likert scale. A “don’t know” category appeared on the right
hand corner of the scale after “strongly disagree”. This last category was
included to take into account respondents who were unaware of PIs or
their benefits/disadvantages. However, because the category generally
did not reflect a position between agree and disagree, it was not placed
between them (Andrich, de Jong, and Sheridan, 1997). Responses of
“don’t know” were treated as missing data. The responses of all the eighteen statements were scored from 0 to 3, and then summed for each respondent. A high score indicated a favourable attitude to PIs. Eight of the statements required reverse scoring. Reverse scored statements were included from a methodological point of view to take account of response sets, as well as the fact that there might be some respondents who genuinely had a positive attitude to PIs. As it was proposed that academics in this study have a general negative attitude to PIs, a low score was expected.

Content of the statements: Rationale

As indicated earlier, eighteen statements were constructed to operationalise the respondents’ attitude to PIs. The rationale for their inclusion into the *Attitude to PIs* scale are provided below.

It will be recalled from the literature review on PIs in Chapter Two that university academics in general have a negative attitude towards the application of PIs in higher education. The pilot study on the questionnaire (to be discussed later) confirmed this view. In particular, the academics surveyed in the pilot study were dissatisfied with the choice of PIs and/or process in which the indicators were used in their university. Accordingly, a statement relating to the participant’s dissatisfaction with the choice of current PIs used in his/her institution,
and another relating to the participant’s dissatisfaction with the process in which the current PIs were used in his/her institution, were added to the questionnaire. The former statement is shown below.

I am not happy with the choice of the current performance indicators used in this University.

The literature review on the dysfunctional effects of PIs included control and strategic manipulation, which could ultimately affect the quality of research and teaching in universities. Therefore, the following statements were asked in the first scale: (1) a statement relating to an increase in control by the Federal Government, and another statement on increased control by the university administration, (2) a statement relating to dysfunctional work behaviour associated with PIs, and (3) a statement relating to an improvement in quality of research, and another on improvement of quality of teaching.

The literature on PIs in Chapter Two also covers the benefits of the application of PIs. One of these perceived benefits is that PIs increase accountability (Cave, Hanney and Kogan, 1991; Jowett and Rothwell, 1988). Accordingly, a statement on assistance provided by PIs to academics in terms of accountability for their work was included. Another claimed advantage of using PIs is in terms of better knowledge of organisational goals and priorities (Hattie, 1990; Hattie, et al., 1991). Therefore, three statements were constructed. The first statement seeks
to assess whether PIs provide academics with better knowledge of institutional goals. The second statement evaluates whether the use of PIs by the Federal Government provides direction to universities on its goals. The third statement attempts to assess whether the use of PIs by the university management provides direction to academics on institutional goals.

The provision of feedback on work performance is another expected benefit of PIs (Pollitt, 1990; Spee and Bormans, 1991). For instance, feedback from students is valuable for improving teaching (Kennedy, 1995). Accordingly, two statements on the provision of feedback on work performance from PIs to academics were included, one of which was reverse-scored. Both these statements are shown below.

Academics in this University do not need performance indicators to know that we have done a good job.

Performance indicators help academics in this University by providing feedback on our work performance. (Reversed scored)

In addition, it was uncovered in the pilot study that feedback on work performance could be particularly useful to specific groups of academics, such as new appointments. Hence, a statement was asked as follows:

Performance indicators help to improve the work performance of specific academics (e.g., new academics).
The introduction of PIs also allows performance to be monitored (Ball and Wilkinson, 1994). This monitoring can be carried out at two levels: (1) across institutions, and (2) within institutions. Thus, two statements were included in the first scale. One of these was on PIs used by the Federal Government to monitor the institution’s performance and, another statement was on PIs used by the institution to monitor academic’s performance.

Although this scale was designed to tap the extent of the academics’ dissatisfaction with PIs, academics might support the introduction of PIs in their institutions, possibly because of the benefits mentioned above, or because of their perceptions that the advantages derived from using PIs outweigh the disadvantages. As a result, a statement relating to the respondent’s support for the PI movement within his/her university was added. In addition, a statement on the use of PI bringing more advantages than disadvantages was included.

Section 2: Perceptions of university reward system scale

This scale was derived from Vroom’s (1964) expectancy theory. One of the requirements in this motivation theory is that the individual must perceive that his/her action will lead to the attainment of a reward. This scale was therefore constructed to observe whether the respondents associate selected PIs with their university reward system. In this way, it
could be later observed whether there was an association between rewards and job behaviour.

As it was the purpose of this study to concentrate on research and teaching, rewards pertaining to research and teaching were addressed in the statements. The PIs for research in this study comprise of publications count, success in winning external research grants, and number of higher degree research completions. The PIs for teaching that are assessed in this study are student surveys on teaching, and graduate employment outcomes. Justification for their choice were covered earlier in Chapter One under Focus of the Study. In addition, although PIs for both research and teaching have been applied for the management of institutions, only the PIs for research have been tied to specific internal funding within many Australian institutions. Therefore, in order to carry out a thorough investigation of the influential effect of monetary rewards on job behaviour, it is relevant to assess activities for which monetary rewards are present (ie. research) as well as activities which are not rewarded to the same extent (ie. teaching).\textsuperscript{50} Examples of statements found in the second scale are shown below.

\footnotesize
\textsuperscript{50} Past studies (Anderson, 1988; McInnis, 1992) have found that teaching plays a minor role compared to research in academic promotion. Furthermore, while student surveys have in recent years been linked to academic promotion, the receipt of such a reward does not occur as frequently or easily as the receipt of internal funds for research. At the time of this study, the participants did not receive any direct monetary benefits based on graduate employment outcomes.
1. High performers in research have a better chance than high performers in teaching of getting:
   (a) promoted
   (b) internal funds

5. Academics who receive favourable student surveys on teaching have a better chance of getting:
   (a) promoted
   (b) other benefits (please elaborate)

The Likert scale employed is similar to that in the first scale, i.e.,
respondents were required to answer each statement in terms of their
degree of agreement or disagreement with it.

Scales designed to tap changes in work activities

The next four scales in the questionnaire were designed to find out any
changes in the work activities of the respondents as a result of the
application of PIs. These scales required the respondents to compare
their work activities, in most cases, between 1997, the year in which the
survey was carried out, with 1986, the year before PIs were introduced
by the Government. The respondents were also asked to compare their
activities in 1997 relative to 1991, the year when universities were taking
steps to introduce PIs. The main purpose of this study was to examine
the effects of PIs on research and teaching undertaken by university
academics. This issue is addressed in the third, fourth, and sixth scales.
The third scale covers general research and teaching activities, the
fourth scale looks at specific research activities, and sixth scale deals
with specific teaching activities. The fifth scale is concerned about the 
change in paperwork load.

Section 3: General research and teaching activities scale

The aim of this scale was to serve as a preliminary scale to the fourth 
and sixth scales. General statements relating to research and teaching 
were asked, in particular any changes in teaching load and research 
load, as well as changes in the pressure to do more teaching and 
research. The purpose of the former statements was to find out whether 
the research and teaching undertaken by the respondent were altered in 
the first place. Past studies (Currie, 1996; Currie, Vidovich, Welch, and 
Pears, 1996; Welch, Currie, Vidovich, and Pears, 1997) have shown that 
university academics are now required to do more research and 
teaching. An example of the statements used are presented below.

3. My research has increased or decreased now compared to: 
(a) 1986 
(b) 1991

A five-point Likert scale was used, with the responses ranging from 
“increase a lot” to “decrease a lot”, with “no difference” positioned on the 
right-hand corner of the scale, after “decrease a lot”. The “no difference” 
response was grouped together with the “not relevant” response, and 
located at the end of the scale rather than the middle. This is because 
the statements in this scale (as well as the subsequent scales) were
constructed to study change in work activities. Since “no difference” indicated status quo, it was deemed to be not informative about change. It should also be pointed out that the score for a “no difference” response was distinguished from the score of a “not relevant” response. “No difference” was given a middle score and “not relevant” was treated as missing data. The last section of the questionnaire (section 7) on the employment profile of the respondents made it possible to distinguish between the two categories of the “no difference” and “not relevant”. For instance, a respondent who did not answer all the statements in the last section under the year of 1986 was assumed not to be in an Australian university during that period. Thus, statements on the period of 1986 in the questionnaire were assumed to be “not relevant” to that respondent. Similarly, if a respondent indicated that he/she was employed to do only research in one of the periods surveyed, any statements on his/her teaching activities might not be relevant for that period. Furthermore, many respondents attempted to distinguish their “no difference” response from their “not relevant” response.

Several Australian scholars have reported that the nature of research undertaken by academics in Australian institutions has changed. For instance, recent studies on the research activities in the Australian universities have indicated heightened pressures for academics to publish more, and apply for more research grants (Harman and Wood,
1990; Moses, 1992). For this reason, two statements relating to changes in the approach to research were included. These are shown below.

5. My approach to research has changed now (e.g., concentrating more on applying for external research grants, or publications) compared to:
   (a) 1986
   (b) 1991
If you agree to either statement 5(a) or 5(b), please elaborate.

Moreover, based on theories of motivation on performance-linked rewards (Hamner, 1992; Vroom, 1964), the relatively more extrinsic rewards associated with research rather than teaching might influence the academic’s job priorities between research and teaching. For instance, an academic who was motivated by the presence of monetary rewards could focus more on research at the expense of teaching. Accordingly, two statements were included in the third scale which focused on changes in the participant’s priorities between research and teaching. As the statements on priorities between research and teaching, as well as the approach to research required the respondent to agree or disagree to the statements, a four-point Likert scale was used which was similar to that used in the first and second scales. The hypothesis of an association between the introduction of PIs and a change in the academics’ approach to research was tested by statements relating to research in the third scale, as well as in the fourth scale.
Section 4: Specific research activities scale

This scale was divided into three subscales. Publications, external research grant applications, and higher degree research student supervision were the research activities which were tapped in subscales A, B and C respectively. These are the activities which are measured by the PIs at the institutional and individual academic levels. As it is impossible for an academic to receive external research grants without applying for such grants in the first place, this scale concentrates on external research grant application instead of research income as part of the research activity undertaken by the university academics.

Content of the statements: Rationale

As in the third scale, each activity that was assessed had two statements devoted to determining the intensity of the rise or change in pressure by the university to do more of the activity concerned. These statements were derived from the X-efficiency theory (Leibenstein, 1978) in which heightened external pressure has been suggested as having an effect on work performance. An example of such a statement is shown below.

1. The pressure from the University to publish has increased now compared to:
   (a) 1986
   (b) 1991
In order to publish or apply for external research grants, an academic must devote some time to such an activity. Thus, academics who are motivated to increase their number of publications or grants received would set aside time to write papers or apply for external research grants respectively. Therefore statements that were asked on publications and external research grant applications included time spent on the activities. In addition, the quantity of publications produced and external research grant applied by the respondent were addressed because the PIs chosen by the Federal Government and, in turn, the universities to measure these two activities tend to focus on the quantifiable aspect of these activities, ie. publications count and external research grant income.

The exclusive emphasis on quantity of publications in the determination of the Federal Government’s Research Quantum has generated intense debate about the quality of publications, as revealed in the literature review on PIs in Chapter Two. Accordingly, two statements were included under Publications in scale 4A which relied on the honesty of the respondents to reveal any changes in their quality of publications. These are shown below.

4. The quality of my publications has increased or decreased now compared to:
   (a) 1986
   (b) 1991
Under the Federal Government’s Composite Index, the different types of publications and grants were weighted differently. This would be covered in detail in Chapter Eight. Academics who were motivated to increase the amount of their extrinsic rewards might choose to concentrate on the types of publications or external research grants which were more heavily weighted. Hence, in scales 4A and 4B, two statements were devoted to noting any change in the types of publications and external research grants applied respectively.

Furthermore, since external research grant bodies have their own priorities or objectives, a primary determinant of the academics’ success in winning these grants is their willingness to conform to these priorities (Marginson, 1997). For instance, an academic may be coerced to do research outside his/her area of interest for the sole purpose of getting external research funding for his/her department or school, or even to partly fund his/her area of interest when limited funds exist for that area. Thus, two statements were added to scale 4B that focused on changes in the participant’s priority areas in research.

When it comes to higher degree research supervision, based on theories of motivation that extrinsic rewards could affect job behaviour (Hamner, 1992; Vroom, 1964), an academic who was motivated to raise the number of completions among his/her postgraduate research students supervised might change his/her nature of supervision, including the
time span of supervision. Hence, in scale 4C, in addition to the first statement on pressure increase, the respondent was asked in what way this raised pressure affected his/her supervision. The statements were inter-related because a respondent who did not perceive any increase in pressure was unlikely to change his/her supervision, as explained in the X-efficiency theory (Leibenstein, 1978).

Section 5: Paperwork scale

This scale was designed to test the hypothesis that there had been an increase in paperwork load by university academics as a result of the introduction of PIs. As the hypothesis only applied to the three research PIs mentioned in the fourth scale, statements on paperwork load associated with these indicators were found in the fifth scale. These are as follows: (1) evidence of publications (2 statements), (2) application for external research grants (2 statements), and (3) supervision of postgraduate research students (2 statements). As in the third and fourth scales, each type of paperwork looked at two periods, namely 1997 compared to 1986, and 1997 compared to 1991, hence providing two statements per statement. Two statements are illustrated below as examples.

1. I have to do more paper work now:
(b) in preparing proposals to apply for external research grants compared to:
   (a) 1986
   (b) 1991
Since the statements were in terms of the degree of increase in the respondent’s paperwork load, a four-point Likert scale was employed. These are “a lot”, “quite a lot”, “a little”, and “not at all”. The “don’t know” category was grouped together with the “not relevant” category, and positioned on the right hand corner of the scale, after “not at all”. The “don’t know” category was treated as a non-response because it is not informative on change in work activities. In addition, forcing the academic surveyed to answer a statement where he/she genuinely did not know the answer would be misleading. Although both responses were treated as missing data, the results obtained from Scale 7 (employment profile) made it possible to distinguish between a “don’t know” response and a “not relevant” response, as illustrated with an example earlier. Therefore, if a respondent indicated that he/she was employed in an Australian university during 1986 to do both research and teaching, any responses under the “don’t know” or “not relevant” category for the year of 1986 were assumed to be “don’t know”. On the other hand, responses by a respondent in the “don’t know” or “not relevant” category was assumed to be “not relevant” if it was indicated that he/she was not employed in an Australian university during the same year. Furthermore, many respondents attempted to separate their “don’t know” response from their “not relevant” response.
The responses for each statement in Scale 5 were added together to obtain an overall paper work score. A high score was reflective of high amount of paper work.

Section 6: *Specific teaching activities* scale

This scale was derived from the hypothesis of an insignificant change in the approach to teaching by university academics associated with the introduction of PIs. Again, as with the third and fourth scales, this scale started with statements on increased pressure applied by the participant’s university, based on X-efficiency (Leibenstein, 1978). As pressure to do more teaching was asked of respondents in the third scale, this scale concentrated on pressure in three areas of teaching:

(1) pressure to teach better; quality of teaching has received wide coverage in the last decade, particularly since Baldwin’s (1991) *Higher Education: Quality and Diversity in the 1990s* and the subsequent quality reviews of tertiary institutions. Quality of teaching is also assessed by the Government in the teaching PI called Course Experience Questionnaire\(^{51}\);

\(^{51}\) The Course Experience Questionnaire (Ramsden, 1991) is designed as a PI of teaching effectiveness at the level of whole course or degree. It is claimed to measure differences in quality of teaching in those aspects of teaching in which students have direct experience and therefore validity to comment (Wilson, Lizzio, and Ramsden, 1996).
(2) pressure to teach employable skills as employment outcomes is one of the teaching PIs examined in this study. The statements are shown below.

2. The pressure from the University to ensure that I teach employable skills to my students has increased now compared to:
   (a) 1986
   (b) 1991

(3) pressure to pass coursework students. The literature review on PIs has suggested that the use of completion rates could have an undesirable effect on the standard of teaching (Cave, Hanney, and Kogan, 1991). This warning became more serious when this PI appeared in DEET’s publications (e.g., 1994, 1996), and in the annual reports of the four universities under investigation to the government.

Respondents who were pressured by their institutions to change their teaching in any of these three areas might respond to this pressure (Leibenstein, 1978). Accordingly, the statements on increased pressure were linked to a statement on change in the approach to teaching. The latter statement could be used directly to test the hypothesis of an insignificant change in teaching approach by academics.

The other PI for teaching that was examined in this study was student surveys on teaching. As these surveys have been linked to promotion applications in all four universities in this study, it is possible that a
respondent who has never or who seldom gave out these surveys to students in the past is now motivated to carry out the surveys more frequently. On the other hand, an academic who has always obtained regular feedback on their teaching through these surveys may not increase the quantity of these surveys. It should be noted that it is only in recent years that the use of student surveys on teaching has been formalised in the four universities in the study. For instance, although Murdoch University has a strong tradition of evaluating teaching by student surveys,\textsuperscript{52} it was not until 1994 that the University took steps to formalise and systematise its evaluation of teaching. The implication was that academics who handed out any student surveys before their formalisation within their institutions either personally designed their own, or the surveys were designed by their Departments or Schools. Therefore, student surveys were taken to include not only the surveys recommended by the participant’s university, but they also included those that were designed by the respondent, his/her Department or School. The statements discussed so far were added up to obtain an overall score for Specific teaching activities scale. A high score indicated a large change in teaching activities. More specifically, it meant a large increase in pressure in the three teaching areas, an increase in the number of student surveys used, and a large change in teaching approach.

\textsuperscript{52} Prior to 1994, this practice had been largely informal, and there was a wide variation in the policies and practices for evaluating teaching programmes (Murdoch University Quality Portfolio, 1994).
In addition to finding out any changes in the number of student surveys handed out by the respondent, it would be useful to find out the uses of these surveys. What did the respondents use the surveys for? One obvious one is in applying for promotion. It is also possible that they can help as feedback on teaching quality (Kennedy, 1995), which in turn can allow the respondents to improve their teaching. However, there can be other purposes served by these surveys. For these reasons, the last statement in the sixth scale is as follows:

6. The results from these student surveys on my teaching have been used by me (please tick the appropriate box(es)):
(a) as feedback on the quality of my teaching
(b) to improve my teaching
(c) to apply for promotion
(d) others (please elaborate)

Instead of using a Likert scale for the above statement, the respondents were required to tick the appropriate box associated with (a) to (d). As this questionnaire was designed to investigate three periods, namely 1986, 1991, and 1997, the first two periods were used. However, since this survey on university academics was conducted in early 1997, it was not feasible to ask respondents on the student surveys which they have carried out for that year. Thus, 1996 was used instead of 1997 for this statement.
Section 7: Employment profile

The employment profile of the respondents was addressed in this scale. It is possible that the employment profile of academics has an effect on their job behaviour. For instance, an academic who was employed to do research only may have felt an increased pressure to do more research but not to do more teaching. In addition, the attitude or behaviour of academics can be a function of certain employment characteristics. As an example, the attitude of respondents may vary with their level of employment (rank). Accordingly, the employment characteristics which were asked in the seventh scale were: (1) mode of employment (e.g., research only, research and teaching, etc.), (2) term of employment (e.g., full-time permanent, fractional full-time contract, etc.), (3) level of position (e.g., lecturer, senior lecturer, etc.), and (4) organisational tenure (in years). Since the study focused on 1986, 1991, and 1997, these periods were asked in this scale (with the exception of organisational tenure).

Pilot Study

The design of the questionnaire involved a pilot study which was carried out prior to the actual survey. Responses and opinions from eleven academic staff across all levels (from Levels A to E) and disciplines (other than those included in the final survey) were obtained.
The pilot study revealed three main problems with the questionnaire: (1) specific terms and their definitions, (2) categories of publications and external research grants, and (3) categories in the response scale. The results from the pilot study showed that some respondents were uncertain about the PIs referred in the questionnaire. In particular, they were uncertain whether the term referred to the PIs in current application in their institutions or an ideal set of PIs. This problem was solved by defining PI at the beginning of the questionnaire. The definition was extended to naming the PIs for research as well as the PIs for teaching which were addressed in the questionnaire. In addition, the respondents were made aware that the term applied only to the PIs in current use in their institutions.

The term “academics” in the questionnaire also posed a problem. Many respondents could not tell whether it referred to university academics in general, academics in Australian universities, or academics within their institutions. Accordingly, the term “academics” was re-written as “academics in this University” in the questionnaire.

The statement on categories of publications as well as the statement on categories of external research grants were confusing to most respondents. The overall complaint was that the response format was too complex. Under the statement on categories of publications, sixteen types of publications were listed. A response scale was present beside
each type of publications. The same was applied to the statement on
types of external research grants; six types of grants were given, with
response scale beside each one. Respondents were asked to circle the
appropriate number on the scale in terms of frequency on their main
type of publications and external research grants. They were required to
do this for three years - 1986, 1991, and 1996. The response scale was
also subjected to misunderstanding. For instance, the term “frequently”
on the scale was interpreted differently by different respondents; a
respondent considered two publications per year as falling under the
“frequently” category but another regarded that category belonged to
those who published more than three publications per year. Therefore,
the statements were altered, as shown below. Respondents were
required to name their main types of publications and external research
grants in the space provided. In addition, examples were given to
minimise misunderstanding.

My priorities in publications have changed now (e.g., concentrate more
on refereed journals or book chapters than before) compared to:
(a) 1986
(b) 1991
If you think that your types of publications have changed, please
elaborate.

The types of external research grants for which I now apply have
changed (e.g., more professional consultancies, industry funding, or
national competitive grants) compared to:
(a) 1986
(b) 1991
If the types of external research grants for which you applied have
changed, please elaborate.
The response format was also changed to a five-point Likert scale in terms of the extent of change from "a lot" to "not at all".

The response scale for the other statements were also the subject of concern in the pilot study. The categories between the scales were not interpreted to be easily distinguishable from each other. As an example, the academics reported that although they could distinguish between "a great deal" and "quite a bit", they had trouble distinguishing between "quite a bit" and "a little". Accordingly, the categories were re-worded in the response scale. For the previous example, "a great deal" was changed to "a lot", and "quite a bit" was changed to "quite a lot". The other categories on this scale remained the same.

The statistical analysis of the final set of responses for the main study was carried out using Rasch Unidimensional Measurement Model (RUMM) (Andrich, Lyne, Sheridan, and Luo, 1997). This model is a model of statement response theory, and in many ways formalises the typical Likert-style scoring of attitude questionnaires (Andrich, 1982). The purpose of this analysis was to check on the consistency of the statements which form each of a set of scales using modern test theory. This is described in detail in the next chapter.
Conclusion

Having covered sample and questionnaire design, it is appropriate to report on the statistical methods employed for this study as well as on the results obtained from verifying the dimensionality of the scales in the questionnaire. These are addressed in the subsequent chapter.
CHAPTER SEVEN: STATISTICAL METHODS AND VERIFICATION OF THE DIMENSIONALITY OF THE SCALES OF THE QUESTIONNAIRE

Introduction

In this chapter, the statistical methods employed for this study are described. The results from the verification of the dimensionality of the scales in the questionnaire by Rasch Unidimensional Measurement Model (RUMM) are also provided. These results are presented in order of the scales in the questionnaire. Each scale was analysed separately.

Statistical Methods

The data derived from the interviews were analysed using QSR Non-numerical Unstructured Data Indexing Searching and Theorizing (NUD.IST) package. The data from the questionnaires were analysed by means of the Statistical Package for Social Sciences, Microsoft Excel, and Rasch Unidimensional Measurement Model (RUMM).

Data analysis on the questionnaires covered correlation, chi-square test, paired sample t-test, and regression. Correlations were carried out to test the significance and direction of the relationship between the variables in the study. A chi-square test was conducted on each item to examine systematic patterns across the response categories. Paired
sample t-test compared any significant changes to job activities (pressure and behaviour) between 2 periods: (1) 1997 compared to 1986, and (2) 1997 compared to 1991. Regression was carried out to observe any significant relationship between the employment profile of the respondents and their attitude to PIs.

**Post-hoc Refinement of Questionnaire**

The responses to the statements in each scale were intended to be summed. This required the statements to conform to a unidimensional scale. The dimensionality of the scales in the questionnaire were verified by Rasch Unidimensional Measurement Model (RUMM) developed by Andrich, et al. (1997). The advantages of this model is that in assessing the structure of the responses, there is no need to make any assumptions about the distributions of the attitudes of the academics, for example, the normal distribution. Largely for this reason, RUMM was used for this study because it allows the operating characteristics of the questions to be separated from the distribution of the latent trait, and in turn permits the location, spread, and shape of the distribution in the study population to be investigated without making assumptions about this distribution.\(^{53}\) The reliability of the questionnaire was also provided by RUMM.

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\(^{53}\) For information on the construction of this model, refer to Andrich (1978, 1979).
Statistics used

In order to evaluate the test of fit between the data and the model, a statistic known as the index of item-trait interaction was carried out for each scale. In carrying out this statistic, three values were taken into account. These were chi-square ($\chi^2$), level of significance ($p$), and standardised residual ($Z$).

The statistic $\chi^2$ was based on placing persons into class intervals based on their estimated locations on the trait, and then comparing the observed score with the expected value. An insignificant difference between the observed and the expected values was indicative of no significant interaction between the responses to the statements and the location values of the persons along the trait. A significant difference between the observed and expected values meant that there was a significant interaction between the responses to the statements and the locations of the persons on the trait. The $\chi^2$ statistic is an approximate chi-square and is sensitive to sample size and location of the item relative to the persons. Therefore, it was not used in a formal statistical sense for rejecting statements, but as an indicator as to which statements were working least consistently, or even inconsistently, with the majority.
The standardised residual, $Z$, provided an indication of the nature of discrimination by the item across the continuum. If $Z$ has a positive value, the implication is that the item tends not to discriminate as expected while a negative $Z$ value shows that the item discriminates more than expected.

The numerical values were augmented by a graphical display on every item in each scale. The curve on the graph for each item represented theoretical expected values while the points showed the observed average score of the persons in the class interval. If the overall pattern of the points were flatter than the curve on the graph, then it meant that the item did not discriminate well, and therefore that item was inconsistent with the other statements found in the construct. On the other hand, if the overall pattern of the points followed the curve and lay on or close to the curve, that item was said to discriminate well across the continuum as expected according to the model.

After item analysis, the reliability of the data collected for each scale was tested. The index of person-separation is the ratio of the estimated true variance among persons and the estimated observed variance among the persons using the estimates of their locations and the standard errors of these locations. It is analogous to the traditional reliability coefficient, particularly Cronbach’s alpha (Andrich and Van Schouwbroeck, 1989), but can be calculated with missing data.
Accordingly, this index was used as a measure of reliability for the questionnaire. The value of this index is affected by the variance of the group. A low value can indicate that the group is relatively homogeneous rather than that the statements are not working consistently with each other. On the other hand, a high value can be interpreted that the group is relatively heterogeneous, i.e. their responses vary widely.

*Attitude to PIs* scale

The *Attitude to PIs* scale is found in the first section of the questionnaire, and measures the degree of the respondent’s satisfaction with the PIs in his/her institution. A $\chi^2$ test of fit was carried out on the eighteen statements in this scale. The results are presented in Table 7.1.

### Table 7.1

Indices of the tests of fit between the data and the model in fit order of standardised residuals: *Attitude to PIs* scale

<table>
<thead>
<tr>
<th>Items (a)</th>
<th>Discrimination standardised Z</th>
<th>Item-trait interaction $\chi^2$; 3 df</th>
</tr>
</thead>
<tbody>
<tr>
<td>6(c) PIs help academics in this University by providing feedback on our work performance.</td>
<td>-3.293</td>
<td>6.572</td>
</tr>
<tr>
<td>4(a) PIs help the Australia Commonwealth Government to increase its control over this University.</td>
<td>-3.119</td>
<td>8.045*</td>
</tr>
<tr>
<td>6(f) PIs help academics in this University to improve the work performance of specific academics (e.g., new academics).</td>
<td>-3.082</td>
<td>2.181</td>
</tr>
<tr>
<td>6(a) PIs help academics in this University to be accountable for our work.</td>
<td>-2.424</td>
<td>0.618 cont/...</td>
</tr>
<tr>
<td>Items (a)</td>
<td>Discrimination standardised Z</td>
<td>Item-trait interaction $\chi^2$; 3 df</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>------------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>... cont/-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6(d) PIs help academics in this University to improve the quality of our research.</td>
<td>-2.266</td>
<td>9.786***</td>
</tr>
<tr>
<td>2. The use of PIs brings more advantages than disadvantages to academics in this University.</td>
<td>-2.152</td>
<td>5.772</td>
</tr>
<tr>
<td>8. I am happy with the move towards the use of PIs in this University.</td>
<td>-1.912</td>
<td>8.897**</td>
</tr>
<tr>
<td>7. The literature on PIs suggests that PIs can encourage dysfunctional work behaviour in some academics.</td>
<td>-0.710</td>
<td>8.697**</td>
</tr>
<tr>
<td>5(a) PIs help this University to increase its control over academics’ work.</td>
<td>-0.284</td>
<td>4.248</td>
</tr>
<tr>
<td>6(e) PIs help academics in this University to improve the quality of our teaching.</td>
<td>-0.054</td>
<td>19.053***</td>
</tr>
<tr>
<td>1(a) I am not happy with the choice of the current PIs used in this University.</td>
<td>0.272</td>
<td>1.157</td>
</tr>
<tr>
<td>3. Academics in this University do not need PIs to know that we have done a good job.</td>
<td>1.179</td>
<td>3.736</td>
</tr>
<tr>
<td>6(b) PIs help academics in this University to have a better knowledge of the goals of this University.</td>
<td>1.208</td>
<td>21.076***</td>
</tr>
<tr>
<td>1(b) I am not happy with the process in which the current PIs are used in this University.</td>
<td>1.374</td>
<td>1.715</td>
</tr>
<tr>
<td>4(c) PIs help the Australian Commonwealth Government to provide direction to this University as to the desired goals of the Government</td>
<td>2.001</td>
<td>12.549***</td>
</tr>
<tr>
<td>5(c) PIs help this University to provide direction to the academics as to the desired goals of this University.</td>
<td>2.271</td>
<td>27.001***</td>
</tr>
<tr>
<td>5(b) PIs help this University to monitor the performance of academics’ work.</td>
<td>3.236</td>
<td>36.673***</td>
</tr>
<tr>
<td>4(b) PIs help the Australian Commonwealth Government to monitor the performance of this University.</td>
<td>4.179</td>
<td>61.653***</td>
</tr>
</tbody>
</table>

| Total | 430 |
|       | 51 df; p < 0.0001 |

(a) performance indicators = PIs
*p < 0.05, ** p < 0.01, *** p < 0.0001. df = degrees of freedom
It can be observed that four statements have large residuals. Their $\chi^2$ values were also found to be large. These were statements 4(b), 4(c), 5(b), and 5(c). Their respective questions are shown below.

4. Performance indicators help the Australian Commonwealth Government to:
   (b) monitor the performance of this University.
   (c) provide direction to this University as to the desired goals of the Government.

5. Performance indicators help this University to:
   (b) monitor the performance of academics’ work.
   (c) provide direction to the academics as to the desired goals of this University.

In order to provide a frame of reference for analysing those statements that did not fit the model, item 1(a), which fitted excellently was summarised first. A graphical analysis was also carried out in conjunction with the statistical analysis. In conducting the $\chi^2$ test of fit, and forming graphical displays, the persons were classified into four class intervals. The graphical display for item 1(a) “I am not happy with the choice of the current performance indicators used in this University” in Figure 7.1 showed that the observed and expected values were close to each other. The implication was that this statement discriminated across the continuum as expected according to the model. The probabilities of responses in the successive categories are shown in Figure 7.2, and indicated a structure that was consistent with the categories showing an increasingly positive attitude.
Figure 7.1

The expected value as a function of the location estimate, and the observed values: Item 1(a) in *Attitude to PIs* scale

Item 1(a) : \( \text{Locn} = 0.022 \quad \text{Resid} = 1.536 \quad \text{ChiSqProb} = 0.628 \)

Figure 7.2

The probability as a function of the location values of the persons: Item 1(a) in *Attitude to PIs* scale

Item 1(a) : \( \text{Locn} = 0.022 \quad \text{Resid} = 1.536 \quad \text{ChiSqProb} = 0.628 \)
In contrast, the graphical analyses of the four statements in Figure 7.3 show them all to have poor discrimination across the continuum.

**Figure 7.3**

The expected value as a function of the location estimate, and the observed values: Statements 4(b), 4(c), 5(b), and 5(c) in *Attitude to PIs* scale

**Item 4(b):**  
Locn = 0.355  Resid = 4.179  ChiSqProb = 0.000

**Item 4(c):**  
Locn = 0.209  Resid = 2.001  ChiSqProb = 0.000
In fact, the general trend of the points in the graph seem to be in the opposite direction of the curve. The scale was re-analysed with these four statements re-scored in the opposite direction, but there was no significant improvement in either the validity or the reliability of this scale. The four statements were eventually removed from the instrument, and
the person-separation reliability increased from 0.725 to 0.817. It is difficult to understand why these four statements do not fit with the rest of the statements. If it is argued that these four statements focused on the academics’ perceptions of PIs on an external party - the Government or university administration - whereas the others pertained directly to academics (such as whether they are happy with the PIs), then statements 4(a) and 5(a) should also proved to be inconsistent. However, they fitted well with the scale. Thus, it was decided that these statements would not be dealt with in the use of the questionnaire.

A $\chi^2$ test of fit was carried out on the scale without the four statements mentioned earlier. The results of the eleven statements are displayed in Table 7.2. The $\chi^2$ value of 78.281 on 39 degrees of freedom suggests that the data showed a tendency towards a discrepancy between the observed and expected values. However, this statistic is sensitive and does not detract from the general reliability of the scale. In addition, this test of fit assessed whether the data deviated from the model, that is perfection, rather than whether they deviated from randomness. If a graphical analysis indicated that the responses followed the general trend of the expected value curve, then they were accepted. Clearly, the responses for statements 4(b), 4(c), 5(b), and 5(c) did not follow the general trend. Although some statements, such as item 6(b) were seen to have large $\chi^2$, they were retained because their removal failed to contribute to any significant improvement to the scale, and their
Responses tended to follow the curve, although not as clearly as that for item 1(a).

Table 7.2
Indices of tests of fit between data and model in fit order of standardised residuals: Without statements 5(b), 5(c), 6(b), 6(c) in Attitude to PIs scale

<table>
<thead>
<tr>
<th>Items (a)</th>
<th>Discrimination standardised Z</th>
<th>Item-trait interaction χ², 3 df</th>
</tr>
</thead>
<tbody>
<tr>
<td>6(c) PIs help academics in this University by providing feedback on our work performance.</td>
<td>-3.741</td>
<td>2.810</td>
</tr>
<tr>
<td>6(f) PIs help academics in this University to improve the work performance of specific academics (e.g., new academics).</td>
<td>-2.755</td>
<td>0.634</td>
</tr>
<tr>
<td>6(a) PIs help academics in this University to be accountable for our work.</td>
<td>-2.215</td>
<td>0.984</td>
</tr>
<tr>
<td>6(d) PIs help academics in this University to improve the quality of our research.</td>
<td>-1.990</td>
<td>3.409</td>
</tr>
<tr>
<td>8. I am happy with the move towards the use of PIs in this University.</td>
<td>-1.695</td>
<td>4.604</td>
</tr>
<tr>
<td>2. The use of PIs brings more advantages than disadvantages to academics in this University.</td>
<td>-1.394</td>
<td>1.464</td>
</tr>
<tr>
<td>4(a) PIs help the Australia Commonwealth Government to increase its control over this University.</td>
<td>-1.051</td>
<td>7.246*</td>
</tr>
<tr>
<td>6(e) PIs help academics in this University to improve the quality of our teaching.</td>
<td>-0.488</td>
<td>13.816***</td>
</tr>
<tr>
<td>7. The literature on PIs suggests that PIs can encourage dysfunctional work behaviour in some academics.</td>
<td>-0.178</td>
<td>0.261</td>
</tr>
<tr>
<td>1(a) I am not happy with the choice of the current PIs used in this University.</td>
<td>1.536</td>
<td>1.689</td>
</tr>
<tr>
<td>6(b) PIs help academics in this University to have a better knowledge of the goals of this University.</td>
<td>1.839</td>
<td>25.053***</td>
</tr>
<tr>
<td>3. Academics in this University do not need PIs to know that we have done a good job.</td>
<td>2.301</td>
<td>8.941***</td>
</tr>
<tr>
<td>1(b) I am not happy with the process in which the current PIs are used in this University.</td>
<td>2.474</td>
<td>1.138</td>
</tr>
<tr>
<td>cont/...</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Items (a) | Discrimination standardised Z | Item-trait interaction \( \chi^2; 3 \text{ df} \)
---|---|---
... cont/

5(a) PIIs help this University to increase its control over academics' work. | 3.517 | 6.233

Total | 78.281 | 39 df, *p < 0.0001

a) performance indicators = PIIs

* * p < 0.05, ** p < 0.01, *** p < 0.0001.

df = degrees of freedom

In summary, a coherent scale for assessing *Attitude to PIIs* was constructed. Having explained the procedures for the first scale of the questionnaire in detail, the tables and graphs for the subsequent subscales in the questionnaire are displayed in Appendices 8 to 12.

*Perceptions of university reward system scale*

The scale referred to as *Perceptions of university reward system* containing eleven statements is found in Section 2 of the questionnaire. As indicated earlier, this scale was designed to find out whether the respondent saw a link between specific PIIs and his/her university reward system. The \( \chi^2 \) test of fit showed the observed responses for the persons to be close to the expected responses. The exceptions were three statements which display large Z values (range between 3 to 5),
and large $\chi^2$ values (range between 34 to 71). The questions (with their item numbers as on the questionnaire) are shown below.

5. Academics who receive favourable student surveys on teaching have a better chance of getting:
   (a) promoted
   (b) other benefits (please elaborate)

6. Schools/departments with a high graduate employment rate have a better chance of getting benefits than schools/departments with a low graduate employment rate.

Graphical analysis of each item was the next step in the analysis. In forming graphical analysis, the persons were classified into four class intervals. The graphical analyses of the above three statements in Appendix 8(a) showed that the observed values were above the expected values in the lower part of the continuum, and below the expected values in the upper part of the continuum. Reversing the three statements did not contribute to any significant improvement. The implication was that these statements did not discriminate consistently with the other statements, and therefore did not belong to the instrument. In fact, a closer examination revealed that these three statements focused on teaching activities while the other statements in the scale concentrated on research activities. Hence, the three statements were dropped from the instrument, and the person-separation reliability rose marginally from 0.773 to 0.777. The results from the $\chi^2$ test of fit on the eight statements are found in Appendix 8(b). Although several statements, such as item 4(b) had large $\chi^2$, they were
retained in this scale as their removal did not contribute to any improvement, and their general response patterns followed the expected value curve. Therefore, a coherent scale for the Perceptions of university reward system was formed.

General research and teaching scale

The third section of the questionnaire contains the General research and teaching scale. As the name implies, this scale focuses on the general research and teaching activities of the respondent, such as the change in the research load, and change in the approach to research. A $\chi^2$ test of fit was carried out on the twelve statements found in this scale. The results are found in Appendix 9(a). The $Z$ values for the statements were less than 3, and $\chi^2$ values were small. However, there were two statements with large $\chi^2$ values. These questions (and their numbers as on the questionnaire) are shown below.

2. (a) The pressure from the University to teach more has increased or decreased now compared to 1986.

6. (b) My priorities between research and teaching have changed now compared to 1991.

A graphical analysis carried out on these questions did not reveal a large deviation of the observed average score of the persons from that of the theoretical expected values. For instance, the graphical analysis in
Appendix 9(b) on item 6(b) showed that the observed values were slightly below the expected value in the lower part of the continuum, and were slightly below the expected values in the upper part of the continuum. However, the trend of observed values appeared to follow that of the expected values. Removing item 6(b) and item 2(a) did not improve the reliability of the scale. These statements were therefore retained. A graphical analysis carried out on other statements in the scale showed the observed and expected values to be close to each other. An example is provided in Appendix 9(b) on item 5(a) which states “My approach to research has changed now compared to 1986”. As indicated, the observed points appeared to be close to the curve. When it came to the person-separation reliability for the scale, the result was 0.655 which signified that the academics surveyed provided a reasonably homogenous responses.

Specific research activities scale

The Specific research activities scale looks at the research activities of the respondents in more detail. This scale is made up of three sub-scales: (A) publications, (B) external research grant applications, and (C) higher degree research supervision. A $\chi^2$ test of fit was carried out on all twenty-three statements found in this scale. Most of the statements were found to discriminate close to that expected. An example is statement 1(a) “The pressure from the University to publish has increased now
compared to '1986" under section 4A of the questionnaire. Its graphical analysis is shown in Appendix 10(a).

However, three statements under Section 4C of the questionnaire were found to have large $\chi^2$ values, i.e., there was a significant interaction between the responses to these statements and the location values of the persons along the trait. These statements (and their numbers) are shown below.

1. The pressure from the University to ensure that the postgraduate research students whom I supervise pass in minimum time has increased now compared to:
   (a) 1986
   (b) 1991

2. This increased pressure affects the way I supervise my research students.

A graphical analysis of the above questions showed them not to discriminate as expected. The graphs are displayed in Appendix 10(b). Elimination of these statements improved the person-separation reliability from 0.749 where all the statements were taken into consideration to 0.768. It appeared that supervision of higher degree research students did not go together with publications and external research grant applications.

The results from the test of fit on the remaining twenty statements, when the above three statements were eliminated, are displayed in Appendix
10(c). The $\chi^2$ and $Z$ values were observed to be small for all statements. Although the $\chi^2$ value for item 13 was relatively large, this item was retained as its removal did not improve the test of fit between the data and the model, or the reliability of this scale, and its general trend was consistent with the expected value curve.

*Paperwork scale*

The *Paperwork* scale is found in the fifth section of the questionnaire. As discussed earlier, this scale deals with the respondents' paperwork load associated with specific research PIs, namely publications, external research grant applications, and higher degree research supervision. The results from $\chi^2$ test of fit on all the statements in this scale revealed small $Z$ and $\chi^2$ values, as shown in Appendix 11(a). The implication was that there was no significant interaction between the responses to these statements and the locations of the persons along the trait. A graphical analysis of each of the six statements in this scale where the persons were classified into four class intervals, also found them to discriminate close to that expected. An illustration is shown in Appendix 11(b) with item 1(b) which states "I have to do more paper work now in preparing proposals to apply for external research grants compared to 1986 ". The person-separation reliability was 0.433. One explanation for this low value is that academics gave very similar responses to each other on the statements in this scale.
Specific teaching activities scale

The scale on Specific teaching activities is found in Section 6 of the questionnaire. This scale provides a more detailed assessment of the teaching activities of the respondents. However, the last question in this scale was not analysed by RUMM because its response categories did not match the Likert-type scale employed by the statements in the previous five sections. Therefore, nine statements were analysed by RUMM. The $\chi^2$ test of fit and the $Z$ values were small (i.e., less than 1), as presented in Appendix 12(a). On the other hand, there were two statements with large $\chi^2$ values. Removing them did not improve the validity or the reliability of the scale. These statements were therefore retained. A graphical analysis of the statements in the scale found them to discriminate fairly well. Overall, the statements were consistent with each other. A graphical presentation of item 7 which states “This increased pressure affects my approach to teaching” is found in Appendix 12(b) as an example. The person-separation reliability for this scale was 0.723 which indicated a fairly large and consistent separation of persons on this scale.

Conclusion

RUMM analysis of the dimensionality of the scales in the questionnaire showed that most of the statements fit their respective scales. The
person-separation reliability for each of these scales was also found to be acceptable. Having provided the methodology for this study and demonstrated the coherence of the scale, the next appropriate stage is presentation of the substantive results which reflect on the hypotheses articulated in Chapter Five. These are covered in three chapters. Results on changes to the institutions as a result of the introduction of PIs are provided in Chapter Eight. Chapter Nine and Chapter Ten present the survey on university academics, including the findings on the scales analysed in this chapter, as well as the relationships among the scales.
CHAPTER EIGHT: EFFECTS OF THE INTRODUCTION OF PERFORMANCE INDICATORS: THE INSTITUTIONAL LEVEL

Introduction

This chapter provides the results of the impact of the introduction of PIs at the institutional level of each university. The effects of the application of the Composite Index to allocate the Research Quantum to tertiary institutions were examined in four Australian universities. These included an investigation of the establishment of any internal funding for research in the universities which resembles the Government’s Research Quantum. A comparison was also made between the PIs in the Composite Index and the institutions’ PIs in their funding formulae, including the weightings assigned to these PIs. Furthermore, a case study was carried out in one of these universities in an attempt to report on any changes in the internal management of research as a result of the Government’s application of PIs.

Adoption of Performance Indicators

Each tertiary institution surveyed was found to have introduced specific research funding based on PIs in the last few years which mirrored that of the Government’s Composite Index-linked Research Quantum. Murdoch University has its Murdoch Research Quantum and Murdoch
Research Infrastructure Fund, Edith Cowan University has its Research Activity Index scheme, Curtin University has its Research Performance Index scheme, and the University of Western Australia has its research incentive scheme included in its Faculty Funding Model. As an example, in *Curtin University's Research and Development News* (Special issue, 1996, p. 1), it was stated that, "The RPI (Research Performance Index)... is shaped by the strict nature of DEETYA's Research Quantum which largely funds the process". Indeed, these funds are essentially derived from the Research Quantum and the Research Infrastructure Block Grant. The functions of these schemes are similar - to motivate academic staff to undertake research, and to reward them for doing so. As an example, one of the functions of the set of research PIs used by Murdoch University (called the Murdoch University Research Index) to distribute its PI-based internal funds, was to provide "encouragement/incentive to staff to increase the value of the Research Quantum in Murdoch's operating grant" (Wackett, 1998).

Not only was the internal research funding criteria introduced in the four universities identical to the Research Quantum but the PIs which were used to allocate funds strongly resembled DEETYA's Composite Index. Each university might have named the index differently as noted above, but a common feature among the indexes from these four universities was that they all contained publications count, external research income, and number of higher degree research completions.
Weightings of Performance Indicators

The four universities in this study also emphasised the three PIs in their indexes in the same manner as DEETYA weighed the PIs in the Composite Index. In 1997,\textsuperscript{54} external research grants income, publications count, and number of higher degree research completions were allocated the respective weights of 82.5\%, 12.5\%, and 5\% by DEETYA. Within external research grants, national competitive grants, other public sector funding, and industry and other funding for research were weighted at 2, 1, and 1 respectively. Within higher degree research, PhDs were assigned a weight of 3 while Masters degrees were given a weight of 1. A comparison among the weightings designated to each of the PIs for research - publications, external research income, and higher degree completions - among the four universities show some similarities to those in the Composite Index. For instance, the Research and Development Committee from Edith Cowan University (1996, p. 1) acknowledged that, “The weightings for the RAI (Research Activity Index) categories reflect a bias toward these three components of the Research Quantum”. Although the weightings between the inputs and outputs for the universities studied differed from those of DEETYA’s, the emphasis given to the sub-category within each category of PIs were similar. In all four universities under investigation,

\textsuperscript{54} The 1997 values were used because the survey on academics was carried out during that period. It was assumed that the views of the academics on PIs would be based on the PIs in use during the period in which the data was collected, namely 1997.
national competitive research grants were given the highest priority under external research grants; books, book chapters, and refereed journals were heavily emphasised in publications; and in higher degree research supervision, the PhD level was assigned more weight than Masters level.

When it comes to categories of publications, the similarities in weightings between those used by DEETYA and those used by the universities are displayed in Table 8.1. Again the 1997 values were used for the same reasons given earlier. As the absolute weights assigned to each of the category varied with university, it was decided that the ratio of the weight for each category to that of refereed journal would be used as standard method of comparison among the universities.\textsuperscript{55}

\textsuperscript{55} In the \textit{Higher Education Funding Report for the 1998-2000 Triennium} (Kemp, 1997a), the Government stated that the number of publications categories would be reduced from 22 to 4 in 1998 in order to reduce the workload on institutions. The categories which are still used are books (A1), book chapters (B), refereed journal articles (C1), and full conference papers (E1). Apart from the first category which is weighted at 5, the rest are weighted at 1.
<table>
<thead>
<tr>
<th>Publications category</th>
<th>Government</th>
<th>Murdoch</th>
<th>ECU</th>
<th>UWA</th>
<th>Curtin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Absolute</td>
<td>Ratio*</td>
<td>Absolute</td>
<td>Ratio*</td>
<td>Absolute</td>
</tr>
<tr>
<td>A. Books</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1. Authored - research</td>
<td>5.0</td>
<td>5 to 1</td>
<td>12.0</td>
<td>12 to 1</td>
<td>500</td>
</tr>
<tr>
<td>A2. Authored - other</td>
<td>2.0</td>
<td>2 to 1</td>
<td>2.0</td>
<td>2 to 1</td>
<td>200</td>
</tr>
<tr>
<td>A3. Edited</td>
<td>1.5</td>
<td>1.5 to 1</td>
<td>1.5</td>
<td>1.5 to 1</td>
<td>150</td>
</tr>
<tr>
<td>A4. Revision/new edition</td>
<td>0.5</td>
<td>0.5 to 1</td>
<td>0.5</td>
<td>0.5 to 1</td>
<td>50</td>
</tr>
<tr>
<td>B. Book Chapter</td>
<td>1.0</td>
<td>1 to 1</td>
<td>1.0</td>
<td>1 to 1</td>
<td>100</td>
</tr>
<tr>
<td>C. Journal Articles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1. Articles in scholarly journal</td>
<td>1.0</td>
<td>1 to 1</td>
<td>1.0</td>
<td>1 to 1</td>
<td>100</td>
</tr>
<tr>
<td>C2. Other contribution to refereed journal</td>
<td>0.5</td>
<td>0.5 to 1</td>
<td>0.5</td>
<td>0.5 to 1</td>
<td>50</td>
</tr>
<tr>
<td>C3. Non-refereed articles</td>
<td>0.2</td>
<td>0.2 to 1</td>
<td>0.2</td>
<td>0.2 to 1</td>
<td>20</td>
</tr>
<tr>
<td>C4. Letter or note</td>
<td>0.2</td>
<td>0.2 to 1</td>
<td>0.2</td>
<td>0.2 to 1</td>
<td>20</td>
</tr>
<tr>
<td>D. Major Reviews</td>
<td>1.0</td>
<td>1 to 1</td>
<td>1.0</td>
<td>1 to 1</td>
<td>100</td>
</tr>
<tr>
<td>E. Conference Publications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E1. Full written paper - refereed proceedings</td>
<td>1.0</td>
<td>1 to 1</td>
<td>1.0</td>
<td>1 to 1</td>
<td>100</td>
</tr>
<tr>
<td>E2. Full written paper - non-refereed proceedings</td>
<td>0.3</td>
<td>0.3 to 1</td>
<td>0.3</td>
<td>0.3 to 1</td>
<td>30</td>
</tr>
<tr>
<td>E3. Extract of paper</td>
<td>0.1</td>
<td>0.1 to 1</td>
<td>0.1</td>
<td>0.1 to 1</td>
<td>10</td>
</tr>
<tr>
<td>E4. Edited volume of conference proceedings</td>
<td>1.0</td>
<td>1 to 1</td>
<td>1.0</td>
<td>1 to 1</td>
<td>100</td>
</tr>
</tbody>
</table>

* Ratio is expressed as weighting for the given category over that of refereed journal (C1).

<table>
<thead>
<tr>
<th>Publications category (cont/-)</th>
<th>Government</th>
<th>Murdoch</th>
<th>ECU</th>
<th>UWA</th>
<th>Institutions</th>
<th>Curtin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Absolute</td>
<td>Ratio*</td>
<td>Absolute</td>
<td>Ratio*</td>
<td>Absolute</td>
<td>Ratio*</td>
</tr>
<tr>
<td>F. Audio-Visual Recordings</td>
<td>1.0</td>
<td>1 to 1</td>
<td>1.0</td>
<td>1 to 1</td>
<td>100</td>
<td>1 to 1</td>
</tr>
<tr>
<td>G. Computer Software</td>
<td>1.0</td>
<td>1 to 1</td>
<td>1.0</td>
<td>1 to 1</td>
<td>100</td>
<td>1 to 1</td>
</tr>
<tr>
<td>H. Technical Drawing/Architectural &amp; Industrial Design/Working Model</td>
<td>1.0</td>
<td>1 to 1</td>
<td>1.0</td>
<td>1 to 1</td>
<td>100</td>
<td>1 to 1</td>
</tr>
<tr>
<td>I. Patents</td>
<td>2.0</td>
<td>2 to 1</td>
<td>2.0</td>
<td>2 to 1</td>
<td>200</td>
<td>2 to 1</td>
</tr>
<tr>
<td>J. Creative Works</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J1. Major written or recorded work</td>
<td>1.0</td>
<td>1 to 1</td>
<td>1.0</td>
<td>1 to 1</td>
<td>100</td>
<td>1 to 1</td>
</tr>
<tr>
<td>J2. Minor written or recorded work</td>
<td>0.2</td>
<td>0.2 to 1</td>
<td>0.2</td>
<td>0.2 to 1</td>
<td>20</td>
<td>0.2 to 1</td>
</tr>
<tr>
<td>J3. Individual exhibition of original art</td>
<td>1.0</td>
<td>1 to 1</td>
<td>1.0</td>
<td>1 to 1</td>
<td>100</td>
<td>1 to 1</td>
</tr>
<tr>
<td>J4. Representation of original art</td>
<td>0.2</td>
<td>0.2 to 1</td>
<td>0.2</td>
<td>0.2 to 1</td>
<td>20</td>
<td>0.2 to 1</td>
</tr>
</tbody>
</table>

* Ratio is expressed as weighting for the given category over that of refereed journal (C1).

As can be seen, the weights for the different categories of publications in the four universities were identical to those of DEETYA's. The exceptions are as follows:

(1) In Murdoch University, category A1 (Authored research books) was assigned a relatively higher weight than that of DEETYA's.

(2) In Curtin University, three categories (F, G, and H) were assigned lower weights than those of DEETYA, and two sub-categories (E2 and J4) were assigned slightly higher weights than those of DEETYA's.

(3) In the University of Western Australia, sub-category A1 was slightly different to that of DEETYA's in that it was divided into further sub-categories, most of which have higher weights than that of DEETYA's. Like Murdoch University, authored research books were highly valued in this university. Other contributions to refereed journals (category C2) was given a weighting that is twice that of DEETYA, while written papers from conference proceedings, whether refereed or non-refereed or edited (category E1, E2, and E4) were given comparatively lower weightings. It appeared that journals were preferred over conference publications in this institution. The weights allocated to categories F, G, I, and J differed to those of DEETYA in that they were awarded on merit.
It appeared that the establishment of the Composite Index by DEETYA to distribute the Research Quantum to the universities had been replicated within these institutions. The four universities had constructed a similar type of index to allocate the same kinds of research funding. Therefore, the first postulation that the introduction of PIs by the Government would see the same set of PIs being adopted by the universities appears to be proven.

**Emphasis on Activities Measured by Performance Indicators**

The four universities have all taken steps to improve their performance in terms of the PIs used in the Composite Index. An examination of their research management plans\(^{56}\) revealed that all of them have introduced sophisticated systems for handling the data on these PIs, and run regular seminars and workshops on grant applications, publications, and supervision of postgraduate research students. The institutions have also stressed the importance of these three PIs. For instance, the University of Western Australia stated that, “Funds in future years will depend on the University’s success within these three groups relative to the success of other universities” (Research Quantum, 1997, p. 1).

When it came to external research grant applications, information on a comprehensive list of grant schemes were provided to academics

\(^{56}\) Universities under the Unified National System are required to develop research management plans (along with other specific plans) in order to receive the annual block operating grants from the Federal Government. See Appendix 1 for more details.
through booklets, newsletters, and the electronic systems in each of the four institutions under investigation. In order to increase the success rate in external grants applications, information on either winning grants and/or influencing panels were provided to academics. Furthermore, either units have been set up (e.g., The Research Administration Unit in University of Western Australia) or specific people were appointed (e.g., Research Facilitators in Murdoch University) to provide advice on individual grant application. For a more in-depth analysis of the impact of the introduction of PIs at the institutional level, the results of a case study of Murdoch University are presented in the subsequent section.

A Case Study

Like many other universities in Australia, the introduction of PIs in Murdoch University was primarily a consequence of Government policies. A university report by the Task Force on Research Activities and their Management\(^{57}\) (1994, p. 23) supported the adoption of PIs in research: “We have an obligation to increase our use of them for the purposes of providing effective responses to DEET and for Quality Assurance purposes”. Murray Wackett, the head of the Research

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\(^{57}\) The Task Force was appointed by the Vice-Chancellor of the university in 1993 to (1) prepare a research management plan which accords with the guidelines established by DEETYA, and (2) outline the development of research activities and their management in the University until the year 2000.
Section in the Registrar’s Office,\(^{58}\) said that there was no systematic and regular collection of data on research within the university until Dawkins’s (1988) *Higher Education: A Policy Statement* (interview). In another interview, Professor Elizabeth Harman, the President of the Academic Council of the university, said that the PIs reported and used by the university were regarded as “sensible” by both the Federal Government and State Auditor-General.\(^{59}\)

In its 1994 report, the Task Force on Research Activities and their Management stated that “the ability to use performance indicators is dependent on the easy acquisition of accurate data” (p. 24). Since then, the university has taken steps to develop the database for its PIs. A research grants database was introduced in 1990 while a publication database was implemented in 1993. On the recommendation of the Task Force (1994), the university purchased a computerised research data collection system in 1994 for storing, retrieving, and reporting research data. While data on research are collected by the Research Section, the data on student evaluation of teaching, and graduate employability are handled by the Teaching and Learning Centre. All data are then sent to the Planning and Statistics Unit for integration with other data for later submission to DEETYA.

\(^{58}\) Mr Wackett is also the Secretary of the Board of Research (responsible for the central management of research within the university), and the Assistant Registrar (Research).

\(^{59}\) She also pointed out that the PIs reported to the state government follow those that are reported to the Federal Government.
PIs serve a number of roles in the central administration of Murdoch University. They are used for external accountability reporting to DEETYA and the State Auditor-General. The PIs (such as, employability of graduates, publications and research grants) are used by the central administration to monitor trends in performance within the University. In this way, they assist in staff development and the planning of the university. The university also uses them for benchmarking purposes in order to identify its strengths, set achievable targets, and measure achievement toward its targets (Murdoch University Quality Portfolio, 1994). The Research Section takes published data from DEETYA (such as, the Selected Higher Education Statistics reports) for benchmarking purposes. In recent years, PIs have also been used for publicity purposes. For instance, the university had used several research PIs to market itself as one of the top research universities in Australia. The impact of the introduction of research PIs by the Government are examined in the internal reward system of the institution (promotion and funding policies) as well as in its research management plan.

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60 For instance, in its Quality Assurance Portfolio (1994), Murdoch University identified several “baskets” of Australian universities to develop benchmarks. The criteria include location (Western Australia, Edith Cowan, Curtin), similar size, age and discipline mix (Newcastle, Flinders, Griffith), provision of distance education (Deakin, University of New England), and perceived high quality achievements in a smaller university (Wollongong).
Criteria for promotion

An examination of the university's policies suggests that research as an avenue for promotion is a powerful incentive for academic staff. Even before the introduction of PIs, research was seen to be an effective way to gain promotion. However, the criteria for research performance in promotion procedures in the 1970s, 1980s, and early 1990s were less specific when compared to those of 1996. In 1978 and 1983, the principal factor that was taken into consideration during promotion under research was publications, including number of pages and whether the publications were refereed (Murdoch University Academic Staff Promotion Procedures, 1978; Murdoch University Academic Staff Promotion Procedures, 1983). In 1990, evidence of research performance were publications (with refereed contributions being specified as more significant than non-refereed ones), as well as invitations to address scholarly meetings and conferences, external grants received, and referees for scholarly journals (Academic Staff Promotion Procedures, 1990). In 1996, the term publications was specified to include books, chapters in books, papers in refereed journals, papers in non-refereed journals, commissioned reports, published conference proceedings, unpublished conference proceedings, discussion papers, and non-commissioned, unpublished reports. Co-authored works were also taken into account, as well as other scholarly works (such as, patent processes) including those "works
which fall outside the confines of traditional publications" (Murdoch University Information on Applying for Promotion, 1996, p. 9). Among other things, the merit of an applicant’s performance in research, where applicable, is determined by research grants received (number and amount), supervision of research students (Honours, Masters, and PhD), and other research activities (such as, assessor of journal publications, grant applications, or examiner of theses) (Murdoch University Information on Applying for Promotion, 1996). The general criteria for research in 1996 are displayed in Table 8.2.

Table 8.2

General criteria for evaluating performance in research during promotions of academic staff, 1996: The case of Murdoch University

Statement on research activities, objectives, outcomes.

List of publications, research grants, collaborative research undertaken, leadership in research (e.g., leading a research team on specific project), and other research activities (e.g., central role in organising academic programme of a conference).

Higher degree research students supervised.

Recognition of research excellence by awards and honours in research.

Peer appraisal of research.

Reports from referees nominated by the applicant.

Assessor’s reports for levels D and E.

Sources: Murdoch University Academic Staff Promotions Procedures, 1996; Murdoch University Information on Applying for Promotion, 1996.

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61 The criteria vary with importance, depending on the level of promotion. For example, leadership of a research team is not expected of an applicant seeking promotion to Level B. Level A academic staff are expected to carry out activities to develop research, while Level B academic staff are required to demonstrate a good to excellent contribution to research, including the supervision of research students. Level C academic staff have to demonstrate an ability to undertake independent research, provide leadership to research teams, and generate research funding.
It appears that while publications count has always been a criteria for evaluating performance in research since the 1970s, external research income, and much later, number of higher degree research students supervised, became more prominent in the 1990s. While it can be argued that the introduction of PIs has not affected the importance of publications in promotion, the factors that are taken into account in publications have certainly changed over the decade. For instance, pagination was a criteria in the 1970s and 1980s but not in the 1990s. More importantly, the categories of publications that were taken into account in the 1996 promotion applications resembled those by DEETYA at that time. Thus, it is apparent that the introduction of PIs has an intended effect on the promotion policies in this university. The next step is to investigate whether the introduction of PIs has had, or is having, any impact on the funding policies of the university.

Funding mechanism

Prior to the introduction of PIs, the internal funding for research in Murdoch University was different from present practice. It involved two main sources. First, a majority of the funds was based on the equivalent full-time research student load. Second, individual researchers could apply for a Special Research Grant. The latter was allocated competitively within the university for specific projects. Over the decade, the criteria used for the allocation of these grants have remained largely
the same - importance or quality of the research project, the applicant's track record in research (e.g., publications), and the applicant's history in research funding.\textsuperscript{62} Therefore, the Special Research Grant was the only internal fund which provided academic staff with the incentive to undertake research prior to the introduction of PI-based funding for research.

The notion of PI-based funding for research was first developed in 1994. In its report, the Task Force on Research Activities and their Management (1994) attacked the effectiveness of the allocation of research funds from the School's budget which was based mainly on research equivalent full time student load in terms of promoting research performance. More specifically, the Task Force (1994, p. 20) remarked that

Under the RFM (Relative Funding Model) used to determine the funds provided to Schools of Murdoch University, the component of School's budget attributable to research depends solely on research EFTSUs (equivalent full time student units), with different weightings for discipline clusters ... The scheme appears to assume that all staff are equally productive in research, this is clearly not so. Basing research funds solely on research EFTSUs means that staff have no incentive to improve performance in other areas of

\textsuperscript{62} However, their weightings have changed over the decade. In 1984, the weightings for each of the criteria were not specified, and the main consideration was the intrinsic merit of the project (Murdoch University Research Policies and Guidelines, 1984). In 1990, the weightings for importance of the project: applicant's research productivity: applicant's history on research funding were 40%:30%:30%. In 1995, the latter two criteria were combined to make allowance for different conditions in different disciplines (such as, availability of grant schemes), and provided a weighting of 40% in relation to 60% for quality of project. The latter could be increased to a maximum of 80% for new, junior staff and those who re-enter research after a long break.
importance to the University such as national competitive
grant acquisition.

This paved the way for the emergence of the $500 000 Research Index
Fund in 1995, which was the same year that DEETYA’s Composite
Index was constructed to allocate the Research Quantum. The
Research Index Fund was allocated based on the Murdoch University
Research Index. The rationale is that monetary incentives could act as a
performance enhancement mechanism to induce academics to increase
their research capacity. The Murdoch University Research Index is
similar to DEETYA’s Composite Index, as shown in Table 8.3. External
research grants were given more weight compared to either publications
or higher degree research completions. Within external research grants,
national competitive grants were considered as deserving a higher
weight than the other two types of grants. And the weights assigned to
PhD and Master levels in higher degree research completions were
similar to DEETYA’s weights of 3 and 1 respectively.
Table 8.3
A comparison of the weightings for Murdoch University Research Index and DEETYA's Composite Index, 1997

<table>
<thead>
<tr>
<th>Performance Indicators</th>
<th>Murdoch University</th>
<th>DEETYA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input indicators</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National competitive research grants ($)</td>
<td>50%</td>
<td>82.5%</td>
</tr>
<tr>
<td>Other public sector research funding ($)</td>
<td>30%</td>
<td>2</td>
</tr>
<tr>
<td>Industry and other research funding ($)</td>
<td>10%</td>
<td>1</td>
</tr>
<tr>
<td><strong>Output indicators</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publications (number)</td>
<td>50%</td>
<td>17.5%</td>
</tr>
<tr>
<td>Higher degree research completions (number)</td>
<td>35%</td>
<td>12.5%</td>
</tr>
<tr>
<td>PhD level</td>
<td>15%</td>
<td>5%</td>
</tr>
<tr>
<td>Masters level</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>


The amount ear-marked for PI-based funding for research increased three-fold from $500 000 in 1995 to $1.5 million in 1997. In 1997, the Research Index Fund was replaced by the Murdoch Research Quantum. The basis for the distribution of this research fund since its introduction in 1995 was on both the input and output components of the Murdoch University Research Index. However, in 1998, the basis for the allocation of the research funds became separated into either inputs or outputs. In 1998, the outputs component of the university's index determines the distribution of $750 000 Murdoch Research Quantum, while the inputs component of the same index determines the $750 000 Murdoch Research Infrastructure Fund. Despite the alteration in the names of

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63 The Murdoch Research Infrastructure Fund was set up to become the successor of the former Research Index Fund.
the funds and the basis of allocation, the index remains unchanged in terms of the categories and sub-categories of PIs as well as their weights, which mirrors those of DEETYA's. The changes to the PI-based funding for research since its introduction at Murdoch University in 1995 are shown in Table 8.4.

Table 8.4
Internal PI-based funding for research, 1995-1998: The case of Murdoch University

<table>
<thead>
<tr>
<th>Year</th>
<th>Name of fund</th>
<th>Components of MURI used as basis for allocation*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995-1996</td>
<td>Research Index Fund</td>
<td>Inputs and Outputs</td>
</tr>
<tr>
<td>1997</td>
<td>Murdoch Research Quantum</td>
<td>Inputs and Outputs</td>
</tr>
<tr>
<td>1998</td>
<td>Murdoch Research Infrastructure Fund</td>
<td>Inputs</td>
</tr>
<tr>
<td></td>
<td>Murdoch Research Quantum</td>
<td>Outputs</td>
</tr>
</tbody>
</table>

*MURI = Murdoch University Research Index

Research management plan

The PIs in the Composite Index were also emphasised in some of the university's objectives found in its research management plan64 for the period 1995-1998. This is shown in Table 8.5.

---

64 The university introduced its first research management plan in 1986.
Table 8.5

1. To recruit and foster high quality academic staff with demonstrated research capacity.
2. To foster superior standards of research and research publications across a range of disciplines, with particular areas of excellence.
3. To increase Murdoch's share of external funding for research.
4. To allocate University research funds to areas of research strength on the basis of research performance.
5. To maintain a limited number of University Research Centres of national and international quality.
6. To attract, and provide high quality research training and supervision for, talented postgraduate research students across a range of disciplines.
7. To ensure that research is conducted in a safe, ethical and financially responsible manner.
8. To provide research management and support systems (administrative, technical, library and financial expertise) that encourage high quality research.
9. To foster links with local, national and international research institutions, including universities and appropriate commercial and policy-making organizations.


With reference to the above table, publications were highlighted in objective 2, external research grants in objective 3, and higher degree research supervision in objective 6. The measures taken by the institution to improve its standing in these three PIs will be covered in the following subsections, starting with external research funding.
Research funding from external sources

The university has taken several measures to increase the research grants received from external sources. The Task Force on Research Activities and their Management (1994) stressed the importance of increasing the number and value of grants from all sources, and recommended the appointment of senior staff to identify additional research opportunities and to stimulate and provide assistance with grant applications. This prompted the formation of the Research Facilitator Scheme in 1994 to improve the University’s success rate in gaining research funds from external sources, particularly from the Australian Research Council. The Board of Research, which is responsible for the central administration of research within the University, set aside funds for the time release of six senior academic staff to act as Research Facilitators. Their duties were to:

(a) conduct grant-writing workshops,
(b) encourage staff to apply for external research funding from national and international sources by developing annual plans for informing and assisting staff who are seeking external funds, and
(c) assist all staff, including new and junior staff, in the completion of research projects.

Apart from providing the academic staff with the necessary skills to apply for external grants, the University has also taken other steps to raise its
success rate in gaining external research funding, namely by improving their academic staff's planning skills, improving access of the academic staff to information about the availability of external research grants, and promoting the university as a research university via marketing. Through the former Academic Staff Development Policy, an Academic Staff Development Adviser discussed the annual research grant applications with new staff and staff returning to research to increase their success rates in grant applications. Major external sources of funds for research are distributed to academic staff in the Research Guide and by electronic mail. Marketing Murdoch University as a research university is also used as another way to gain external research funding. A member of the Board of Research was allocated the task of communicating and publicising research matters, and strategies were being developed for promoting the university as a research university (Murdoch University Research Guide, 1995). In 1997, a former DEETYA officer (Research Branch) was brought in to discuss Australian Research Council applications with Murdoch staff and provide advice on applications. The university has also sought ways to raise funding from industry.

These include the allocation of a member of the Board of Research to an

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65 Under the 1993 Academic Staff Development Policy, every member of the academic staff was allocated to a Staff Development Adviser (often a senior colleague) who would help the academic staff to set realistic annual goals on all aspects of their work - research, teaching, administration, professional work, and community work- and matched his/her achievements against the stated goals (Academic Staff Development, 1996). According to Dr Lesley Willcoxson, the Academic Staff Development Co-ordinator, this policy is now being replaced by a performance development system which is similar except that this system feeds into the appraisal system. It is carried out at divisional level (with each division specifying their own standards and criteria on which to base the performance development discussion).
Industry/Commercialisation portfolio, the use of companies set up by the University to commercialise research, development of a strategy in 1995 by the Task Force on Industry Funding for increasing industry funding, initiation of annual programmes of visits to major industrial/commercial companies, and the use of external representatives on discipline Industry/Employer Advisory Panels (Murdoch University Research Guide, 1995; Murdoch University Quality Portfolio, 1994).

In comparison, the effort expended by the university in the 1980s to attract external funding, at least those found in the university documents, was minimal. Taking the university's 1984 Research Policies and Guidelines, the 1988 Research Grant Guide, and the 1990 Research Management Plan as examples, the only information found in these documents relate to the types of external research grants, as well as the conditions and procedures in applying for them. Although it is stated in both the Research Policies and Guidelines (1984, p. 3) and the Research Grant Guide (1988, p. 4) that the "University encourages its staff to engage in research projects", assistance in the form of finance and human resources were scarce. For instance, in the 1988 Research Grant Guide, academic staff, who were less experienced in applying for external research grants, were advised to seek assistance from other members in their Schools or a member of the Board of Research. There were also no central strategies to improve research funding from
external sources, including those in industry. An indication of the extent of the changes undergone by the University in order to gain funding from external sources is shown in Table 8.6.

<table>
<thead>
<tr>
<th>Details</th>
<th>1984</th>
<th>1990</th>
<th>1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>Induction course for new academics</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Sources of advice on grant application:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Members of Board of Research</td>
<td>Absent (a)</td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>Members of School Research Committee</td>
<td>Absent (a)</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Senior School academic staff</td>
<td>Absent (a)</td>
<td>Present</td>
<td>Present</td>
</tr>
<tr>
<td>Research Facilitator</td>
<td>Absent (a)</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Academic Staff Development Adviser</td>
<td>Absent (a)</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Assisting funds (e.g., Research Application Fund)</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Access to information about the availability of external funds:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research Guide</td>
<td>Absent</td>
<td>Present</td>
<td>Present</td>
</tr>
<tr>
<td>Electronic system</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Internal grants that take external funding as one of their criteria:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special Research Grant</td>
<td>Present</td>
<td>Present</td>
<td>Present</td>
</tr>
<tr>
<td>Research Index Fund(b)</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Research Infrastructure Block Grant(b)</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Strategies to improve funding (e.g., publicity, Task Force on Industry Funding)</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
</tr>
</tbody>
</table>

(a) Apart from procedures and guidelines, the 1984 Research Policies and Guidelines distributed to academic staff did not identify any individual/committee who could provide assistance in grant application.

(b) Both Murdoch's Research Index Fund and the Federal Government's Research Infrastructure Block Grant were introduced in 1995; the latter replacing the former Mechanisms A and B Research Infrastructure Programmes. The Research Index Fund has since been replaced by the Research Infrastructure Fund in 1998.


It is evident that the university has taken considerable steps in recent years to support and encourage its academic staff to apply for external
grants as compared to 1984 and 1990. The induction programme for new academic staff covers grant applications. Staff also have easy access to information about research funds from national and international funding bodies. Various identifiable sources of advice for grant applications are also provided by the university. Success in winning external research grants has also been linked to some research grants. In recent years, strategies have been developed, including the establishment of assisting funds, to improve the university’s success rate in receiving external research funds. Similarly, the university has attempted to improve its standing in publications and higher degree completions.

Publications and higher degree completions

The university’s earlier documents on research did not provide details on how it encouraged or improved research publications by academics and postgraduate research student activities. The incentives for concentrating on publications during this period were provided by the university promotion policies and the Special Research Grant. In both cases, publications was one of the criteria. However, the support provided at the university level were either not detailed or minimal. In the 1990 Research Management Plan, for instance, academic staff were encouraged “to participate in appropriate conferences and to undertake appropriate outside studies programmes” (p. 4) in order to be at the
forefront of their research fields. However, the academic staff’s ease of access to funds for these purposes was not clearly indicated. For instance, the Research Travel Fund which was to be used for research purposes in 1990 was distributed on a “competitive basis” (Murdoch University Research Grant Guide, 1990, p. 19) but with no further details. In contrast, in 1995, the research management plan explicitly urged both academic staff and postgraduate research students to participate in national and international conferences through the provision of specific funds established for this purpose. Postgraduate research students have access to the Postgraduate Research Student Travel Fund, while the Academic Travel Fund and External Travel Fund permit every academic to attend a conference every two years.

There are also various steps taken to improve postgraduate research student activity in the 1995 Research Management Plan. Murdoch University provides annual training in postgraduate research student supervision for all staff taking their first higher degree student and other staff at the direction of the university. Unless approved by the Research Degree and Scholarships Committee, an academic staff member cannot supervise more than five postgraduate research students at any one time. The annual progress reports required for research students\(^66\) are reviewed every year as a basis for continued enrolment, suspension, or

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\(^{66}\) The report consists of written comments relating to the student’s research progress from the student, supervisors, senior academic, and Dean of the School in which the student is enrolled.
termination of candidature. The students also have access to training
facilities in electronic communication and information retrieval and their
views on the quality of supervision received are sought in an annual
postgraduate supervision feedback survey. A comparison of the
measures taken by the university to improve the rates of publications by
its academic staff and higher degree completions of its research
students over the decade is found in Table 8.7.

Table 8.7
Measures taken to improve publications and postgraduate research
completions: A content analysis of Murdoch University documents,
1984, 1990, and 1996

<table>
<thead>
<tr>
<th>Details</th>
<th>1984</th>
<th>1990</th>
<th>1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support for publication:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Induction course for new academics</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Skills improvement (including in goal-setting)</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Travel funds for conferences</td>
<td>Absent</td>
<td>Present</td>
<td>Present</td>
</tr>
<tr>
<td>Internal grants that take publication as one of their criteria:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special Research Grant</td>
<td>Present</td>
<td>Present</td>
<td>Present</td>
</tr>
<tr>
<td>Research Index Fund(a)</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Steps to improve higher degree completions:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Induction course for new staff</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Skills improvement (through training in postgraduate research student supervision)</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Limit in the number of students supervised</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Annual progress report by students</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Annual supervision feedback survey</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Internal funding that take higher degree completions as a criteria (e.g., Research Index Fund (a))</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
</tr>
</tbody>
</table>

(a) The Research Index Fund was discontinued in 1997. The Murdoch Research Quantum was distributed to Schools based on the Murdoch University Research Index in 1997 but has since been altered to the outputs component of the Murdoch University Research Index in 1998.
Murdoch University appears to have undertaken significant measures to improve both the publications of its academic staff and the postgraduate degree completions of its research students in 1996 as compared to five or ten years ago. New academic staff are now introduced to research management and graduate supervision skills in their research induction course. During their tenure, academic staff are provided with opportunities to improve their skills through workshops and other training programmes for both publication and supervision of postgraduate research students. Furthermore, both publications and higher degree completions are linked to performance-based funding for research via the Murdoch University Research Index.

It appears that research is now actively managed at Murdoch University. In 1984, no one was identified as being responsible for providing advice or encouraging research among academic staff, particularly among new staff. During 1990, senior academic staff within each discipline were given responsibility for encouraging junior or new members within their disciplines to undertake research. In comparison, the research management plan for the period 1995-1998 identified various sources of advice in research, and schemes in a bid to encourage research, such
as members of the School Research Committees, and senior academic
staff within each discipline. All new academic staff are also encouraged
to attend a research induction course which includes materials on
research management, grant application writing, and graduate
supervision skills. There are also various schemes in place to encourage
research by academics.  

Although the promotion policies and the Special Research Grant were
powerful incentives for academic staff to undertake research during the
period before the introduction of PIs, the establishment of a significant
amount of research funding, distributed on the basis of Murdoch
University Research Index provides further encouragement for research.
What is interesting about this encouragement in research is that it has
predominantly focused on three areas - success in winning external
research grants, increasing the number of publications, and to a lesser
extent, higher degree research completions. Similarly, the introduction of
PIs saw the incorporation of external research grants (number and
income) and higher degree research students supervised (number) into
the promotion criteria. For the recognition of publications in promotion,
the categories of approved publications have basically become similar to
those recognised by DEETYA at that time. Thus, the second hypothesis
that the introduction of PIs by the Government has encouraged

\[67\] For instance, among other things, the Junior Academic Women Mentoring Scheme
introduces junior female academics to research.
universities to focus on the activities measured by the PIs is substantiated. The above case study appears to be consistent, from informal and anecdotal evidence, with those of other universities.

**Conclusion**

In summary, the introduction of PIs by the Federal Government has been accompanied by changes in the internal management of tertiary institutions. More specifically, the Government’s practice of linking PIs to the research component of the operating grants has been followed by the establishment of a similar type of funding for research within the institutions, the adoption of these PIs into the universities, and an emphasis placed on the activities measured by these PIs. Whether these changes in the institutions under investigation will have an impact on the research and teaching activities of the substantive individual academic member is examined in the next two chapters.
CHAPTER NINE: IMPACT OF PERFORMANCE INDICATORS AT THE ACADEMIC LEVEL: ATTITUDE TO PERFORMANCE INDICATORS

Introduction

This chapter presents the results on the attitudes of the academics to the application of PIs in their universities. The statistical findings from the questionnaires are provided, followed by the comments collected from both the questionnaires and interviews. The chapter will begin with a presentation of the demographic profile of the sample.

Demographic Profile of the Participants

The demographic profile of the participants\textsuperscript{68} is provided in Table 9.1. Staff profiles across the four institutions show some similarities. The academics in this study were predominantly in full-time permanent employment, did both research and teaching, were lecturers (Level B), have been in the current universities for at least 10 years, and with the exception of Curtin University (where 54% of the sample were female),

\textsuperscript{68} Throughout this dissertation, the terms “respondents” and “interviewees” indicate the academics surveyed by questionnaire and interview respectively. On the other hand, the term “participants” comprises both respondents and interviewees.
male. The findings are consistent with those reported by other authors (e.g., Harman and Wood, 1990; Mahony, 1995) as well as government statistics (DEETYA, 1997a; The Government of Western Australia, 1997). When it came to staff rank, there was a noticeable difference between the universities. Although the participants from all four institutions were mostly at Level B (Lecturer), the older or established universities (University of Western Australia and Murdoch University) contained a larger proportion of participants who were at Level C (Senior Lecturer) and higher positions than the newer universities (Curtin University and Edith Cowan University). In the latter, about half of the participants were at Level B (Lecturer) and lower levels. Identical profiles have been reported by Australian researchers, such as Harman and Wood (1990).

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69 The relative high proportion of females in Edith Cowan University and Curtin University could be attributed to the academics from the Nursing discipline who were mainly female and were in large numbers.
Table 9.1
Demographic characteristics of the participants

<table>
<thead>
<tr>
<th>Variables</th>
<th>University*</th>
<th></th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Murdoch</td>
<td>UWA</td>
<td>ECU</td>
<td>Curtin</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>75%</td>
<td>92%</td>
<td>58%</td>
<td>46%</td>
<td>64%</td>
</tr>
<tr>
<td>Female</td>
<td>25%</td>
<td>8%</td>
<td>44%</td>
<td>54%</td>
<td>36%</td>
</tr>
<tr>
<td>Discipline</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arts</td>
<td>18%</td>
<td>22%</td>
<td>17%</td>
<td>13%</td>
<td>17%</td>
</tr>
<tr>
<td>Science</td>
<td>14%</td>
<td>39%</td>
<td>8%</td>
<td>8%</td>
<td>16%</td>
</tr>
<tr>
<td>Professional</td>
<td>68%</td>
<td>39%</td>
<td>75%</td>
<td>79%</td>
<td>67%</td>
</tr>
<tr>
<td>Mode of employment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research and teaching</td>
<td>100%</td>
<td>86%</td>
<td>69%</td>
<td>63%</td>
<td>77%</td>
</tr>
<tr>
<td>Research</td>
<td>-</td>
<td>5%</td>
<td>-</td>
<td>8%</td>
<td>4%</td>
</tr>
<tr>
<td>Teaching</td>
<td>-</td>
<td>4%</td>
<td>25%</td>
<td>27%</td>
<td>16%</td>
</tr>
<tr>
<td>Others (a)</td>
<td>-</td>
<td>5%</td>
<td>6%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>Term of employment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time permanent</td>
<td>92%</td>
<td>89%</td>
<td>86%</td>
<td>79%</td>
<td>86%</td>
</tr>
<tr>
<td>Full-time contract</td>
<td>4%</td>
<td>8%</td>
<td>3%</td>
<td>11%</td>
<td>7%</td>
</tr>
<tr>
<td>Fractional full-time contract</td>
<td>-</td>
<td>3%</td>
<td>3%</td>
<td>6%</td>
<td>3%</td>
</tr>
<tr>
<td>Others (b)</td>
<td>4%</td>
<td>-</td>
<td>8%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Position</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head/Chair-Others</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head/Chair</td>
<td>11%</td>
<td>14%</td>
<td>11%</td>
<td>10%</td>
<td>11%</td>
</tr>
<tr>
<td>Others (c)</td>
<td>89%</td>
<td>86%</td>
<td>89%</td>
<td>90%</td>
<td>89%</td>
</tr>
<tr>
<td>Level of appointment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associate Lecturer (level A)</td>
<td>7%</td>
<td>6%</td>
<td>-</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>Lecturer (level B)</td>
<td>25%</td>
<td>11%</td>
<td>64%</td>
<td>46%</td>
<td>38%</td>
</tr>
<tr>
<td>Senior Lecturer (level C)</td>
<td>29%</td>
<td>25%</td>
<td>22%</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>Associate Professor (level D)</td>
<td>32%</td>
<td>36%</td>
<td>3%</td>
<td>15%</td>
<td>20%</td>
</tr>
<tr>
<td>Professor (level E)</td>
<td>7%</td>
<td>22%</td>
<td>11%</td>
<td>10%</td>
<td>13%</td>
</tr>
<tr>
<td>Others: Research Fellow</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>Organisational tenure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 2 years</td>
<td>-</td>
<td>3%</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>2-5 years</td>
<td>7%</td>
<td>3%</td>
<td>11%</td>
<td>4%</td>
<td>6%</td>
</tr>
<tr>
<td>6-9 years</td>
<td>21%</td>
<td>16%</td>
<td>39%</td>
<td>42%</td>
<td>32%</td>
</tr>
<tr>
<td>10 years or more</td>
<td>72%</td>
<td>78%</td>
<td>47%</td>
<td>52%</td>
<td>60%</td>
</tr>
</tbody>
</table>

*UWA = University of Western Australia, ECU = Edith Cowan University  
(a) Administration/coordination. (b) Fractional full-time permanent. (c) Job positions other than head of School/Department/Unit or chair of programme.
Results from Questionnaires

In order to obtain an overview of the attitude of the respondents towards Pls, a frequency distribution of the location of the persons in logit scores\textsuperscript{70} and the distribution of the estimates of the affective values of the items from the Attitude to Pls scale of the questionnaire are shown in Figure 9.1. The locations of the items have an arbitrary numerical origin of 0.0, but because all statements are bipolar, with two negative and two positive responses, it can be taken also as the average substantive origin. This can be made more concrete by interpreting the locations of the thresholds between the successive responses "strongly disagree"/"disagree", "disagree"/"agree", and "agree"/"strongly agree". These are respectively, -2.3, 0.1, and 2.3. Thus, any person location below -2.3 indicates a most likely response of "strongly disagree", a location between -2.3 and 0.1 a response of "disagree", a location between 0.1 and 2.3 a response of "agree", and above 2.3 a response of "strongly agree". In other words, negative values indicate a negative attitude, and vice versa. It can be seen that the frequency distribution of the persons is negatively skewed relative to the item locations. Since a high score implies a positive attitude, the interpretation is that the respondents tend to have a negative attitude towards the Pls. Evidently, there were very few responses in the last category, that of strongly

\textsuperscript{70} Logit scores are transformed raw score totals on each scale which places them on an interval metric.
agreeing as a reflection of a positive attitude to PIs. Therefore, the third hypothesis – university academics generally have a negative attitude towards PIs - is supported.

For a more in-depth analysis of the respondents’ attitude to PIs on a statement by statement basis, two $\chi^2$ tests were carried out on the statements measuring the Attitude to PIs scale. The first considered the distribution of responses in the four categories - “strongly disagree”, “disagree”, “agree”, “strongly agree” - and the second involved a dichotomisation between the two disagree categories, “strongly disagree” and “disagree”, and the two agree categories, “agree” and “strongly agree”. The results are presented in Appendix 13.
The first $\chi^2$ test showed that the frequencies among the four were significantly different categories for all the statements. A closer inspection showed that the majority of responses were in the “disagree” or “agree” categories. In other words, most of the respondents did not feel strongly one way or the other about the statements on PIs.

The second $\chi^2$ test showed that only six statements have statistically significant different frequencies between the “strongly agree + agree” and “strongly disagree + disagree” responses. These statements, which are displayed in Table 9.2, focused on control, accountability, quality, and dysfunctional work behaviour. These are discussed in more detail in the next section on *Results from interviews*. 
Table 9.2

Statements in *Attitude to Pls* scale: Significant chi-square results

<table>
<thead>
<tr>
<th>Survey items</th>
<th>Category of responses</th>
<th>( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 (a) Performance indicators help the Australian Commonwealth Government to</td>
<td>A+SA: 69, D+SD: 15,</td>
<td>54.24**</td>
</tr>
<tr>
<td>increase its control over this University.</td>
<td>Don't know: 16</td>
<td></td>
</tr>
<tr>
<td>5 (a) Performance indicators help this University to increase its control</td>
<td>A+SA: 68, D+SD: 22,</td>
<td>34.75**</td>
</tr>
<tr>
<td>over academics' work.</td>
<td>Don't know: 10</td>
<td></td>
</tr>
<tr>
<td>6. Performance indicators help academics in this University: (a) to be</td>
<td>A+SA: 57, D+SD: 36,</td>
<td>7.21*</td>
</tr>
<tr>
<td>accountable for our work. (R)</td>
<td>Don't know: 7</td>
<td></td>
</tr>
<tr>
<td>(b) to have a better knowledge of the goals of this University. (R)</td>
<td>A+SA: 46, D+SD: 43,</td>
<td>0.19</td>
</tr>
<tr>
<td>(c) by providing feedback on our work performance. (R)</td>
<td>Don't know: 11</td>
<td></td>
</tr>
<tr>
<td>(d) to improve the quality of our research. (R)</td>
<td>A+SA: 23, D+SD: 67,</td>
<td>32.03**</td>
</tr>
<tr>
<td>(e) to improve the quality of our teaching. (R)</td>
<td>Don't know: 10</td>
<td></td>
</tr>
<tr>
<td>7. The literature on performance indicators suggests that performance</td>
<td>A+SA: 31, D+SD: 59,</td>
<td>12.97*</td>
</tr>
<tr>
<td>indicators can encourage dysfunctional work behaviour in some academics.</td>
<td>Don't know: 10</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>70.13**</td>
</tr>
</tbody>
</table>

SA = strongly agree, A = agree, D = disagree, SD = strongly disagree.
(R) = reverse scored statement.
Number of participants = 152.
Level of significance: *\( p < 0.05 \), **\( p < 0.01 \), ***\( p < 0.001 \).
Degrees of freedom, df = 1.

As for the rest of the statements on Pls (which were mainly on the benefits of using Pls), the proportion of respondents who agreed with them was not significantly different from those who disagreed. For instance, forty-six per cent agreed that “Performance indicators help academics in this University by providing feedback on our work performance” compared to the forty-five per cent who disagreed.
The moderating factor: Rank

The attitude of the respondents towards PIs was also found to vary significantly with their level of position (rank) although this was a substantively small relationship ($r^2 = 0.052$, $p = 0.0046$). More precisely, the attitude towards PIs tend to improve with rank. An exception shown in the graphical display in Appendix 14 applied to respondents who were Associate Lecturers, whose attitude seem to be more positive than those of the Lecturers. However, the responses collected from only a small number of Associate Lecturers (5) might not be representative of the views of other academics at this level.

Comments from the Participants: Questionnaires and Interviews

This finding of a significant association between attitude to PIs and rank was confirmed by the comments received from the interviews. For instance, when asked the interview question, “Overall, are you happy with the move towards the use of performance indicators in this university?” , the following answers given by a selection of academics of different rank reflect the varying degrees of satisfaction with PIs.

No. I am not happy. I don’t believe that they are designed to represent real productivity. I think they are designed for people who know how to use the system. I think they are designed by people who have been in the system, the old system, and are not willing to change the system. (046) Lecturer

71 Identification code given to each participant in this study.
I suppose it gives you some evaluation on your performance. It is an evaluation in one way but it is not very helpful in evaluation. It is sheer number counting. It doesn't really indicate quality. (194)

Senior Lecturer

I am fairly happy with the current performance indicators as I understand them. The process I am a little less happy with. There is a tendency to stress the last couple of years rather than 15 years of service. That is quite tiresome. It doesn't impact on my life. I just get on and do my job. (056)

Associate Professor

Yes, overall, I would say so. I think it's been a positive aspect to at least allow people to assess. I think it has been a positive aspect to both the institution and the individual. The institution to get some measure of people who are contributing to research, and contributing to teaching. It is also been useful to individuals as a means of those people who are in fact doing a good job have an opportunity of being measured and showing that. It is the acknowledgment that one is heading in the direction the institution wants you to head. (125)

Professor

The results of the interviews on the perceived advantages versus the disadvantages of the introduction of PLs are summarised in Table 9.3. In addition to the proportion of interviewees who were supportive of and opposed to the application of PLs in their institutions, there was a small proportion of interviewees (9 per cent) who were uncertain about the PLs themselves, how they were used, and even unaware of their introduction into their universities. This is also reflected in the $\chi^2$ test of the Attitude to PLs scale in Appendix 13. The proportion of respondents who answered "don't know" to the questions in this scale varied between three to eighteen per cent. In the space provided in the questionnaire, a respondent (051) wrote, "I am not altogether sure what they are", while
another (014) admitted that, "Until I can understand the process, I am more confused than happy/unhappy".

Table 9.3
For, against, and confusion over PIs: Results from interviews

<table>
<thead>
<tr>
<th>Variables</th>
<th>Total No.</th>
<th>Total %</th>
<th>Examples of academics' comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Positive</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) General</td>
<td>15</td>
<td>35</td>
<td>Without performance indicators, we would have to go by impression. (016)</td>
</tr>
<tr>
<td>(b) Publications count</td>
<td>2</td>
<td>5</td>
<td>They are the only way you'll get international reputation ... (044)</td>
</tr>
<tr>
<td>(c) External research grants</td>
<td>3</td>
<td>7</td>
<td>It's a very strong peer reviewed process. (087)</td>
</tr>
<tr>
<td>(d) Student surveys on Teaching</td>
<td>8</td>
<td>19</td>
<td>It deals with the technical aspects of teaching.(097)</td>
</tr>
<tr>
<td><strong>2. Negative</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) General</td>
<td>24</td>
<td>56</td>
<td>I don't think they really represent work performance. (046)</td>
</tr>
<tr>
<td>(b) Publications count</td>
<td>13</td>
<td>30</td>
<td>It achieves very much the wrong ends rather than the ends that are meant to be achieved. (087)</td>
</tr>
<tr>
<td>(c) External research grants</td>
<td>13</td>
<td>30</td>
<td>How much money you bring in becomes the measure of how good you are. (234)</td>
</tr>
<tr>
<td>(d) Student surveys on teaching</td>
<td>27</td>
<td>63</td>
<td>It's trying to use 1 tool to try to assess teaching performance across a wide range of different tasks. (214)</td>
</tr>
<tr>
<td><strong>3. Unclear</strong></td>
<td>4</td>
<td>9</td>
<td>They are not very clear to us. (056)</td>
</tr>
<tr>
<td>Total interviewed = 43</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

With reference to Table 9.3, it appeared that the university academics interviewed generally were aware of the advantages derived from the introduction of PIs in their universities as well as the disadvantages although the proportion with negative comments on PIs was slightly more than those who talked about the benefits of PIs. For instance, while thirty-five per cent of the interviewees acknowledged some benefits
served by PIs, fifty-six per cent of them were critical about their usefulness. A common complaint about PIs was their restrictive nature.

Ineffective representation of academic's work

First, PIs were perceived as being unable to adequately capture the various dimensions of academic work. For instance, an interviewee (079) pointed out that

There is no indication that those performance indicators really measure performance in any real sense of the word. I suppose it causes you to do things that you may not otherwise have done. Now whether this is worthwhile or not is doubtful.

Hence, academics who carried out activities which were not assessed by PIs were disadvantaged. Below are two typical comments.

... some of the other people around here whom I have talked to have said that it is really quite frustrating because you are actually doing things, you are productive, you are producing things but it is not recognised. (136)

... one colleague next door does a lot of work in this school. She goes out talking to various school groups, to teachers, to students, and so on. That is of course very important public relations exercise for the school and the university, and it draws on her expertise. And yet she doesn’t get a lot of credit for that in terms of research points. (157)

This disadvantage also extended to courses which were not easily assessed quantitatively. An interviewee (019) from the arts discipline
discussed the problems of depending on student surveys for feedback on teaching:

I do lots of creative performance-oriented work with students in theatre drama studies. There's no way of assessing that as an indicator of satisfaction for learning or research. There's no structure in place at the moment in the current surveys that allow for an evaluation of what happens there.

Furthermore, while the introduction of PIs for research was seen by a majority of the participants as encouraging research, the categories for approved research were believed to be too narrow. This apply to both the arts and science disciplines, as shown below.

In the last year, there has been categories lost which means that certain people (in creative production) in this particular school no longer register in that index anymore ... the research index is getting much more narrowly focused on traditional scholarship. And those other categories seem to be disappearing. (168)

As an active research person, I feel it's very important for scientists to communicate both with themselves but it's equally important that they communicate with other people, with ordinary people. And I'll be tempted to give almost equal weighting to a paper published in a popular science magazine, something like the magazine published by the Australian Museum, or even National Geographic, magazines like that which reach a lay audience. And I know from experience that almost as much work goes into a good article for one of these magazines as publishing scientific paper. And at the moment, they are given very, very low value, if any. The result is that a lot of people might not be bothered writing articles for public consumption. And I think that really cuts off one whole area of scientific endeavours. (149)
The disadvantage, therefore, occurred in academics who were not engaged in activities measured by the PIs, and this might include academics who were new or in a junior position.

It (research index scheme) is opened to enhancing the careers of people who are already efficient researchers, and it can work against the junior people. Because in the new climate, when all of us are teaching more than we’ve ever taught before, bigger classes than ever before, people starting out in research now are not going to be able to get into the research index. (168)

People who don’t get the benefits are the ones who aren’t doing as much, who aren’t doing the right sort of stuff, or perhaps who are starting out. There’s a bit of lag between when you do it, and when you start to get points for doing it. (136)

Neglecting exogenous factors

Second, the participants appeared to be convinced that PIs were subjected to external influences which were not taken into consideration during interpretation of results. An academic (157) explained, "Performance indicators, it seems to me are all very well. But they don’t really seem to take a lot of notice of context in which the particular academic is operating, whether personal or institutional". Another academic (175) said, "It’s subject to all sorts of influences other than what it’s supposed to measure". Student surveys in particular, had been accused of assessing factors which were beyond the control of the academic (such as personality, topic, and class size), and factors which
were considered to be relatively less important than knowledge of the academic (like pedagogic skills). A few comments are presented below.

Some of them are like personality things. I get compared to X who is a great lecturer... And people would say my personality is different to his. My personality should be more like X. But I can't do that. I'm basically a shy person. When I'm in a lecture, I have this shy manner about me, and it's hard for me to be very informal and speak to the students. (101)\(^2\)

My impression, in first year at least, if the more of the showman a lecturer is, the better they (the students) give the results. (097)

It's always a question of how do you present what you know instead of do you know enough to present something that is really detailed. It simply assume that it doesn't matter how much the academic knows, how well he or she has the field in her grip. It's always a question of is she using such and such pedagogic devices and mechanisms no matter how much in charge of the field she is ... (016)

Disregard of discipline research traditions

At the research level, the PIs which were commonly discussed by the interviewees were publications count and external research grant applications. Again, the proportion of academics who supported their introduction (less than 10 per cent of the interviewees) was smaller than the proportion who opposed their introduction (30 per cent), as shown earlier in Table 9.3. In particular, the introduction of PIs for research had

\(^2\)The name of the academic mentioned by the interviewee was withheld to protect the identity of both parties. Similarly, any names of persons, disciplines, universities or commission mentioned by the interviewees would not be identified to protect the party mentioned as well as the interviewee.
been claimed to disadvantage certain disciplines through their inability to recognise the different research traditions (for instance, publishing profile) in different disciplines, as shown by the comments below.

The present research index is one that is highly specific, that focus more on scientific writings and exclude some other aspects of a person's research or a person's activities, and to some extent, it is to the detriment of those people who are not in the clear-cut scientific discipline. People in humanities, people in the arts and craft are certainly disadvantaged by the present research index system that we have, and an institution such as X is disadvantaged by that sort of system. (125)\textsuperscript{73}

... publications in refereed journals, for example, are considered to be of higher value, which is true. But each discipline has got its own publications profile. For example, pure chemist or pure physicist will mainly published in refereed journals because that has been the traditional way. On the other hand, with computer science, for example, where if you wait for the process of refereeing, then you are left behind because technology advances so quickly. Similarly, in engineering, when you've got an advance in a particular topic that has to be provided more appropriately in a conference where there is a forum because if you just wait for the process of refereeing, then events would have overtaken you. There's no recognition of the different publications profile of different disciplines. (034)

... in certain discipline areas and nursing is one of them which is a very dynamic practice profession, that to disseminate knowledge at conference is at least as important with its currency to current audience as being published in a refereed journal two years after the event.

\textsuperscript{73} In the four universities surveyed, the research index and student surveys on teaching were given different names. For instance, as indicated earlier in Chapter Eight, the research index is called Research Performance Index in Curtin University, Research Activity Index in Edith Cowan University, and Murdoch University Research Index in Murdoch University. Similarly, student surveys on teaching is called Student Perception On Teaching (SPOT) in University of Western Australia, and Student Assessment Of Teaching (SAT) in Curtin University. For confidentiality reasons, the research index from the various institutions referred to by the participants would be known as "research index" and the student surveys on teaching would be referred to as "teaching surveys".
And that is what annoys me, that same credence is not
given to that kind of presentation and networking as well at
conference. Things happen very quickly in practice
professions, and it would be nice if people could pick up
the ideas and implement them quickly. By the time you’ve
got something published, it can be up to two years, and the
moment is gone. (290)

The interviewees also pointed out that the choice of external research
income as a PI for research may not be appropriate for all disciplines. As
an example, an academic (057) from the arts, believed that,

The research that I do most of the time in between is fairly
inexpensive. So I don’t require any extensive funding for
that except what comes through the department. I don’t
have expensive equipment. I don’t have research
assistants. If I do research, I want to do my own research.
I’m not interested in having research assistants do it for
me. My own resources are either what I have in my own
library, or that I’ve brought back from leave, or it’s available
in the library, or an inter-library loan.

The disadvantages brought about by the application of PIs were
perceived to not only apply to certain disciplines but also extended to
certain areas within the disciplines. For instance, a respondent (163)
from the creative production area in the arts discipline wrote in the
questionnaire, “I earn more points by critiquing a novel, say, than writing
one”. Another respondent (196) highlighted the limitation of external
research income as a PI for research by pointing out that, “a theoretical
physicist doesn’t need much money whereas somebody doing research
for a satellite might need a large amount”. Similarly, an interviewee (157)
admitted that,
... even in this school, someone from film television and journalism is more likely to get an outside contract or outside consultancy to bring money in than someone like me working in the area of cultural studies. I’m not saying people who bring in money should be discouraged from doing so, but I think those who don’t should not be punished for not doing so.

Student surveys on teaching

The dichotomisation between the number of interviewees who were for the application of PIs and those who were against their use was particularly marked in the case of student surveys on teaching. As shown in Table 9.3, over sixty per cent of the interviewees were doubtful or unconvinced about the capability of the surveys to assess teaching performance compared to less than twenty per cent who saw some merit in their application. First, there was a perception that students were unable to distinguish between teaching quality and its rigour. A few comments are shown below.

Students quite often don’t distinguish between the quality of the teaching and its rigour. In other words, if you make students suffer in taking the course because you make certain demands - I’m not talking about illegitimate and excessive demands but demands of literacy, demands of reading schedule, and so on - students will often feel resentful. And that may then spill over into their assessment of your teaching (157).

If you go into a class of 50 students, and you give them an exam, easy, and they’ve all done well. And you do a survey immediately after that. And you’ll get very good grading. Alternatively, you just give a quiz which is tough. The results can be quite different. I’ve seen it in both cases. Because it’s just human nature of evaluating (197).
Students use it to take revenge (149).

Second, the interviewees argued that students might have certain misconceptions which may affect their decisions to cooperate in the surveys. Below are two typical comments from the interviews.

If you've got very small classes, I'm not sure that students will be honest because they run the risk or the perceived risk of being identified. (309)

I have some students who tell me they just put 5, 5, 5 for everything because they thought that would get them a better mark... There's another class of students who think that you're going to forensically analyse the pencil marks or whatever. I have students who've told me that they won't fill the teaching surveys out because they're frightened of what I might do to them when I find out their answers. (238)

Third, the interviewees argued that the reliability of the results obtained from the surveys was dependent on a good response rate which could not be guaranteed. For instance, an academic (149) indicated that, "In the last class I handed out, we had 89 students in a class, and 6 of the students filled them in. The other class, 30 out of 80 students filled them in ...". Fourth, these surveys were perceived to be unable to discriminate teaching performance sufficiently. Accordingly, the interviewees were convinced that these surveys were limited in relation to feedback on teaching which enable improvement in teaching. A collection of typical remarks from the interviews are presented below.

It's very quantitative. It tells you how many students like the courses, how many students read the book. I don't
believe it gives me feedback on the ways in which it can be improved. (046)

It asks the students if the student is happy with the course content, and the student has five choices, ranging from strongly agree to strongly disagree. But if the student disagrees, then what? ... it’s not clear how the academic is supposed to act on it. (157)

These surveys are meant to be used right across the campus so they’re written in very general way. They will show up when a unit is very bad but they won’t provide feedback to the coordinator about specific things that need to be addressed. The lecturer really needs to do a follow-up survey more specific to identify what the particular problems were. (024)

I don’t rely on it for feedback. I rely on it for keeping files on my case in case I want to go for promotion, and increasingly I suspect it won’t be for promotion, it’ll be keeping your job. But I don’t use it. I use a very extensive system of student journals in which they record every week their reaction to the lectures and the tutorials in the course of meditating on the units. And I get much better feedback on what I’m doing right, what I’m doing wrong from that. But I can’t use those for my career. (168)

The limitation of these surveys in providing feedback that is useful for improvement in teaching becomes more pressing given that a majority of the respondents reported that they used student surveys (both those that are administered by their institutions and self-designed ones) for feedback on performance, and to a lesser extent, on improving their teaching in 1986, 1991, and 1996. The results are shown in Table 9.4.
Table 9.4

Purposes of teaching surveys (self-designed and institution’s): Proportion of participants who used them

<table>
<thead>
<tr>
<th>Purpose of student surveys</th>
<th>Years</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Feedback on the quality</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>of teaching</td>
<td>68</td>
<td>45</td>
<td>113</td>
<td>74</td>
<td>115</td>
</tr>
<tr>
<td>2. Improving teaching</td>
<td>64</td>
<td>42</td>
<td>102</td>
<td>67</td>
<td>102</td>
</tr>
<tr>
<td>3. Apply for promotion</td>
<td>17</td>
<td>11</td>
<td>51</td>
<td>37</td>
<td>34</td>
</tr>
<tr>
<td>4. Others (a)</td>
<td>3</td>
<td>2</td>
<td>8</td>
<td>5</td>
<td>15</td>
</tr>
</tbody>
</table>

(a) Feedback on courses taught, changing courses, application for awards (e.g., teaching excellence award), and career advancement (e.g., job application).

Feedback on teaching from students: Other methods

Since the surveys recommended by their institutions were perceived to be limited in their capacity to provide feedback on work performance, several participants explicitly stated that they employed other methods of obtaining feedback from students in addition to the institution’s surveys. These methods include active contact with students and/or peers, addition of extra questions to the institution’s surveys, and designing a new questionnaire. A selection of their comments are shown below.

I depend on attaining and retaining contact with the students, and talking to the students. And at the end of the day, when I give a lecture, I ask myself, “Did I enjoy that?” And if the answer is yes, then I always think that I gave a good lecture (125).

My approach to student evaluation is I talk to students. And I get a feel from them, whether they’re understanding the material. I ask the students whether they’re enjoying it, whether they’re learning anything, whether it’s covering the material that they think they like to learn about, whether I’m talking too fast. I modify my course as I go along, and from year to year, based upon what feedback I get from
students. But I'm selective. To me, the most valuable feedback I can get is from the best students in my course, the ones who actually make an effort to come to lectures, to learn, to do the reading, to do the work, perform well. They can tell me more about the quality of my teaching, the quality of the course than the students who don't show up for lectures (149).

I improve my teaching by talking to lecturers and picking up techniques from other people's lectures and attending the odd course (97).

Now and then, I get a colleague to sit in and get the colleague to evaluate me. I choose my colleagues. I'm not going to choose the one that's going to say, "That was brilliant". I don't want that. I want to know the negatives and the positives (286).

I use my own surveys if I want to find out any specific problems (024).

I have my own questionnaire. I get students to rank my units but I use a totally different system. It's more useful for me. I've got two. One is how much students think they have had the opportunity to self-teach themselves, so how much it has been student centred learning. And the other one I use is a fairly simple questionnaire. It's just about this unit in comparison to other units, and the things they got out of it, the good things, the less good things, and so on. So it's much more open-ended so I do my own quality assurance that way (173).

What I also did with the student surveys is ask them two questions: What you particularly like about my teaching? What did you particularly don't like? (207)

Comments from the participants shown so far are about the suitability of the PIs used by their institutions to assess performance in research and teaching. The interviewees also discussed the perceived effects of the application of PIs. The results from the interviews are summarised in Table 9.5. It appeared that the academics' perceptions of the impact of
Pls were divided. Some interviewees believed that the introduction of Pls had no impact on academics’ behaviour whatsoever, in many cases, citing the internal motivation of academics. Another group saw mainly positive results from the use of Pls while the third group was primarily concerned with their unfavourable effects.

Table 9.5
Perceived effects of Pls: Results from interviews

<table>
<thead>
<tr>
<th>Variables</th>
<th>Total No.</th>
<th>Examples of academics’ comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No impact</td>
<td>10 23</td>
<td>A good academic will be responsible for his work whether he’s got to fill in Pls or not because it’s in the person. It's personality. (123)</td>
</tr>
<tr>
<td>2. Positive</td>
<td></td>
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<tr>
<td>(a) General</td>
<td>5 12</td>
<td>People who are performing well get a pat on the back. (035)</td>
</tr>
<tr>
<td>(b) Research</td>
<td>12 28</td>
<td>It has improved the income and has worked as an incentive. (016)</td>
</tr>
<tr>
<td>(c) Teaching</td>
<td>4 9</td>
<td>The indicators have forced people to put effort into their teaching because now the courses, the units are surveyed ... (024)</td>
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<tr>
<td>3. Negative</td>
<td></td>
<td></td>
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<tr>
<td>(a) Research</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Publication</td>
<td>18 42</td>
<td>Publishing incremental findings and tending to go for minor publications rather than one or two decent journals. (087)</td>
</tr>
<tr>
<td>- External research grants</td>
<td>5 12</td>
<td>Many of my colleagues are doing it. They are money chasers. (007)</td>
</tr>
<tr>
<td>(b) Teaching</td>
<td>12 28</td>
<td>... you may focus on the things that give you the ticks in the right places, whether that is good learning practice or not. (234)</td>
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<tr>
<td>(c) Research over teaching</td>
<td>16 37</td>
<td>Whatever they say, research is the basis of the promotion and the reward system. (194)</td>
</tr>
<tr>
<td>(d) Quality</td>
<td>13 30</td>
<td>... people are rushing to do more but the quality is not there ... because that's not differentiated by DEET. (207)</td>
</tr>
<tr>
<td>(e) Other</td>
<td>12 28</td>
<td>When you set the rules, people will immediately change their habits to maximise what they're getting. (194)</td>
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</tbody>
</table>

Total interviewed = 43
Perceived positive effects of performance indicators

Overall, the perceived positive effects of PIs appeared to lie in four areas. There were provision of (1) academic accountability, (2) recognition for work done, (3) financial benefit, and (4) motivation for higher work performance. As shown earlier in Table 9.2, a majority (57 per cent) believed PIs assisted in providing academic accountability. Some of the typical comments are shown below.

I guess sometimes academics resent having to what appears to be an assessment been made of what they do. They like academic freedom. They like to feel they are doing their own thing. But the fact of the matter is funds are difficult to obtain and we have to report back that we have achieved these milestones that we have put out. (032)

We live in a world that expects accountability... I think in today's world, you can't live without them (PIs). The way organisations work, the way bureaucracies work, performance indicators are part of the accountability that is accepted. (234)

It (PI) demonstrates to the community that we are accountable, and because the rest of the world has to perform, we should as well. (053)

Another commonly held benefit of the introduction of PIs, including student surveys, was the provision of recognition to academics for their work. This is illustrated by the comments below.

The recognition from the research index is nice ... I think it is rewarding your research activity, and I don't think you get that reward perhaps from any other mechanism. The promotion process is a very slow and has very long-term
aims. I think this, psychologically, has been very good... the fact that the university is saying that you’re doing a good job. (207)

... it’s more an increased recognition that you’re doing what you’ve always been doing. (057)

Most academics also saw the financial link to PIs as a primary benefit. This applies to the incentive funding scheme for research in universities, and to a lesser extent, awards and grants for teaching (e.g. Teaching Excellence Award, outstanding teacher grant, and teaching grants to develop new courses). Comments included “I like the system, the research index that we have at X (a university) as I do perform. I get money back” (149), and “I actually like the fact that every year, I’ve got $10 000 to $15 000 I can do something with” (173). In many instances, the money received from incentive funding for research were fed back into the research. The final outcome appeared to be increased motivation to do research. For instance, a respondent (225) remarked that PI “probably has helped people get more focus into getting research papers and things written which maybe they wouldn’t have done otherwise”. An interviewee (175) stated the following:

We feed the research index money into honours research projects. So students gain, everybody gains as a result of that. Plus, research index money is being used to buy all sorts of equipment that students can gain from, that staff can do better research. If they do better research, the whole thing snow balls. I don’t think there’s any argument that the research performance indicators has done its job in terms of this department, of feeding into the research process of encouraging people to do more research, of the
benefits that flow from that to the school and to the students.

Perceived negative effects

When it came to the perceived unfavourable effects of PIs, the proportion of interviewees relative to those who viewed PIs as having a positive impact, was larger, particularly in research, as seen earlier in Table 9.5. The commonly discussed undesirable consequences of the introduction of PIs are classified into four main groups: strategic work behaviour, a fall in the quality standards of research and teaching, increased control by the Government, and the research versus teaching dilemma.

Engagement in strategic work behaviour

A major complaint about the application of PIs was the motivation they provide to academics to engage in strategic work behaviour. This was earlier reported in the $\chi^2$ results of the questionnaire in Appendix 13. In response to the open-ended statement in the questionnaire, a respondent (107) answered, "Such an approach is evident from comments by some colleagues, and is abundantly clear to me as a referee of journal articles". Another respondent (008) wrote in the questionnaire, "At least I don't have to guess where to put my energies. I
know what is important to my University and ultimately to my career”.

The interviews also uncovered similar sentiments.

PLs just become another game. Academics are not fools. People learn to play the game. You learn ways around it. Everybody gets to look at who lies where in terms of these indicators. How do we get our indicators? How do we manipulate the system so that we can put back indicators that look better? It didn’t help X (a university) case by having its erstwhile VC saying certain things to the committee when they came; shot himself in the foot. This university decided to improve it by getting in some public relations mob who re-gypped the entire process. What he didn’t change, just how he collected and presented and made the case. I don’t say that people necessarily cheated or anything. I’m just saying that a lot of effort goes into learning how to play the game better. (175)

Take last year, I had both a conference presentation and a page for a journal which was identical but they counted twice because one was a conference presentation and the other was a journal article even though they were the same thing. (173)

For research done as a group, may submit one paper in own name, and another as a group in a bid to increase number of publications. (026)

I just returned from a conference, and a paper given at the conference, it was quite a good one but I have noticed that in another conference - this was in Europe and there was another in United States in the next month - and the paper is almost identical, even the title. So there’s the quantity thing. In terms of research index, that is 2 papers at 2 different conferences, both of them reasonably prestigious. But it’s one piece of research. It’s the same piece of research that’s being massaged. But the research index doesn’t see that. The research index sees it as 2 pieces. Cynically, you have a lot of that happening. You can see that people are publishing massages of the same research... One of our post-docs has got a job elsewhere, and basically being told that she will have to change her research focus totally. Totally different area. But they told her that in the transition, any publishing is better than no publishing. So she is allowed to keep going at her own
research during the transition so that they can get ticks on their research index. And it would have no relevance to her new position at all. That's the reality. (234)

At one stage, I knew someone who got a grant to check the difference in central gravity for female surfers because no one else has applied for that particular avenue of funding. So they got some ladies and went out surfing. (044)

There's a temptation for people to look for projects to do to get the money which probably involves doing research that doesn't need to be done, or is done instead of more worthwhile research. (057)

They (the colleagues of the interviewee) bring in very large amounts of grants from various sources, but the research that's been done, in some cases is so trivial, so irrelevant, so nonsensical as to make one blush. (007)

Very often, the results are over-interpreted and made to seem important. The results of research are made to seem important either in terms of government goals or social goals when it's just not good research. (079)

The comments collected from the interviews also suggested that student surveys on teaching could be easily manipulated. For instance, since the academics in one of the universities surveyed could choose which class of students to survey, the general perception among the staff in that institution was that the surveys were likely to be carried out in a favoured class. In addition, there was a concern that the use of teaching surveys to assess teaching performance may encourage some academics to pander to students' superficial needs in order to make the latter happy.

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74 In 1999, the academics in this institution could still decide on the class to survey but with consultation with their heads of Schools, and on the condition that the class chosen is representative of all the classes taught by the academics concerned.
so that these academics could receive higher student ratings. Some of
the typical comments are provided below.

I’ve seen very poor teachers get very good marks from it
because you actually dish them out to a favoured class …
(173)

… we have tested it (student surveys) and you can get
extremely good scores by dropping anything demanding
from a unit that makes demands. Thus the students are
able to remove any difficult material from their course and
have a much more enjoyable time at Uni. But that isn’t
what the lecturing staff are here for.

With student surveys in particular, as in any statistics, you
can fiddle them to your heart’s content. Very much a case
of when you give them. For example, if you give them
straight after a piece of feedback that you have given that
has been positive, ie. the assignments are back and most
of the people did pretty well, then the chances are that
your student surveys will come up. You did it after the
semester test, and they’re all feeling a bit grouchy, and
your student surveys are down… each lecturer makes a
choice about whether they will teach the way that they see
should be right, or whether they will teach the way that
show best on the performance indicators, and there can be
two very different things. And a choice is actually made.
For example, shall I give my students every thing I say, all
of my lecture notes totally? They don’t have to learn. They
don’t have to acquire it in any other way but it makes it
easy for them. When they come out, they’re not as good …
If I choose not to, I know it will show up as detrimental.
(234)

I would find it very easy to manipulate those student survey
scores. First of all, I could hand them out on a day that I
cancel a test. If I wanted really good student survey
scores, I’d cancel a test and hand the student surveys out
that day… if I seriously wanted to manipulate student
survey scores, I could do it… just by putting the students in
an absolutely good mood. If I stood up and say for
example, “Assignment 1 was far too difficult and I’ve
decided to multiply everybody’s mark by 1.7. And now fill in
these student survey scores”. I reckon I would get
magnificent student survey scores. However, if I hand
them out on a day they got their tests back, and seventy per cent failed their tests, I'm going to get a much worse student survey score that week than I will a week later when they've died down from feeling bad about their test. I'm talking about first years here. I'm not going to manipulate mature-aged students. If I was teaching grad dips, I wouldn't try anything so transparent. (238)

But we all know, students' evaluation on a course; they are only human beings. The nicer you are to them, the nicer they are to you. If you make a course hard and difficult to pass, they whack you over the head in the evaluation... in a profession like psychology, there are many areas, statistics being the notorious one... which a professional psychologist must have a good grasp for if he or she is to worth anything in the profession... They just hate it. They like touchy feely stuff. They like counselling each other, do all the sort of things that are easier and don't require any difficulty. And the more scrupulous of my colleagues emphasise these areas in their course, and neglect the other areas. And I don't blame them. I'm starting to think the same way myself. (007)

Some of the (teaching) portfolios I see now are a con job. (056)

On the other hand, there was a small number of academics who were more reserved with respect to their opinions on the possible dysfunctional effects of using PIs. Some academics perceived PIs as having no impact on academics' work behaviour, citing self-motivation as the main rationale. An interviewee (016), for example, stressed that "ninety-eight per cent probably of the academics I've ever known are driven by the self-motivation of being good academics or becoming known in their field. That drives them". Others argued that the dysfunctional work behaviour associated with PIs has always been
present in academia although the introduction of PIs has highlighted the problem.

I don’t think it’s a new problem because the problem has been around for a long time, and all these indicators do is quantify it a little bit more, perhaps reinforce that particular message. (024)

People’s ethical standards vary. I think performance indicators provide the ground on which certain kinds of behaviours and activities can occur. Intrinsic qualities of the individuals will be what it is that brings about particular manifestations of behaviour. Before these sorts of things were ever devised, people did those sorts of things. In those days, it had to do with your CV. This just provides another forum in which that sort of behaviour can occur. Some people will do it, some people won’t. (175)

To sum up, while the results from the interviews showed that the possibility of the occurrence of dysfunctional work behaviour associated with PIs lay with the intrinsic characteristics of the individual academic, the fact that the current PIs were generally perceived to be plagued with limitations, as elaborated earlier, but applied simplistically to judge overall performance meant that a majority of the participants actually believed that dysfunctional work behaviour was likely to become more widespread with the introduction of these PIs.

Deterioration in quality of research and teaching

Another concern of the academics in the interviews was quality. This was found earlier in the $\chi^2$ results of the Attitude to PIs scale. In addition, the $\chi^2$ results on PIs providing feedback on work performance and
knowledge of institutional goals, showed that the proportion who agreed
as opposed to those who did not agree on the ability of PIs to serve
these roles were almost equal. This was also revealed in the interviews.
Different comments on the effectiveness of PIs in directing academics
towards the goals of their institutions are shown below.

I think what it’s (PI) done is if you want to be promoted, you
need to do certain things. And I think that’s healthy. I can’t
see any problem with that. (173)

It certainly lets them know what is expected. It begs the
question of whether what is expected is just and fair and
proper. But it certainly has the effect of letting them know
what is expected. (168)

You get feedback and the objectives are very clear. If you
want to get high index, you know exactly what to do. As to
whether what you are aiming is good or not is separate.
(034)

It re-directs people to tell them what they must do rather
than giving them the option of what they do best. And
when you give people the option of what they do best, they
are best motivated to do it well. I do a lot of work with the
public. There is no criteria that assesses the work, how
many people I speak to and change their attitudes and so
on. And yet to me, it is the most positive work that I can do
but it does not fit in the defined work performance. (046)

This has prompted several participants to voice their concerns that the
priorities of the Government and the institutions, important as they are,
are not the only element required for high work performance. In other
words, the term “work performance” which is defined according to the
criteria set by the Government and in turn the institutions, and measured
by the current PIs, may not be representative of work performance
based on the overall contribution the work makes, for example to the
discipline and community at large.

I like the principles of research index and the principles of
the student surveys. I don’t think either of them capture
necessarily the appropriate performance that make a good
teacher or a good researcher... It really just reinforces
quantity, not quality. (226)

Depend on how we understand the notion of work
performance. I think they’re made to work in that respect, but
whether that work is valuable, if you understand what we
mean by work... I certainly think that these measures are
artificial coercions placed upon new academics in order to
achieve certain levels. But in terms of quality, I wouldn’t think
they have any impact at all. (019)

In terms of the criteria that have been set by the university,
yes. In terms of the overall contribution that the work makes,
probably no. But if you define work performance as the
output in terms of teaching and research, the answer is
yes... in terms of quality of research and teaching, it
probably isn’t. (024)

It does not contribute to good research and teaching. It only
conforms to whatever buttons the Federal Government are
pushing or else the university funding model are pushing.
(097)

Thus, although one benefit of PIs was perceived to be the provision of
feedback on work performance, the participants were aware that this
feedback is restricted to the goals, objectives and priorities of the
institution. In other words, this feedback would not be sufficient to
improve the quality of research or teaching.
The findings from the interviews suggest that the concern about quality mainly hinge on two issues: (1) the tendency of the current PIs to emphasise quantity rather than quality, and (2) the inability of these PIs to discriminate in terms of quality. On the former issue, an interviewee (234) highlighted that the effects of the application of PIs

... means that you are targeting your performance on measurable things, and so much of what you do is not measurable in terms of ticking the boxes ... I don’t think performance indicator has any bearing on the quality of research. It’s only talking about what’s put out. And if you can tick the right box, you’ve hit the performance indicators.

The use of publications count as a PI for research was widely perceived by the academics as encouraging the “publish or perish” syndrome. A respondent (104) wrote in the questionnaire, “The fact is publishable unit rules. Quality should rule”. A few comments collected from the interviews are shown below.

It’s probably improved the quantity of research, that the quality may have been detracted from because there’s an incentive for people to publish more and go to press earlier rather than wait until the work has finished because they need to maintain their output in order to get a high rating on the research index. (024)

I think on the research side of it, I think it has probably affected the quantity. Whether it has affected the quality is an issue. I suspect it hasn’t. I suspect that we do, I’m guilty of this as well, is that you pump out a couple of things just to score some runs, and I don’t worry so much about the quality of them. (173)

I see counting papers as an indicator of something which encourages people to publish mediocre papers in large
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I see counting papers as an indicator of something which encourages people to publish mediocre papers in large
numbers. I think it’s much better to publish better papers in small numbers. And I don’t think the current system allows you to do that. People can’t afford to publish just a few papers. You’ve got to publish lots of stuff quickly. So I think it’s detrimental to the quality of research. (101)
Every time there’s a little step, you publish rather than in the past, you may have waited until you get a substantial amount of work, then publish it. Now every little thing is published, and everything ends up as a separate publication. (196)

I imagine there’s a tendency for people to do things that end up in a publication regardless of where it’s published or really how important a topic is. (079)

A few academics questioned the ability of refereed publications to capture the quality of performance.

The system of refereed journals doesn’t mean that there are the best articles by the best people. Articles which referees approve of can be those that are not disturbing or challenging to them. One will then tend to research to orthodoxy, not diversity. You’ll get a narrow arrangement of research activity, and reporting of those research activities also become homogenised. Risk-taking is discouraged which is against all principles of the university. (134)

I don’t think the refereeing process is consistent. So you get 100 points for putting into a refereed conference irrespective of whether it’s the hardest conference in the world to get into or the easiest one in Singapore to get into. So people are finding way to maximise their points without necessarily doing the hard yards. (214)

They believe that if it’s not refereed, it’s not good. There are good publications communicated in a different forum, through symposium, workshop, conference. The idea is that it must be refereed. You must follow the profile of just one discipline. I know there are many publications that are not good because they’re not refereed. But just the fact that they’re refereed doesn’t mean that the publication is good. You can confuse the two - quality and refereed. (034)
The big complaint I have is that they don’t distinguish what sort of books they are. It just say books. And whether it is an ISBN (International Standard Book Number) in-house publication from Canberra College or whether it is a book from Toronto University Press or Harvard University Press or Macmillan ... It can’t distinguish quality. If an ISBN number stamped minor publication that you could publish 3 or 4 a year, counts the same as those scholarly book in a major press that takes you 5, 6 years to put together, then there’s something basically wrong with the quantification. (016)

The use of external research income was also seen to have a negative effect on the quality of research. An interviewee said,

A slightly more subtle but nonetheless much more influential source of destruction and disruption of university is the chase of the almighty dollar. I’ve met many times the Pro Vice Chancellor for research, and I hastened to say at this point, I don’t blame him for his attitude. He’s trying to do a job. He is caught in a terrible bind but the consequence of that is in all the meetings I’ve had with him, I don’t recall him ever once mentioning the concept of quality in research. What we always talk about endlessly is money. Support for research dollars. Where we can get more, more dollars for research. And who did what to get more money. And how you can do this to get more money. But no one ever talks about what was actually, whether it was worth doing, whether it was research that needed to be done, or should be done.

The introduction of student surveys on teaching was also subjected to criticisms. Some of the remarks are shown below.

What often happens with these mandatory surveys, you think of what those indicators are that are going to be assessed, and you teach to those rather than being inventive, dynamic, and creative sort of teacher ... (019)
It's very clear in psychology that there are courses that students don't like doing, like research methods. So if you want to get good ratings in research methods, you make it easy, and you make it kind of much more entertaining, but they don't come up at the end, out of the course with the kind of skills which you want them to have. In that sense, it's not a high quality course. But you will get good student ratings. (013)

... if people start popularising courses, if people start making courses easier, which is what people are going to do, then that will also have a deleterious effect on the process... So a popular teacher might well be a teacher who just say let's do it easy. Stunning teaching surveys and bad performance. (168)

Increased control by the government and management

The factor of control by Government of university management, and, in turn, by university management of academics, was also a concern of some interviewees. This is consistent with results described in *Attitude to Pls* scale shown in Table 9.2. Just like the responses received from the questionnaire, some interviewees perceived that the Government's control over the universities, and the universities' control over academics' work, had increased partly as a result of the introduction of Pls.

I think it is Canberra-driven. A lot of the background disillusionment you're finding in the university today is the fact that people perceived that the university is merely following the government so that everything that we get seems to be a flow-down from Canberra. There is no involvement with the people down at the bottom. You can't have unusual people in the university anymore. They get fired. (086)
It underwrites a grab for power. So what you tend to get is a whittling away of expertise, a whittling away of responsibilities, and constraining and circumscribing what academics do by putting in place rules and regulations and measures. So you move from being able to teach, have reasonable autonomy about the curriculum and teach, to a position where you are increasingly being told you must have a expert from the Teaching and Learning Group. They will tell you how to design the curriculum, and they even start commenting on content where they have zip expertise. It is the road to Weberian nightmare. (175)

In fact, the findings from this study uncovered the division felt by some academics with the Government and university administration as a result of the introduction of PIs. In the open-ended comments in the questionnaire, a respondent (011) wrote, “There is a sense of a lack of trust in academics, that they won’t “do the right thing”’. Some of the comments collected from the interviews are presented below.

There is this discussion going on in the university, the Federal Government doesn’t like “academics”. They feel as though we sit around all day, picking up huge salaries, and basically not doing a great deal. (286)

There was a time when the administration was sort of a group that helped the academics do their tasks. Now the administration often seems to be acting in a hostile way with their own agenda. (079)

Having being an academic for twenty years, I suppose in the first ten years of my life, I was trusted to do a good job. In the last ten years, I’ve been much more scrutinised and in a sense that I’m not trusted to do a good job. And I think that is an ethos which is unfortunate. So there is a sense of increasingly being managed, the sense of increasingly being an employee rather than somebody who is a free spirit, who was paid by the public purse to be clever... And I think that ethos is a little disturbing, and I think performance indicators increase that ethos. (173)
There’s a psychological factor where tragically big brother is looking over your shoulder. It doesn’t affect what I do but it creates a climate of suspicion that you’re not doing well enough. It seems the only ones who are perfect are those in Staff Development. (056)

Thus, the perception of many participants was that the introduction of PIs had increased the bureaucratic control of the Government over the university, and in turn the university administration over the academics. This had led several participants to comment about the extent of the alienation they felt from the Government. Other academics raised their concerns about the growing division between them and the university administration.

Another issue that was constantly brought up in the interviews on the effects of the application of PIs was research being rewarded over teaching. However, before this is discussed further, it is first necessary to provide the findings of the participants’ perceptions of their university reward systems.

Perceptions of university reward system

The scale, *Perceptions of university reward system*, also bears on the impressions and impact of PIs on academic staff. It is concerned with the relative emphasis given to different PIs. A person-item frequency distribution of the scale is provided in Figure 9.2. It can be observed that
the frequency distribution of the persons is skewed positively relative to
the origin of the eight statements, which again can be taken as 0.0. It will
be recalled that a high score implies a strong conviction by the
respondents of a link between the PIs for research and their university
reward system, as indicated here. This means that most of the
respondents perceived a linkage between PIs for research and the
university promotional and funding systems.

Figure 9.2
Distribution of academics' perceptions of university reward system and the
location of the items on the transformed continuum

Parameter Estimate

75 The locations of the thresholds between the successive responses of "strongly
disagree"/"agree", "disagree"/"agree", and "agree"/"strongly agree" were -3.0, 0.1, and
2.9 respectively. Therefore, any person location below -3.0 indicated a most likely
response of "strongly disagree", a location between -3.0 and 0.1 a response of
"disagree", a location between 0.1 and 2.9 a response of "agree", and above 2.9 a
response of "strongly agree". Evidently, there were very few responses in the first two
categories, that of strongly disagreeing and disagreeing as a reflection of being
unconvinced of a link between research PIs and the university reward system.
For a detailed analysis of the respondents' perceptions on a linkage between PIs and their institutions' reward system, a $\chi^2$ test on a statement by statement basis was carried out on the *Perceptions of university reward system* scale. A similar test was undertaken for three other items which did not fit into the scale but which addressed questions on the university reward system. The results are provided in Appendix 15.

When the responses were combined into two groups ("strongly agree" with "agree", and "strongly disagree" with "disagree"), there were six notable findings. First, over eighty per cent of the respondents agreed that high performers in research have a better chance of getting promoted and funds than high performers in teaching. Second, a majority of the respondents (from over 50 percent to over 90 percent) seem to lean towards agreeing that there was a link between the PIs for research - namely publications count, external research income, higher degree research student completions - and the institutions' promotion and funding systems.

Perceptions of teaching reward system

Third, the proportion of respondents who disagreed that student surveys on teaching were important in their institutions' promotion procedures was not significantly more than the proportion who agreed. The
implication is that the opinions of the respondents on the importance of student surveys in promotion appeared to be more or less equally divided. An example of an Associate Professor's doubts about the significance of student surveys in promotion is shown below.

The trouble is the higher you get up the system, you actually don't need to do it (student surveys). Where a Lecturer A would need to use it, once you get to a C or D, there's not much point in filling it in because it doesn't actually make any difference in your promotion or what have we. I've been here for 10 years and I've never fill in one of my own teaching performance because there is no point. I'm not going to get promoted to a professor by teaching so in fact there's absolutely no point in filling them. (173)

Although several academics were aware that promotion based on teaching had been introduced, some of them complained that the production of a teaching portfolio was too time-consuming. For instance, a respondent (098) stated, "Pathways for promotion based on quality of teaching have been introduced but production of a teaching portfolio is demanding and invalid". An interviewee (101) said,

I wrote a teaching portfolio last year which is part of this business. And it took me a week of solid work plus during the last few years, X number of days preparing student surveys and things like that. And in the end, the results of the student surveys told me what I knew anyway. Okay, it's nice to get good student surveys. I pat myself on the back. I've done okay. But in all the time that I spent preparing these student surveys, I could have been preparing better lectures... Even the teaching has been put back by all the bureaucracy that goes in assessing it.
Fourth, forty-four per cent of the respondents were not convinced that their institutions provided other benefits for favourable student surveys (other than the possibility of promotion). For instance, an interviewee mentioned that apart from its use in promotion, carrying out teaching surveys really depends on the individual academic because

... there is no reward attached to it other than personal professional pride and behaviour. It depends very much on the individual. And if the individual is conscientious, they will use them and they will try and work on some of that information. But if they're very thick-skinned, they (a) won't use them because it's not mandatory, and (b) so what? There is no negative consequences yet.

Fifth, forty-five per cent of the respondents did not believe that schools or departments with high graduate employment rates received more benefits from their universities. Sixth, although a majority of the respondents disagreed that academics and schools/departments with favourable student surveys and high graduate employment rates respectively were provided with institutional benefits (except promotion for student surveys), a large proportion of them also did not know whether these two PIs for teaching played a significant role in the distribution of benefits to the academic or school concerned.

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76 Those who believed that student surveys were linked to the receipt of benefits other than promotion tended to list these as teaching awards, personal satisfaction, recognition, and teaching-related funds (such as teaching grants to develop new courses).
Research or teaching dilemma

Therefore, a major concern expressed by the participants was that the introduction of PIs, particularly the establishment of PI-linked funding for research had led to research being valued and rewarded at the expense of teaching. Although most of the academics surveyed perceived a strong association between the PIs for research (publications count, external research income, higher degree research student completions) and their institutions' reward system, the proportion was comparatively less for the two PIs for teaching (student surveys on teaching and graduate employment rate). The implication is that there was a perception by most of the participants that research, particularly the activities that were measured by the above three PIs for research, was rewarded, but not teaching. This is reflected in remarks from the interviews, as shown earlier in Table 9.5, and those below.

Rewards for research related activity brings rewards - funding for conference attendance. Conferences are then attended during teaching weeks with makeshift staff employed to cover the teaching duties. Conference attendance is then rewarded again! There are no rewards/or the conscientious teacher who values continuity of classroom duties ahead of conference attendance, etc. (154)

My major concern is the focus of performance indicators. And if you look at the research index, you get dollars for it... What happens if you really get a good performance indication for teaching? What did you get back tangible? What did you hold in your hand? Nothing... Ninety per cent of our students will go out and get jobs. They will not continue studying. They want a job. Where is the reward we get for doing a good job there? I think that is very
important and I think that is where the performance indicators fall down so badly. (234)

The lack of rewards associated with teaching has contributed to the perception that people who enjoy teaching will be disadvantaged.

We have a senior lecturer who is very strong on teaching and has been doing a good job for many years. But in terms of his standing because he does not do much research, there’s almost a stigma attached to the fact that he does very good teaching, and not as much research because of the focus on teaching. (234)

I have staff who tell me that, “I’m not interested in research and I teach the best I can. Yet I get no reward. Why should I feel inferior or feel that I’m not doing my best when I’m not interested in research?” (134)

Some interviewees have suggested that this focus on research at the expense of teaching (as a result of the introduction of incentive funding for research but not teaching) would encourage academics to concentrate on research, and do minimal teaching or neglect their teaching, thereby reducing the quality of teaching. Indeed, a few academics have admitted to avoiding heavy teaching load by concentrating on research: “A certain level of publications and grants must be maintained in order to maintain lower teaching load” (230), and “I do the minimal teaching required... People like me get external grants and buy their way out of teaching” (044). Other comments are shown below.

People have given, certainly in this department, credit for research which lets them off teaching. So people in fact
produced a lot of published papers and things according to that research index and don't have to teach as much. Now that has implications on the quality of teaching because people like that are very often replaced by PhD students. So there's a trend if you do research, you don't have to do so much teaching, and then teaching is taken up by whomever is around and that may well reduce the quality of teaching. (079)

The people who do well on their research indicators buy themselves out of teaching. So if the balance is even slightly skewed towards research, chances are you'll buy yourself out of teaching. There is another positive benefit to playing the research index game, the research game. You can use the money to buy yourself out of teaching. (234)

What happens is the more research that you do, the more money you get for research, and the further you get away from teaching. And the more teaching you do and the less research that you do, the more you are trapped into teaching. (173)

I understand there's an urgent problem for people to do any research in this university. That's why the research index is good in the short term. In the longer term, I'm concerned that the good teachers don't get recognised, and the bad teachers will turn to research and neglect teaching. (134)

The emphasis placed on research over teaching was felt throughout the four universities surveyed although the newer universities (Edith Cowan and Curtin) may have felt this more intensely relative to their former mainly teaching tradition. Here are some remarks collected from academics in the newer universities.

I think the focus that has been put on the research index points, I think to the exclusion to some of the teaching. We're a new university and there's just this big emphasis on we must publish, we must get research index points, we must be seen to be a university doing a lot of research.
And really we’re here because of the students. And I think some of that gets forgotten... I don’t know whether that’s across universities or whether it’s because we’re a new university and we’re trying to prove that we’re equal to some of the established universities. (309)

In principle, the strategy for X (a university) has three bases: teaching, research, and administration. However, the de facto at the moment is that research takes precedent. And that is one of the outcome of this wish to pull itself up within its ranking, to boot-strap it from one ranking to the other and going higher. (234)

Reasons put forward for the focus on research as opposed to teaching include the Government and difficulties in designing teaching PIs.

... all the university is doing is reflecting that its place in the sun with the Government is rewarded if it’s doing research that’s seen as useful but the university gets no reward for good teaching, either, aside from perhaps been able to attract more students. (125)

There was a move last year to try and put together some evaluation or some criteria of how you can award somebody for their teaching. But the huge discussion was what’s a good teacher, what’s a bad teacher, what’s your criteria going to be ... that’s been a huge problem. (286)

... most people would agree that it’s easy to recognise a good teacher when you see them but it’s very difficult to say, to quantify what it is about the way they’re teaching. And there are certain things like your lectures and materials are up-to-date, all that type of things. But occasionally, you get a person who doesn’t up-date their lecture materials but they still give brilliant lectures. So whatever formula you’re going to use, I think it’s going to have difficulties. (103)

It appeared that a majority of the university academics in this study saw a strong link between research activities - namely publications, external research grant applications, and to a lesser extent, higher degree
research supervision - and the receipt of their institutions' rewards. In contrast, the proportion of respondents who perceived student surveys on teaching to be important in promotion was not significantly different from the proportion who thought otherwise. A majority of the participants also did not believe that student surveys and graduate employment outcomes were linked to other extrinsic benefits. Based on their conviction that there was a discrepancy between the rewards attached to research and teaching, the general perception was that academics who enjoyed teaching would be disadvantaged.

Conclusion

To summarise, a major finding of this study was that most of the participants had a negative attitude to PLIs. The survey also uncovered several concerns by the participants. One of these was that the application of PLIs had increased the control of the Federal Government over the universities, and the administrators of universities over the academics. Another main concern was that the PLIs in current use in their institutions were insufficiently refined to capture all the dimensions of academic's work performance. In addition, the introduction of the current PLIs (particularly publications and external research grant income) were perceived to disadvantage certain universities, disciplines, sub-disciplines, and rank and activities of the academics. The establishment of PLI-linked funding for research but not teaching contributed to the
perception that research was rewarded over teaching. Therefore, there was a concern by some participants that the quality of teaching could suffer. Indeed, most of the respondents were not convinced that PIs could improve either the quality of research or teaching. Moreover, PIs were viewed as encouraging strategic behaviour among academics.

Having found the attitudes of the participants towards PIs, including their perceptions of the effects of the introduction of PIs, it is now appropriate to present the results on the actual effects of PIs on their work. This will be examined in the next chapter.
CHAPTER TEN: THE IMPACT OF PERFORMANCE INDICATORS AT THE ACADEMIC LEVEL: EFFECTS ON WORK ACTIVITIES

Introduction

Chapter Ten presents the findings on the effects of PIs on the work activities of the university academics surveyed. The findings from the questionnaire responses and from the interviews are both considered. The set of scales in the questionnaire, consisting of Paperwork, General Research and Teaching Activities, Specific Research Activities, and Specific Teaching Activities, was concerned, not simply with the attitudes to PIs, but with their actual impact. It could be inferred that this impact contributed to their attitudes. Thus, this set of scales helped to explain the generally negative attitude to PIs found in the previous chapter.

The presentation of the findings on the effects of PIs on academics' work will begin with an examination of the significance of the relationships among the scales and relevant sub-scales in the questionnaire through intercorrelations. The effects of the application of PIs on paperwork load will then be reported, followed by those on research activities, on teaching activities, and on the priorities between research and teaching. In each of these, two statistical tests were carried out – a $\chi^2$ test and a paired t-test. The first test examines the change or increase in the work activities in the periods of 1986-1997 and 1991-1997. The second test
focuses on the change over these two periods. In other words, it would show whether the change in work activities has increased, decreased, or reached its limits.

In these analyses, a substantial number of correlations and tests of significance were carried out. These were carried out univariately. In doing so, it was recognised that there was a substantial increase in opportunities to find some significant differences by chance. As a result, following interpretations on individual tests of significance, interpretations of major trends are made.

**Intercorrelations on Scales in the Questionnaire**

The results of the intercorrelations on scales and relevant sub-scales in the questionnaire are shown in Table 10.1 in the following page.
Table 10.1
Intercorrelations among the scales and subscales in the questionnaire

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Notes: 1. The number in parentheses represents number of participants, N. Unless stated, N = 152.
2. * p<0.05, ** p<0.01, *** p<0.0001. 3. HD = higher degree.
4. All the study variables listed above are scales of the questionnaire except Research over teaching which is a subscale of Perceptions of university reward system scale. This subscale is included to observe whether there is an association between a respondent’s attitude to PIs and his/her perception that research is rewarded over teaching.
5. Interpretation of high score on:
(a) Attitude to PIs - positive attitude towards PIs,
(b) Perceptions of university reward system - belief in specific research PIs being tied to university reward system,
Research over teaching - belief in research being rewarded over teaching,
teaching surveys (promotion) - belief in teaching surveys being tied to promotion,
teaching surveys (other benefits) belief in teaching surveys being tied to receipt of benefits other than promotion,
grant employment outcomes - belief in this PI being tied to the receipt of rewards,
paperwork - increase in paperwork load,
general research and teaching activities - increase in research and teaching activities,
specific research activities - increase/large change in activities related to publications and external research grant applications,
higher degree research student supervision (pressure) - large increase in pressure to ensure supervised higher degree students complete in minimum time,
higher degree research student supervision (approach) - large change in supervision approach, and
specific teaching activities - large increase in pressure and some activities associated with teaching, with a large change in other teaching activities.

There are five prominent features in Table 10.1. The first is the significant relationship between Teaching surveys (promotion) and Teaching surveys (other benefits) (0.72) as well as between the former and Graduate employment outcomes (0.22). Although these PIs for teaching were shown not to fit into the Perceptions of university reward system scale by the RUMM analysis in Chapter Seven, they all pertained to teaching, as explained in that chapter. The correlation results here show that they go together. In other words, respondents who regarded student surveys as being important in promotion also believed that these surveys brought other benefits; they also thought that schools/ departments with high graduate employment rates had a better chance of receiving benefits.

A second notable feature of the table is the significant relationship between rewards for research PIs (Perceptions of university reward system scale) and rewards for teaching PIs (Teaching surveys (promotion) (0.19) and Graduate employment outcomes (0.23)). The
implication is that respondents who perceived selected PIs for research
as tied to their university reward system were also likely to consider
teaching surveys to be important in promotion, and graduate
employment outcomes to be important in receiving benefits.

A third observation in Table 10.1 is the significant relationship between
the Paperwork scale and the various job activities. A rise in paperwork is
associated with a rise in general research and teaching activities,
specific research activities (publications and external research grants
applications), specific teaching activities, and a change in the approach
to supervising higher degree research students. Thus, the findings
suggest that an increase in these research and teaching activities during
1997 had been associated with a rise in paperwork.

The fourth feature is the significant association among different job
activities. A significant relationship exists between General research and
teaching activities scale, and (1) Specific research activities scale (0.59),
and (2) Specific teaching activities scale (0.26). Therefore, respondents
who, for example, increased their general research and teaching
activities were also likely to increase their specific research activities and
specific teaching activities. There is also a significant association (0.31)
between the Specific research activities scale and the Specific teaching
activities scale, implying a simultaneous increase in research and
teaching activities. Other significant associations are between Higher
degree research student supervision (pressure) and (1) Higher degree research student supervision (approach) (0.42), and (2) Specific teaching activities scale (0.27). Another significant relationship (0.35) is between Higher degree research student supervision (approach) and Specific teaching activities scale. The implication of the latter relationship, and the absence of a significant association between Higher degree research student supervision and Specific research activities scale, is that higher degree research supervision tends to be more closely linked to teaching than research.

The fifth notable characteristic in the table is the significant relationship between rewards and job activities. In particular, a significant relationship exists between the Perceptions of university reward system scale and (1) the General research and teaching activities scale (0.31), and the (2) the Specific research activities scale (0.33). To reiterate, a high score on the Perceptions of university reward system scale implies a belief in a link between selected research PIs and the university reward system, a high score on the General research and teaching activities scale suggests an increase in the general research and teaching activities, and a high score on the Specific research activities scale implies an increase in most activities and a large change in other activities related to publications and external research grants applications. Therefore, the more convinced the academics in this study were about the link between PIs for research and the university reward
structure (promotion and funding), the more likely they were to increase their general research and teaching activities, and to increase and change their activities in publications and external research grants applications. On the other hand, the less convinced the respondents were that PIs for research were tied to their university reward structure, the less likely they were to change their activities in these areas.

The absence of a significant relationship between the Perceptions of university reward system scale and the Specific teaching activities scale could be attributed to the fact that the former scale focused on rewards for research rather than teaching. A possible explanation for the insignificant relationship between Perceptions of university reward system scale and Higher degree research student supervision (approach) is that the results of supervising such students were perceived by most academics to be related more to teaching than to research. For instance, the outcomes of higher degree research students supervised was included as one of the promotion criteria for teaching in Murdoch University (Murdoch University Information on Applying for Promotion, 1996). Furthermore, as reported earlier, a significant association was found between Higher degree research student supervision and Specific teaching activities scale but not with Specific research activities scale. Therefore, the absence of a significant relationship between the Perceptions of university rewards system scale
and *Higher degree research student supervision* could be because the latter was more closely linked to teaching than research.

Another significant relationship between rewards and job activities is that of *Teaching surveys (promotion)* and *Specific teaching activities* scale.\(^{77}\) It appeared that the more convinced the academics were that those who received favourable surveys had a better chance of being promoted, the more likely they were to increase and change their teaching activities. Conversely, if they perceived that teaching surveys were not important in promotion, they were less likely to increase and change their teaching activities. Although the above effects operated in terms of the relationships among variables, it appeared that there were as many academics who perceived the important role played by teaching surveys in promotion as there were who thought otherwise, as discussed earlier in Chapter Nine and shown in Appendix 15.

*Research over teaching* subscale

It will be recalled that *Research over teaching* is a subscale of *Perceptions of university reward system* scale. Therefore, in addition to the latter scale, the relationships of *Research over teaching* subscale is considered separately to other scales. The *Research over teaching*

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\(^{77}\) A high score on (1) *Teaching surveys (promotion)* implies a stronger belief in the link between this PI and the university reward system, and (2) *Specific teaching activities* implies a large increase in pressure and some activities related to teaching, and a large increase in activities related to teaching.
subscale correlates at 0.66 with the *Perceptions of university reward system* scale (of which it is a part) and therefore might explain the relationships with the broader scale. The *Research over teaching* subscale and the *Perceptions of university reward system* scale will essentially display similar relationships with other scales.

However, one relationship which should be pointed out is the negative significant relationship (*r* = -0.21) between *Attitude to PIs* scale and *Research over teaching* subscale. It appeared that the more convinced the respondents were that research was rewarded (in terms of funds and promotion) more than teaching, the more negative their attitude was towards PIs. Conversely, the less that they believed research was rewarded more than teaching, the less negative was their attitude towards PIs. In the previous chapter, issues such as control, quality, and dysfunctional work behaviour were reported to contribute to the participants’ negative attitude to PIs. It is found here that the perception of research being rewarded more than or even over teaching also coincided with the respondents’ unfavourable attitude to PIs.

In summary, the results suggest several associations among the scales and subscales in the questionnaire. First, there appears to be a simultaneous increase in research and teaching activities for the respondents. Second, this rise in research and teaching activities seem to be associated with an increase in paperwork. Third, the results
suggest that the respondents’ perception that research was rewarded more than or over teaching contributed to their unfavourable attitude to PIs. Fourth, the respondents who were convinced of a link between PIs for research and their university reward system were more likely to increase their general research and teaching activities, and increase and change their activities in publications and external research grants applications. Fifth, the academics who perceived that teaching surveys were important in promotion were more likely to increase and change their teaching activities.

Comments from the participants: Questionnaires and interviews

The finding of a significant relationship between rewards and job activities is supported by comments from the participants. For instance, “If you look on the research index thing and see that you’ll get more points for this and for that, then of course, you’re going to produce that kind of thing” (168); and “More grant applications because of research points and promotion” (290).

Comments received from the participants also revealed a widespread belief that activities which were not rewarded by PIs were of little value. A respondent (011) wrote in the questionnaire, “With increased pressure in all areas of academic workloads, an individual must choose where to
place most energy. It make sense to find ways around the indicators”.

Below are some typical comments from the interviews.

When I first came here, I used to volunteer for all sorts of things. And in the end, you sit back and look at it. All the sorts of things you volunteered for take a lot of time but there isn’t any personal benefit from doing them. I used to give lectures to visiting groups of school children. That doesn’t count for anything so I don’t do it anymore. (101)

A lot of people now are very hard-nosed about what they will or they won’t do. Because you get no points for being on university committees, or even school committees or doing a whole lot of other things, there a number of people who would say, “I will not do that. I will only do what generates the points”… It certainly influences some of my behaviour in terms of where I might put some of my energies if I’ve got to make a choice. But there’re a lot of other things that motivate me too… But if I do have to make choices in terms of my time, and some activities will earn me 50 research index points and the other one won’t earn me any, I will do the 50 research index points. (245)

When you get promoted, they count the papers. Somebody wants someone to organise Open Day. I have in fact have organised two, one because I like it but that’s completely stupid behaviour by myself. Why spend any time at all doing anything for Open Day that doesn’t get measured? (044)

I used to do a lot of unpaid work for the SEA which is the Secondary Education Authority. Virtually voluntary work. Hundreds of hours. Government committees. And now, you have to say to them, I have to get research index points for this or my department can’t afford to let me go because I’m not useful to them. (168)

For some academics, the fear of being given more teaching/administration duties or losing one’s job appeared to be as potent as the incentive of being rewarded (promotion and funding). The comments collected from the questionnaire included “Poor performers get
penalised with administration/teaching duties and lesser support for travel etc" (230), "Look at it as keeping one job" (188), and "In these times of economic rationalisation, ie. your job's on the line - who's going to spend time doing something that's perceived as of little value" (278).

Other comments are shown below.

I have a very dark feeling that it's going to become more and more rigorous, and it will be used to make people redundant. And it may be used to make people redundant just because the university can't afford to have so many staff, which means people are going to end their careers feeling that they're useless, when in fact, all that's happened is that the university decided that they need fewer people. And you can juggle performance indicators to make certain kind of people look so close to retirement... I have a dear, dear colleague who was made redundant last year, and the excuse might have been that she wasn't good enough. We had to work very hard to get it put on the table that the reason was that the position no longer existed. (168)

I can't hold out against it (temptation to emphasise on activities by PIs). I can't keep scoring badly on performance indicators. Eventually I'll be squeezed out. In this day and age, I even stand the possibility of losing my job because of performance indicators. (007)

From the findings above, it seems that the rewards attached to PIs as well as the absence of rewards linked to PIs had an impact on where a majority of the academics decided to place their energies. In general, activities that were rewarded tended to be emphasised.
Paperwork

The findings suggested that the paperwork load of the participants had been generally affected as a result of the introduction of PIs. The statistical results from the Paperwork scale of the questionnaire are presented, followed by the comments collected from the questionnaires and interviews.

The analyses will be detailed for the case of the Paperwork scale, and then the same analyses will be used for the other scales. It will be recalled that the questions were asked in such a way that they built in to them the question of change relative to the present circumstances.

Furthermore, this change was referenced to 1986 and to 1991.

For example, the first statement in the Paperwork scale is the following:

I have to do more paper work now to account for my publications compared to:

<table>
<thead>
<tr>
<th></th>
<th>A lot</th>
<th>Quite a lot</th>
<th>A little</th>
<th>Not at all</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The “don’t know” category was consistently considered as missing data, so that only the other four categories were used in the analysis.

The other four response categories clearly have an implied order, with “a lot” indicating most change and “not at all” indicating least change.

Under the hypothesis that some people might have experienced change and some not, and that this was random, it could be hypothesised that
the distribution of the responses across the four categories would be random. A simple \( \chi^2 \) test of the equality of the uniformity of the distribution across the categories was carried out. This was a conservative test of the hypothesis that there has not been much change, because the most conservative test would be to compare the "Not at all" category to the others. The values of these \( \chi^2 \) are shown in the tables showing the distribution of the responses. A statistically significant \( \chi^2 \) implied that there had been change. To consider a more conservative test, but not the most conservative one, the categories were dichotomised to give "a little" and "not at all" in one category and "a lot" and "quite a lot" in the other category. The results of this analysis are shown in Appendix 16. This facilitates the interpretation of the degree of change from the previous periods to the present.

A dichotomisation of this kind, and the \( \chi^2 \) test on all categories, check whether the distribution is uniform across categories. For example, when the categories were dichotomised to "a little" and "not at all" relative to "a lot" and "quite a lot", a non-significant result would be found if fifty per cent considered that there had been a little or no change. However, that fifty per cent considered that there had been changes may itself be significant relative to everyone considering that there had been no change. In order to check this absolute degree of perceived change, on ninety-five per cent confidence interval for the percentage, and where relevant a change in percentage, the limits of confidence level under
which a percentage of respondents was significantly different from zero was calculated. Then, if a percentage of zero was outside this interval, it was concluded that the effect was significant. Using the formula shown in Appendix 17 with the most conservative sample size (n) of 79, and proportion (pp) of 0.18, it was calculated that the lower limit was 0.09. Therefore, a significant change in any work activities is said to occur when 10 per cent or more of the respondents indicated a change in their work activities.

Another relevant analysis was to compare any relative changes between the periods from 1997 to 1986 and 1997 to 1991. If the distributions were equivalent for 1986 and 1991 (relative to 1997), then it would mean that there was as much change between 1997 and 1986 as there was between 1997 and 1991. That meant that effectively there was no change on those variables between 1986 and 1991. In that case, there had probably been a delay in the effect of the 1987 changes brought about by the introduction of the Unified National System. This would not be surprising, because many of the changes took some time to be understood and implemented, and in many cases they were resisted. On the other hand, if there was change, but the change was less from 1997 to 1991 compared to 1997 to 1986, that meant that there was change between 1986 to 1991, that the change had continued, but that it had been decelerating. For such variables, it meant that a lot of the change occurred in the period from 1986 to 1991. Again, there may be
variables where there was an initial flurry of change, and these changes have reached their limits.

It needs to be noted that statements such as the above constrained the responses to showing an increase – they did not provide an opportunity to directly show a decrease. Thus, it was unlikely that there could be a greater increase in workload between 1991 and 1997 than between 1986 and 1997. If, however, there was such an increase, it would imply a reduction in pressure and/or workload between 1986 to 1991. In some subsequent scales, where a balance was considered between the activities, there was an opportunity provided for changes in both directions. An elaboration of the interpretation in such cases would be provided when that kind of response format is encountered first.

The three cases outlined above are shown diagrammatically below in Figures 10.1a, 10.1b and 10.1c.
Figure 10.1a
Change between 1997 to 1991 is equal to change between 1997 to 1986

Figure 10.1b
Change between 1997 to 1991 is less than change between 1997 to 1986
To assess the difference in change between the two periods, it would be possible to consider the interaction between the two periods. However, the responses were dependent because they came from the same individuals, and so the regular $\chi^2$ test was not appropriate. In addition, a result which showed an interaction would still require interpretation of direction. Therefore, the categories reflecting the changes in each period were given a score, the mean calculated, and a paired t-test conducted. The scores given to the categories was 3 for “a lot”, 2 for “quite a lot”, 1 for “a little” and 0 for “not at all”. This meant that the greater the score, the greater the change in the relevant period.
The change that was assessed for significance using the $\chi^2$ test across the distribution of responses and the confidence interval for percentages would be termed "General change" and the comparison of changes assessed using the paired t-test would be termed the "Rate of change". With this background to the substantive analysis of the individual statements and the change, the results follow.

Results from questionnaire

As in Attitude to PIs and Perceptions of university reward system scales, the person-item frequency distribution for the Paperwork scale, displayed in Figure 10.2, is used to provide an overview of the academics' paperwork load. As in the previous figures, the locations of the items can be taken to have an origin of 0.0. It can be seen that the frequency distribution of the persons is positively skewed relative to the locations of the six statements.\(^7^8\) As a high score indicated an increase in paperwork load, the fact that there were few responses below -0.8, that of no rise in paperwork load, would imply that the paperwork load for a majority of the respondents had increased. Therefore, the fourth hypothesis - the introduction of PIs is associated with a significant increase in paperwork for the university academics - is substantiated.

\(^7^8\) The locations of the thresholds between the successive responses of "not at all/a little", "a little/quite a lot", and "quite a lot/a lot", were respectively -0.8, 0.1, and 0.7. Therefore, any person location below -0.8 indicated a most likely response of "not at all" on average, a location between -0.8 and 0.1 a response of "a little", a location between 0.1 and 0.7 a response of "quite a lot", and above 0.7 a response of "a lot".
A more detailed analysis of the paperwork issue on a statement by statement basis is presented in Tables 10.2 and 10.3. These were carried out to reinforce the interpretations of the general trends.
Table 10.2
Paperwork associated with PIs: Chi-square test results

<table>
<thead>
<tr>
<th>Survey items</th>
<th>Frequency of responses (%)</th>
<th>( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A lot</td>
<td>Quite a lot</td>
</tr>
<tr>
<td>1. I have to do more paper work now to account for my publications compared to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) 1986 (N = 100)</td>
<td>52</td>
<td>27</td>
</tr>
<tr>
<td>(a) 1991 (N = 128)</td>
<td>48</td>
<td>20</td>
</tr>
<tr>
<td>2. I have to do more paper work now in preparing proposals to apply for external research grants compared to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) 1986 (N = 87)</td>
<td>40</td>
<td>33</td>
</tr>
<tr>
<td>(b) 1991 (N = 113)</td>
<td>34</td>
<td>32</td>
</tr>
<tr>
<td>3. I have to do more paper work now in supervising postgraduate research students compared to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) 1986 (N = 90)</td>
<td>23</td>
<td>27</td>
</tr>
<tr>
<td>(b) 1991 (N = 122)</td>
<td>24</td>
<td>23</td>
</tr>
</tbody>
</table>

Degrees of freedom, df = 3. Level of significance* p < 0.05, ** p < 0.01, *** p < 0.001.

The findings from the \( \chi^2 \) test in Table 10.2 revealed a significant increase in paperwork associated with publications and external grant applications in 1997 compared 1986 and 1991. However, the \( \chi^2 \) test for paperwork associated with higher degree research supervision was insignificant for both periods. A closer look at the latter results revealed that the proportion of academics who responded to the four different categories from "a lot" to "not at all" were more or less similar to one another. Similarly, when the responses were dichotomised to combine the categories "a lot" and "quite a lot" relative to "a little" and "not at all" - for the purpose of reinforcing this interpretation, as explained earlier - the proportion of academics who acknowledged an increase in paperwork associated with postgraduate research student supervision was similar to those who perceived no such increase. This is shown in Appendix 16 (under Paperwork section). Since a change by 10 per cent or more of
respondents is regarded as significant (Appendix 17), a proportion of
approximately fifty per cent respondents who perceived a rise in
paperwork is significant.79

Therefore, it appears that the three above-mentioned research PIs had
ccontributed to an increase in paperwork. Fifty per cent of the
respondents perceived an increase in paperwork associated with higher
degree research student supervision in 1997 compared to 1986 and
1991. This proportion is even larger for publications and external
research grant applications. In Table 10.2 (statements 1 and 2), it can be
observed that about seventy per cent of the academics indicated an
increase in paperwork associated with publications and external
research grant applications.

Table 10.3
Paperwork associated with PIs: Paired t-test between periods
(between 1997 compared to 1986, and 1997 compared to 1991)

| Survey items | N   | Mean ± standard deviation
|--------------|-----|--------------------------|
|              | 1986 | 1991
| 1. I have to do more work now to account for my publications compared to | 98   | 3.29 ± 0.90 3.22 ± 0.99 |
| 2. I have to do more paper work now in preparing proposals to apply for external research grants compared to | 87   | 3.03 ± 0.99 2.95 ± 1.04 |
| 3. I have to do more paper work now in supervising postgraduate research students compared to | 90   | 2.53 ± 1.06 2.50 ± 1.12 |

Level of significance * p < 0.05

79Appendix 17 also includes a calculation of the upper and lower limits of confidence for paperwork associated with postgraduate research supervision as an illustration of a specific work activity.
With reference to Table 10.3, the mean values for the three research activities (publications, external grants applications, and higher degree research supervision) showed a fall in the period of 1997 compared to 1991, in relation to the period of 1997 compared to 1986. However, the drop was not significant. Although the paperwork load associated with these activities in the period of 1991-1997 had not increased as much as in the period of 1986-1997, the paperwork load for the respondents, nevertheless, had increased in 1991 and again in 1997. It is possible that the respondents may be in the process of reaching their limits of increase in paperwork in 1997.

Comments from the participants: Questionnaires and interviews

The results from the interviews also showed paperwork to be a problem for many academics. It seemed that the huge amount of paperwork was a consequence of one or a combination of the following three factors:

(1) the requirement of substantiating claims of research. A respondent (040) wrote in the questionnaire, “There are more forms, more detail, more frustration”. An interviewee (149) said,

The other concern I have about performance indicators is the information that’s required to substantiate claims... It should be quite adequate simply to submit a copy or cover page of the article, and that should suffice. The reason I say that is that often, if you’re a co-author and all your other co-authors might be in another state or another country, and they might have, say, the referees’ reports, there are lots of extra work, and time wasted getting that
information together. Another problem comes up when, as it just happens with me, we publish a paper in a journal which is not in our library, nor the nearest library. So in order to get my hands on the journal, to get the ISBN (International Standard Book Number), I have to travel across the city, or get an inter-library loan.

He went on to point out the following:

... so long as the research index paperwork coincides with the preparation of the annual reports, then it actually is a useful thing to go through because you need to have that information for the annual report any way... It's really a reasonable way of keeping tabs on what you're doing over the course of a year so that you can prepare your annual report. Where we have a problem at X (a university), and I suspect every university has this problem is that the requirements for preparing the annual report and the requirements for submitting a research index are out of phase. So you wind up doing the work twice.

Another interviewee (168) complained that

It's getting more time-consuming to substantiate the material for the research index. I had to ring a colleague and asked her secretary to retype all the handouts for a conference I gave a paper out because the name of my university wasn't on the original one, and I couldn't use it otherwise... I had a fax from a colleague wanting information about a journal I edited from a couple of years ago, wanting to know whether it was refereed or not, and apologising but saying she needs it in writing for the research index.

(2) duplication in reporting. Some comments are shown below.

Everything just has to be documented in much more detail. And it seems like they are constantly asking for the same information over and over again. So the school wants it once, the research office wants it separately, and it always changes. (016)
I think it all focuses on the paperwork. The fact that a lot has to be reported, in a variety of ways, to different bodies. (057)

(3) an increase in research activities. As discussed earlier, the correlation result in Table 10.1 indicated a significant relationship between paperwork and academics’ job activities. In other words, an increase in job activities was associated with an increase in paperwork load. It is, therefore, possible that an increase in publications or external research grant applications could contribute to a rise in paperwork, largely because of (1) and (2).

The main frustration with the time involved in paperwork appeared to be its distraction from academics’ work, as indicated by some quotes below.

In general, I would have to say it (PI) brings disadvantages because it’s more paperwork, and it’s more rubbish that isn’t pure teaching and isn’t pure research. Anything that isn’t pure research or pure teaching can be looked upon as a waste of time. I shouldn’t be filling in forms. I shouldn’t be doing all these other stuff. I should be using my expertise. I apparently train this thing here (indicating the head) to do certain things. The less chance I get to do it, the less efficient I become. (044)

Performance indicators are a nuisance when they require a lot of work to administer. If it means more things to fill in, then all they (academics) do is get annoyed because they’ve been taken away from doing what they want to do, which is in teaching or research or both of them... People are fed up with wasting their time. (097)

Everybody likes to think that performance indicators automatically produce better performance. But often times,
they put people under pressure to just produce the same performance with twice the paperwork. (086)

Having presented the findings on the change in paperwork load, the next step is to examine any changes in the approach to research. The research activities reported will be on the three types of activities measured by the current PIs in the institutions - publications, external research grants applications, and higher degree research students supervision. The results on research will first be on pressure, followed by the actual research activities.

Pressure to do Research

The findings suggest that the introduction of PIs for research, particularly the establishment of incentive funding for research, has heightened the pressure on most academics to undertake research. As in the previous section, this section (as well as the next two sections) will be divided into three subsections. The first subsection will report on the results from the comparison of the activity between 1997 and 1986, and 1997 and 1991 (using a $\chi^2$ test); the second reports on the change in activities between these periods (using a paired t-test); and the third provides additional comments from the questionnaires and interviews.
Unlike the *Paperwork* scale, there is opportunity provided in a statement measuring “Pressure to do research” for changes in both directions. The statement is shown below.

Pressure from the University to do more research has increased or decreased now compared to:

<table>
<thead>
<tr>
<th></th>
<th>Increase a lot</th>
<th>Increase a little</th>
<th>Decrease a little</th>
<th>Decrease a lot</th>
<th>No difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>1991</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

The five categories have an implied order, with “increase a lot” given a score of 4, “increase a little” a score of 3, “no difference” a score of 2, “decrease a little” a score of 1, and “decrease a lot” a score of 0. This means that a high score indicates an increase in research, a low score a decrease in research, and a middle score no change. A $\chi^2$ test and paired t-test were carried out on such statements for the reasons given earlier under the previous subsection on *Paperwork*.

The interpretation on a comparison on the relative changes between the periods from 1997 to 1986 and 1997 to 1991 is described briefly. If the distributions were equivalent for 1986 and 1991 (relative to 1997), then it would mean that there was as much increase, decrease, or no change between 1997 and 1986 as there was between 1997 and 1991. This means that effectively there was no change on those variables between 1986 and 1991, with most of the changes occurring between 1991 and 1997. Again, the interpretation would be that there was a delay in the
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<table>
<thead>
<tr>
<th></th>
<th>Increase a lot</th>
<th>Increase a little</th>
<th>Decrease a little</th>
<th>Decrease a lot</th>
<th>No difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>1991</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

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effect of the 1987 changes brought about by the introduction of the
Unified National System, with most of the changes taking place between
1991 and 1997. On the other hand, if there was change, but the increase
or decrease was less from 1997 to 1991 compared to 1997 to 1986, that
means that there was change between 1986 to 1991, and that the
change has continued, but that it has stabilised or decelerated. For such
variables, it means that a lot of the change occurred in the period from
1986 to 1991. Again, there may be variables where there was an initial
flurry of change, and that these changes have reached their limits.
However, if the increase or decrease was greater from 1997 to 1991
compared to 1997 to 1986, that means that there was change between
1986 to 1997, and a decrease in pressure and/or workload between
1986 to 1991. With this background on the analysis of such statements,
the results follow.

General change

The results from the \( \chi^2 \) test carried out on the statements on the
comparisons between 1997 and 1986 and 1991 respectively are shown
in Table 10.4. Sixty-one percent of the respondents indicated that the
pressure from their institutions to do more research has “increased a lot”
in 1997 compared to 1986. When compared to 1991, sixty-four percent
of the participants reported a similar degree of pressure from their
universities to undertake research in 1997.
### Table 10.4

Pressure on research activities: Chi-square test results

<table>
<thead>
<tr>
<th>Sect. no.</th>
<th>Section (Sect.) and number (no.) as in questionnaire</th>
<th>Survey items</th>
<th>Frequency of responses (%)</th>
<th>$\chi^2$ (a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Pressure from the University to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>do more research has increased or decreased now compared to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) 1986 (N=112)</td>
<td>61 29 9 1 0</td>
<td>147.554***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(b) 1991 (N=146)</td>
<td>64 25 10 1 0</td>
<td>203.932***</td>
<td></td>
</tr>
<tr>
<td>4A</td>
<td>publish has increased now compared to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(a) 1986 (N=107)</td>
<td>44 28 21 7 0</td>
<td>30.832***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(b) 1991 (N=141)</td>
<td>38 35 19 8 0</td>
<td>33.950***</td>
<td></td>
</tr>
<tr>
<td>4B</td>
<td>apply for external research grants has increased now compared to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(a) 1986 (N=104)</td>
<td>60 27 10 3 0</td>
<td>79.000***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(b) 1991 (N=139)</td>
<td>49 36 12 3 0</td>
<td>74.784***</td>
<td></td>
</tr>
<tr>
<td>4C</td>
<td>ensure that the postgraduate research students whom I supervise pass in minimum time has increased now compared to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(a) 1986 (N=92)</td>
<td>16 34 28 20 2</td>
<td>7.156</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(b) 1991 (N=122)</td>
<td>15 29 31 23 2</td>
<td>7.133</td>
<td></td>
</tr>
</tbody>
</table>

(a) For the purpose of presenting data using different scales on the same table, in the first statement, 5=increase a lot, 4=increase a little, 3=no difference, 2=decrease a little, 1=decrease a lot. For the other statements, 5=a lot, 4=quite a lot, 3=a little, 2=not at all, 1=don’t know.

Degrees of freedom, df = 4 for first statement. For other statements, df = 3.
Level of significance, * p < 0.05, ** p < 0.01, *** p < 0.001.

In particular, a majority of the academics perceived a rise in pressure to publish and apply for external research grants in 1997 compared to 1986 and 1991. As observed in Table 10.4, most of them described this increase in pressure to publish and apply for external research grants as “a lot”. On the other hand, when it came to pressure from the institution to ensure that their higher degree research students complete within a minimum time, the proportion of academics who fell into the four different categories of responses were very similar. Even when the
responses for "a lot" and "quite a lot" were combined together, and compared to those for "a little" and "not at all", i.e. two classes of responses, the $\chi^2$ test results remained insignificant, as shown in Appendix 16 (under Higher degree research supervision section, statement 1). The proportion of respondents who perceived a rise in pressure to ensure that their research students completed their higher degrees in minimum time (approximately 50 per cent) was not significantly different from those who felt no rise in this pressure (approximately 50 per cent). However, as discussed earlier under Paperwork section, and calculated in Appendix 17, a change in any work activities is regarded as significant as long as a minimum of ten per cent of the respondents showed a change in these work activities. Accordingly, a proportion of fifty per cent respondents who indicated an increase in pressure to ensure minimum higher degree research completion time is significantly different from zero. Therefore, it appeared that the academics perceived a rise in pressure to undertake more research, particularly in the three research activities - publications, external research grant applications, and higher degree research supervision. However, the increase in pressure seemed to be perceived by more respondents for the two former research activities.
responses for "a lot" and "quite a lot" were combined together, and compared to those for "a little" and "not at all", i.e. two classes of responses, the $\chi^2$ test results remained insignificant, as shown in Appendix 16 (under Higher degree research supervision section, statement 1). The proportion of respondents who perceived a rise in pressure to ensure that their research students completed their higher degrees in minimum time (approximately 50 per cent) was not significantly different from those who felt no rise in this pressure (approximately 50 per cent). However, as discussed earlier under Paperwork section, and calculated in Appendix 17, a change in any work activities is regarded as significant as long as a minimum of ten per cent of the respondents showed a change in these work activities. Accordingly, a proportion of fifty per cent respondents who indicated an increase in pressure to ensure minimum higher degree research completion time is significantly different from zero. Therefore, it appeared that the academics perceived a rise in pressure to undertake more research, particularly in the three research activities - publications, external research grant applications, and higher degree research supervision. However, the increase in pressure seemed to be perceived by more respondents for the two former research activities.
Rate of change

The results on the period of 1997 to 1986 relative to the period of 1997 to 1991 are shown in Table 10.5. Although the findings were not significant, the mean values for publications, external research grants applications, and higher degree research supervision for the period of 1986-1997 (3.1, 3.4, and 2.5 respectively) were higher than for the period of 1991-1997 (3.0, 3.3, and 2.4 respectively). Although these pressures have not risen to the same extent in the latter period compared to the former period, they, nevertheless, have increased since 1986, and this includes in 1991, and again in 1997. Again, as suggested for the paperwork load, it is possible that the respondents may be nearing their limits of heightened pressure to publish, apply for external grants, and supervise higher degree research students.
Table 10.5
Pressure on research activities: Paired t-test between periods
(between 1997 compared to 1986, and 1997 compared to 1991)

<table>
<thead>
<tr>
<th>Section (Sect.) and number (no.) as in questionnaire</th>
<th>Survey items</th>
<th>N</th>
<th>Mean ± standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sect. no.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 4</td>
<td>Pressure from the University to: do more research has increased or decreased now compared to</td>
<td>111</td>
<td>3.77 ± 0.60 3.79 ± 0.62</td>
</tr>
<tr>
<td>4A 1</td>
<td>publish has increased now compared to</td>
<td>107</td>
<td>3.09 ± 0.96 3.02 ± 0.91</td>
</tr>
<tr>
<td>4B 1</td>
<td>apply for external research grants has increased now compared to</td>
<td>104</td>
<td>3.43 ± 0.80 3.31 ± 0.84</td>
</tr>
<tr>
<td>4C 1</td>
<td>ensure that the postgraduate research students whom I supervise pass in minimum time has increased now compared to</td>
<td>90</td>
<td>2.48 ± 1.00 2.43 ± 1.01</td>
</tr>
</tbody>
</table>

Level of significance * p < 0.05

To summarise, most of the respondents perceived that they were under more pressure from their institutions to do research in 1997 compared to 1986 and 1991. More specifically, they felt that they were under intense pressure from their universities to publish, apply for external research grants, and ensure minimum time completion for their supervised higher degree research students in 1997 compared to 1986 and 1991. The increase in pressure was also indicated between these periods although this rise in pressure appeared to have stabilised in the period of 1997 to 1991 compared to the period of 1997 to 1986.
Comments from the participants

The comments collected from the interviews also show heightened pressure to undertake research as a result of the introduction of the research PIs.

The research indicators more than encourage people to do research. It seems to almost you are forced to. (225)

There has always been in universities considerable, usually implicit pressure to do research. But the nature of that pressure, the way in which it is exerted is becoming more explicit, very much more foolish. (007)

The university is saying effectively that you’re not performing if you don’t research whereas ten years ago, they couldn’t have cared. If you’re a good teacher and didn’t dirty your nose somewhere, you’re okay. But that has changed. (086)

There’s a much more cynical attitude now toward research. In the past, I guess I would have been able, you see, within literature, one of the things we had, is to contemplate, we had a chance to meditate, and to think about the kinds of arguments and debates and interpretations that we wanted to develop within an article. Now the pressure is on to, from my perspective, to rush out, whatever is trendy, popular, interesting, and of the moment. There’s a kind of coercion there … and the impulse is to get yourself the article written, publish, and a conference. So there’s a kind of three-way measures … And you need 3, 4, 5 a year to maintain what the university regard as a healthy production output. (019)

My approach to research has changed in the fact that I’ve just got to do it rather than wanting to do it, and having the time to do it. I feel that I’m being pressured to do it. (225)

Taking external research grants applications as an illustration, the remarks written in the questionnaire included “The need for external
grants is now paramount” (294), and “The relentless pressure to apply for external grants takes a continuing toll” (052). Below are some remarks provided by the interviewees.

The university is always jumping up and down, and telling us how we don’t have enough Large ARC (Australian Research Council) Grants. (013)

Once you reach the senior lecturer level, no matter what your other duties are, there’s huge amount of pressure to apply for research grants which may or may not be effective. (019)

When I was here in 1986, I didn’t apply for any research grants... But in the last year, in 1995, I was only here as casual person and yet I was applying for research grants. (196)

The comments collected from the interviews also suggested that the increase in pressure to have higher degree research students complete in minimum time was due to resource constraint.

... in the past, we didn’t worry about them if they went on for 5 or 6 years, it wasn’t much of a concern. But it is a concern now particularly as the department only gets funded for a short period. (103)

The main effect has been on the sort of Master student level - get your thesis in or we’ll fail you. Because we can’t afford to have them sitting around using up resources and not getting any money for them. (175)

One department had what was called a space management system to encourage their postgraduate research students to finish within four years.
What I do is now have a system where they come within a department, they get offered some space in another building which is not the best space we have available. And after a year and a half, they're asked if they want to move to the main building where they get better space. And at the end of the three and a half to four years, they're moved out to a room where they write up. At the end of five years, they're kicked out of the department. So they are very aware of the passage of time because we have a space management system which forces them to get through.

Having found out the extent of the pressure felt by the participants in the three research activities - publications, external research grant applications, and higher degree research supervision - for the periods of 1986-1997 and 1991-1997, as well as between these periods, the next step is to report on any actual changes in these activities over the same periods. The results are presented in the following order:

(1) publications, (2) external research grant applications, and (3) higher degree research student supervision. The first two research activities will be analysed by a $\chi^2$ test and paired t-test, for the same reasons given before. Comments collected from the questionnaires and interviews are also provided for each of the above three activities.

**Publications**

As a majority of the participants have been found to be under intense pressure to publish, it is appropriate to observe whether their activities in relation to publications have actually changed in response to this pressure. This will be achieved with a comparison of the perceptions of
their activities between the period of 1997 and 1986 and the period of 1997 and 1991 in the same way as with the previous variables studied - by means of a $\chi^2$ test, followed by a comparison on the change in the activities between these two periods by means of a paired t-test.

General change

When it came to publications, a majority of the respondents indicated that their time spent on this activity as well as the quantity of publications produced had risen in 1997 compared to both 1986 and 1991. This is displayed in Table 10.6. Thirty-seven per cent of the respondents described their increase in time devoted to publications in 1997 as “increase a lot” relative to 1986, while thirty-four percent described it as “increase a little” relative to 1991. When it came to number of publications, forty per cent of the respondents indicated the rise in their number of publications as “increase a lot” in 1997 relative to 1986. When compared to 1991, forty-one per cent of the respondents indicated this rise as “increase a little”.
Table 10.6
Publications: Chi-square test results

<table>
<thead>
<tr>
<th>Statement number as in questionnaire</th>
<th>Survey items</th>
<th>Frequency of responses (%)</th>
<th>$\chi^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>My time spent on publications has increased or decreased now compared to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) 1986 (N = 102)</td>
<td>37</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>(b) 1991 (N = 132)</td>
<td>28</td>
<td>34</td>
</tr>
<tr>
<td>3</td>
<td>The number of my publications has increased or decreased now compared to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) 1986 (N = 99)</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>(b) 1991 (N = 133)</td>
<td>26</td>
<td>41</td>
</tr>
<tr>
<td>4</td>
<td>The quality of my publications has increased or decreased now compared to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) 1986 (N = 98)</td>
<td>22</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>(b) 1991 (N = 131)</td>
<td>16</td>
<td>36</td>
</tr>
<tr>
<td>5</td>
<td>My priorities in publications have changed now compared to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) 1986 (N = 92)</td>
<td>21</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>(b) 1991 (N = 122)</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

(a) For the purpose of presenting data using different scales on the same table, for statements 2-4, 5= increase a lot, 4= increase a little, 3= no difference, 2= decrease a little, 1= decrease a lot. For statement 5, 5= a lot, 4= quite a lot, 3= a little, 2= not at all, 1= don’t know.

Degrees of freedom, df = 4 for statements 2-4, and df = 3 for statement 5.

* p < 0.05, ** p < 0.01, *** p < 0.001.

Although most of the respondents acknowledged that the quantity of their publications had increased, the same did not apply to their quality of publications. As shown in Table 10.6, at least forty per cent of the academics in this study stated that their quality of publications had not altered in 1997 compared to both 1986 and 1991. Similarly, a majority (over 45 per cent) of the respondents reported no change in their priorities in publications over the same periods. When the responses for "a lot" and "quite a lot" were combined together, and compared to those
for "a little" and "not at all", ie. two classes of responses, the results in Appendix 16 (under Publications section) showed that about seventy percent of the respondents indicated no change in their priorities in publications in 1997 when compared to 1986 and 1991. However, as mentioned earlier, a change in work activity by a minimum proportion of ten percent is considered to be a significant change (Appendix 17). On this basis, the thirty per cent who perceived a change in their priorities in publications is significant. Therefore, the results revealed that although quality of publications have remained largely unchanged for most of the respondents in 1997 relative to 1986 and 1991, other areas in their publications have changed. In particular, a sizeable proportion of respondents indicated a change in their priorities in publications, and a larger proportion perceived an increase in both the time spent on publications and the quantity of publications.

Rate of change

As with the previous sections on Paperwork and Pressure to do Research, the next question which arose was whether there was a difference in the comparison between 1997 and 1986, and between 1997 and 1991. This was answered with a paired t-test, as shown in Table 10.7. It was observed that the mean values for the period of 1991-1997 were less than those in the period of 1986-1997. This means that the rate of increase and/or change in the publications activities for the
period of 1991-1997 were less than those for the period of 1986-1997. In other words, since 1986, publications activities have continued to increase and/or change, but at a slower rate from 1991 onwards. However, only one of these activities was significantly affected - the quantity of publications.

Table 10.7
Publications: Paired t-test between two periods
(between 1997 compared to 1986, and 1997 compared to 1991)

<table>
<thead>
<tr>
<th>Statement number as in questionnaire</th>
<th>Survey items</th>
<th>N</th>
<th>Mean ± standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>My time spent on publications has increased or decreased now compared to</td>
<td>102</td>
<td>3.62 ± 1.03</td>
</tr>
<tr>
<td>3</td>
<td>The number of my publications has increased or decreased now compared to</td>
<td>98</td>
<td>3.64 ± 0.96*</td>
</tr>
<tr>
<td>4</td>
<td>The quality of my publications has increased or decreased now compared to</td>
<td>97</td>
<td>3.99 ± 1.08</td>
</tr>
<tr>
<td>5</td>
<td>My priorities in publications have changed now compared to</td>
<td>91</td>
<td>2.12 ± 1.20</td>
</tr>
</tbody>
</table>

*p < 0.05

The implication of the findings is that when compared to 1986, the time devoted to publications according to a majority of the respondents, and their quantity of publications, had significantly increased in 1997, or more accurately "increased a lot". It is likely that most of the academics spent relatively less time on their publications, and they had fewer publications in 1986 than in 1997. In 1991, many of the academics had already
begun to increase their quantity of publications. This is shown by the majority of respondents who indicated their publications count in 1997 as “increase a little” relative to 1991, and the significantly lower results in the paired t-test for the period of 1991-1997 compared to the period of 1986-1997. Thus, while the quantity of publications rose in 1997 when compared to 1986 and 1991, this increase has proceeded at a slower rate since 1991, suggesting that the respondents may be reaching their limits in terms of quantitative output of publications.

Comments by the participants: Strategic rise in publications

The results from this study also revealed several techniques used in a bid to increase the number of publications. Some respondents opted for shorter papers: “Shorter papers offer a better ‘return’” (073). There were also respondents who chose journals with relatively higher acceptance rate: “I look for journals that are more likely to accept the paper” (011). An interviewee (196) admitted that his focus was “Towards publishing in less prestigious journals... So lighter articles are published and more frequently”. In fact, according to some participants, an increase in the number of publications has been accompanied by an increase in the number of journals available which are not necessarily of high quality. For instance, “more journals now means less review so it’s easier to get into a newer journal and get something published” (086). Another interviewee (134) pointed out that
The pressure to publish in journals has led to the establishment of an industry of unnecessary journals. These journals are not read, wanted, and there's no demand for them. They're simply created as a device to win points.

Although the points allocated to these publications may be comparatively less than those in more prestigious publications, this appeared to be compensated by an increase in the number of publications. An interviewee (007) pointed out that

To do good, high quality research that's recognised by my colleagues as being good high quality university level research, I have to engage in a process which requires me to take 2 to 3 years to get one paper published. But that only gets me one point. Now set against that is the fact that a non-refereed paper gets half a point. So what does this lead me to do? If I'm to say that the university is going to assess my performance using performance indicators, the research index, obviously, I'll sit down and write acres and acres of these, these rubbish that will be accepted by non-refereed journals... I now spend more time, not all the time, I'm pleased to say, more time on relatively superficial publications rather than trying as I used to do 10 years ago getting together 3 to 6 good experiments to publish in one paper. Now each of those experiments gets published separately. Even though my effort to produce, the amount of time I have, the incentive I have to produce top-quality publications is not there, is not the same as it was 10 to 15 years ago.

In an effort to increase the number of publications for the university departments, higher degree research students were also encouraged to publish their work prior to submission of their theses. Some participants also undertook research to publish with their students. A respondent (040) wrote in the questionnaire that more of his publications were done
by his students. An interviewee (046) stated that, "Most of my research is done through my students. It's done 60 per cent by them and 40 per cent by me". Similarly, another (087) said, "Now I've got a few postgraduate students publishing for me. I publish with them. But I wouldn't normally publish that sort of stuff myself". Another method that was used by some academics in this study to maximise the quantity of their publications was by concentrating on research that is easily published.

Reasons for changing publications

As mentioned earlier, a sizeable thirty per cent of the respondents perceived that their priorities in publications have changed in 1997 relative to 1986 and 1991 (see Appendix 16, Publications section). In fact, comments collected from the questionnaires and interviews suggest that many participants who have switched their main types of publications tended to focus on publications that generated comparatively more points, such as refereed journals. A collection of their remarks are displayed below.

My priorities have changed a lot. Now I wouldn't think about anything which isn't a refereed journal. I mean you would think about but you hesitate about writing for something which doesn't generate research index points. (168)

It has shifted towards the ones that score more points in the research index, you know, the refereed publications in international journals. (024)
They believe that if you don’t publish in a refereed journal, the publications is not good. In my field, just because a publication is not in a refereed journal doesn’t mean it’s not good because you have to inform your audience, and you have to inform them very quickly. And one way of doing that is to go to a conference, or organise your own conference which I’ve done a lot. If you go through the refereed process, it takes a long time. But if it is valued more, you don’t worry. You just publish in a refereed journal. (034)

The university has always implicitly said that you have to publish a lot. It’s more clearly now because of the index. And there’s the shift towards refereed journals because of the index … I attend less conferences now. I used them to enthuse myself, and I used to use them to give a paper of what I’m going to publish. Now I’ve got a backlog of papers, what’s the point? And now I don’t need to enthuse myself. I just need to publish the papers. (044)

In many instances, the main motive for the shift in the categories of publications was the rewards attached - money, promotion, and recognition, as supported by the earlier significant correlation result between rewards and behaviour in Table 10.1. Statements written in the questionnaire included “No point in publications other than those highly rewarded” (098), “I don’t even consider publications without brownie points” (167), “We don’t get recognised for things that aren’t in refereed journals so why do them?” (136), “Don’t waste time on conference proceedings but focus on refereed journals due to the point values” (293), “It is much more credible to publish in refereed journals - get more recognition for promotion and increase research index points” (262), and “Concentrating on producing a book because the research index is 12:1 book:article and because of the prestige (017).
However, there was also another group of participants who published in the categories which were highly rewarded because of personal interest or because of experience. In the questionnaire, one academic (160) explained: “More emphasis on books though not due to university pressure but personal choice”, while another (206) said, “Simply that I wrote more chapters as my experience increases”.

In summary, although there were those whose quality of publications had been sacrificed for quantity, the results from the survey suggested that most of the respondents had not altered the quality of their publications in 1997 relative to 1986 and 1991. On the other hand, a sizeable percentage of them have shifted their priorities in publications, particularly towards those which were taken into account in their institution’s research index scheme. Moreover, for a majority of them, the time devoted to publications as well as the quantity produced had increased significantly in 1997 compared to 1986 and 1991.

External Research Grant Applications

As for publications, most of the participants have earlier been shown to experience increased pressure to apply for external research grants. Their actual change in work activities related to grant applications were also quite similar to those for publications.
General change

A detailed analysis of the work activities on grant applications were carried out on a statement by statement basis to reinforce the interpretations of the general trends. The results of a comparison of these activities between 1997 and 1986, and between 1997 and 1991, are displayed in Table 10.8. Forty-six percent and forty-one percent of the respondents indicated their time spent as “increased a lot” in 1997 relative to 1986 and 1991 respectively. In terms of quantity of external research grant applications in 1997, thirty-seven percent of the participants described their increase as “increase a lot” relative to 1986, while forty percent described it as “increase a little” relative to 1991.
Table 10.8

External research grants applications: Chi-square test results

<table>
<thead>
<tr>
<th>Statement number as in questionnaire</th>
<th>Survey items</th>
<th>Frequency of responses (%) (a)</th>
<th>χ²</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 My time spent on external research grant applications has increased or decreased now compared to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) 1986 (N = 89)</td>
<td>46 26 14 7 7</td>
<td>48.697***</td>
<td></td>
</tr>
<tr>
<td>(b) 1991 (N = 118)</td>
<td>41 29 15 8 7</td>
<td>52.593***</td>
<td></td>
</tr>
<tr>
<td>3 The number of external research grants which I have applied has increased or decreased now compared to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) 1986 (N = 89)</td>
<td>37 31 18 7 7</td>
<td>34.652***</td>
<td></td>
</tr>
<tr>
<td>(b) 1991 (N = 119)</td>
<td>26 40 20 6 8</td>
<td>47.849***</td>
<td></td>
</tr>
<tr>
<td>4 The types of external research grants for which I now apply have changed compared to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) 1986 (N = 79)</td>
<td>16 18 22 44 0</td>
<td>16.139**</td>
<td></td>
</tr>
<tr>
<td>(b) 1991 (N = 109)</td>
<td>13 18 22 47 0</td>
<td>29.459***</td>
<td></td>
</tr>
<tr>
<td>5 My priority areas in research have changed now compared to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) 1986 (N = 98)</td>
<td>13 17 13 57 0</td>
<td>54.245***</td>
<td></td>
</tr>
<tr>
<td>(b) 1991 (N = 125)</td>
<td>12 16 19 53 0</td>
<td>52.824***</td>
<td></td>
</tr>
</tbody>
</table>

(a) For the purpose of presenting data using different scales on the same table, for statements 2-3, 5=increase a lot, 4=increase a little, 3=no difference, 2=decrease a little, 1=decrease a lot. For statements 4-5, 5=a lot, 4=quite a lot, 3=a little, 2=not at all, 1=don’t know.

The degrees of freedom, df = 4 for statements 2-3, and df = 3 for statements 4-5.

* p < 0.05, ** p < 0.01, *** p < 0.001.

Although a majority of the respondents indicated a rise in the quantity of external research grant applications and the time spent on this activity in 1997 compared to 1986 and 1991, most of them did not perceive that their types of grants and priority areas in research had changed (Table 10.8, statements 4 and 5). For the purpose of reinforcing this interpretation, the responses were dichotomised to combine the categories “a lot” and “quite a lot” relative to “a little” and “not at all”. It is
shown in Appendix 16 (External research grants section) that approximately about thirty per cent of the respondents felt that their types of external research grants and priority areas in research have changed. As the proportion that changed was greater than ten per cent (Appendix 17), the shifts in types of external grants and priority areas in research were considered to be significant.

Rate of change

The next step is to report on any changes in the grant applications activities between the period of 1997 to 1986, and the period of 1997 to 1991. In this way, it can be observed whether the rate of change in grant applications activities has stabilised, decelerated, or accelerated. It can be observed in Table 10.9 that the mean values for the period of 1991-1997 were lower than the period of 1986-1997. This means that the degree of increase and/or change in these activities had decreased in the 1991-1997 period compared to the 1986-1997 period. The mean values were also not significantly different between the two periods. Although the change in quantity of external research grant applications was significant between the two periods, this change was of the same order of magnitude. This essentially means that the difference in the change in quantity of external research grant applications between 1991-1997 period and 1986-1997 period are the same.
Table 10.9

External research grants applications: Paired t-test between two periods (between 1997 compared to 1986, and 1997 compared to 1986)

<table>
<thead>
<tr>
<th>Statement number as in questionnaire</th>
<th>Survey items</th>
<th>N</th>
<th>Mean ± standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1986</td>
</tr>
<tr>
<td>2</td>
<td>My time spent on external research grant applications has increased or decreased now compared to</td>
<td>87</td>
<td>3.54 ± 1.04</td>
</tr>
<tr>
<td>3</td>
<td>The number of external research grants which I have applied has increased or decreased now compared to</td>
<td>87</td>
<td>3.52 ± 1.08*</td>
</tr>
<tr>
<td>4</td>
<td>The types of external research grants for which I now apply have changed compared to</td>
<td>79</td>
<td>2.06 ± 1.14</td>
</tr>
<tr>
<td>5</td>
<td>My priority areas in research have changed now compared to</td>
<td>98</td>
<td>1.86 ± 1.12</td>
</tr>
</tbody>
</table>

* p < 0.05

There are two implications of the findings. First, despite a consistent increase in the quantity of grant applications, this rate of increase has decelerated since 1991. It is likely that most of the academics applied for fewer external research grants in 1986, as shown by the response of “increase a lot” in 1997 relative to 1986 in Table 10.8 (statement 3). In 1991, many respondents had begun to apply for external research grants which is why they gave the response to the quantity of grant applications as “increase a little” in 1997 relative to 1991. In other words, since 1986, the respondents have applied for increasing number of external grants but this rate of increase has decelerated from 1991 onwards, as indicated by the lower mean results on the 1991-1997 period compared to the 1986-1997 period (Table 10.9, statement 3).
Again, as for paperwork load, and number of publications produced, it is possible that the respondents may be reaching their limits in terms of quantity of external research grants applications.

Second, time spent on grant applications has continued to rise since 1986. It is likely that the academics spent relatively less time on their external research grant applications in 1986 as most of them indicated the increase in time spent on grant applications in 1997 relative to 1986 as "increase a lot". This can be seen in Table 10.8 (statement 2). A similar result of "increase a lot" for the period between 1997 to 1991 suggests a rise in time spent on grant applications in 1991 and a further rise in 1997. The increase in time spent on grant applications in 1997 relative to 1991 can mean that these academics put more effort into their applications in 1997 than in 1991 in order to guarantee success in an increasingly competitive environment. It can also mean that they were applying for more grants than before in an attempt to receive funding as shown by the significant increase in quantity of grant applications in 1997 relative to 1991 (Table 10.8, statement 3(b)).

Comments from the participants

Comments received in the questionnaires and interviews support the above finding of a rise in time spent on grant applications in 1997 compared to 1986 and 1991. This rise in time spent appeared to involve
an increase in effort as well as an increase in the number of grants applied. For instance, a respondent (057) elaborated that, "Grants have become harder to get so people have to put more effort into it", while others said, "more effort needed for NCG (national competitive grant) funds" (103), and "spend longer on 'lottery' of gaining funding" (104). One academic (101) pointed out, "I'm just applying for more things now. I used to just apply to the ARC but now, I apply to other things as well", and another (021) explained

I spend a lot more time now seeking funding for research. I apply for 15 different agencies each year to get funding for research. So a lot of my time is spent actually applying for grants, much more so than it was prior to 1991.

In addition, those who reported a change in their sources of funding chose mainly one of the three options: (1) national competitive grants because of the money and prestige, (2) industry funding and/or consultancies because of the belief that they were easier than national competitive grants or that money was concentrated in these sources, or (3) as many external research grants as possible in order to obtain much needed finance. Below are some of the statements collected.

... the status of the research grant, external, such as ARC and NHMRC (National Health and Medical Research Council), is much higher than funding you get from department, and one feels a pressure and one has to conform to that. (125)

When I first came here, I applied for an ARC grant and got it. And I vowed after that, I would never take another one
again. Because for $10,000, it was so much work. We have to put in quarterly progress reports. We had to keep filling in forms. And you were told how to spend the money. And consequently, I said it is easier to get contract research because you don’t have to do that nonsense. Nowadays, the university is saying, nonsense or no nonsense, you have to do ARC. That’s the only thing you get your kudos for. It has to be nationally competitive grants ... It’s the fact that it’s prestige for the university that counts. (086)

We do a lot more industrial work than we did in 1986 or 1991. More towards applied research and industrial research. That’s where the money is. (024)

I now apply for consultancies + industry funding rather than national competitive grants because of the higher likelihood of success. (038)

I don’t do ARC grants. I go for industry money because it’s easier. I don’t have to fill in all those stupid forms. Again as a cynical person, there are a number of people on the ARC panel, I suspect you have to know everyone of them to be successful. So why bother applying? (044)

I look at all possibilities now, not just ARC. (052)

Apply for everything. (214)

Local funds e.g. nursing funds + everything that moves. (286)

Moved from high profile grant bodies to any source of funds! (248)

Internal maintenance funds are now so limited that one broaden the scope of application types to maximise the possibility of getting something. (096)

Thus, a sizeable proportion of respondents had altered their types of external grants and priority areas in research in 1997 relative to 1986 and 1991. In addition, a majority of the respondents had significantly increased the quantity of and time spent on grant applications.
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Thus, a sizeable proportion of respondents had altered their types of external grants and priority areas in research in 1997 relative to 1986 and 1991. In addition, a majority of the respondents had significantly increased the quantity of and time spent on grant applications.
Supervision of Higher Degree Research Students

Having found earlier that the pressure to ensure minimum time completion for higher degree research students supervised had changed significantly in the period of 1997 relative to 1986, and the period of 1997 relative to 1991 (Table 10.4), and between these periods (Table 10.5), it was relevant to examine whether the approach to supervising these students had changed. A $\chi^2$ test of equality of the uniformity of the distribution across the four different categories of responses (from “a lot” to “not at all”), as elaborated earlier, showed no significant change for most of the participants’ (42 per cent) approach to supervision, as shown in Table 10.10. The same result was obtained when the responses for “a lot” and “quite a lot” were added together, and compared to “a little” and “not at all” categories, as displayed in Appendix 16. The proportion who had not altered their approach to supervision (82 per cent) was significantly more than those who changed (18 per cent). A possible explanation is that regular procedures were already in place before the introduction of this PI.

I think for quite long time, certainly before pre-Dawkins, we’ve always have fairly regular procedures. Meeting postgraduate research students once a fortnight and sometimes more frequently if necessary. And of course, when you get to the more intensive part of the research, writing up and so on, it can be much more intensive still with more frequent meetings. (057)

I wouldn’t say it’s changed. I always meet them once a fortnight anyway so it hasn’t changed my behaviour. (245)
I’ve always seen all my students once a week for an hour, and more often if they need to see me. (019)

In addition, it appeared that while the participants were aware of the need to pressure their postgraduate students to complete the research degrees in minimum time, it was unlikely that they would do it to the point where it severely disadvantaged the students. A respondent (067) said, “I stress the desirability of punctual completion, though I continue to place the onus on the student to organise her/his pace of work”, and another (168) stated, “I meet more frequently with my students. I would never do that to the point where it’s unfair to the students”. However, as it was determined that a change by ten percent of the respondents is regarded as significant (Appendix 17), a change in the approach to supervision by eighteen per cent of the academics would be significant.

The time involved in supervision had changed. It occurred over a shorter time period. The postgraduate students were made aware of their deadlines. Methods that had been used to achieve this included design of a time plan by the students, more contact with students, and frequent written submissions of work by students to their supervisors.

I think the role of the supervision hasn’t changed. I think basically the instructions to the students have changed. Basically you do the same things but they now have a fixed dateline. The interaction is just the same but they occur over a shorter span of time. (175)
More contact. More structuring of students’ timetable at outset. (011)

Spend a lot of time with them, plan well ahead, give them lots of ideas. (197)

I think it’s meant that you scrutinise their progress more closely. They’re not allowed to drift along. (032)

More concentrated supervision with earlier submission of draft chapters. (018)

Ask them to write up papers more frequently and getting thesis together. (026)

Table 10.10
Other research activities: Chi-square test results

<table>
<thead>
<tr>
<th>Sect. no.</th>
<th>Survey items</th>
<th>Frequency of responses (%)&lt;br&gt;(a)</th>
<th>χ²</th>
</tr>
</thead>
<tbody>
<tr>
<td>4C 2</td>
<td>This increased pressure affects the way I supervise my research students. (N = 88)</td>
<td>3 15 40 42 0</td>
<td>38.000***</td>
</tr>
<tr>
<td>2 5</td>
<td>My approach to research has changed now compared to:&lt;br&gt;(a) 1986 (N = 112)</td>
<td>23 40 22 9 6</td>
<td>23.648***</td>
</tr>
<tr>
<td></td>
<td>(b) 1991 (N = 138)</td>
<td>25 38 28 7 2</td>
<td>28.230***</td>
</tr>
<tr>
<td>2 6</td>
<td>My priorities between research and teaching have changed now compared to:&lt;br&gt;(a) 1986 (N = 115)</td>
<td>24 24 44 5 3</td>
<td>12.0267**</td>
</tr>
<tr>
<td></td>
<td>(b) 1991 (N = 145)</td>
<td>16 31 47 5 1</td>
<td>58.056***</td>
</tr>
</tbody>
</table>

(a) For the purpose of presenting the results in this table, for statement 2, 4=a lot, 3=quite a lot, 2=a little, 1=not at all. For statements 5-6, 4=strongly agree, 3=agree, 2=disagree, 1=strongly disagree.

Degrees of freedom, df for all statements = 3. * p < 0.05, ** p < 0.01, *** p < 0.001.

Although the changes to supervision of higher degree research students mentioned earlier appeared to be positive, there were also negative effects reported. There were a few academics who admitted to giving
their research students projects which were relatively easy to finish within a short time period. In the questionnaire, a respondent (025) admitted that his research students undertook “easier projects, less scope for lateral thinking”, another (128) gave his students “more specific research, applied, easier to finish on time”, and yet another (177) “concentrate on pragmatic issues - topic which can be managed in the time”. One respondent (036) said, “I am more mindful that they need to undertake projects that are achievable within three and half years”. The interviews uncovered similar practices by some academics.

The whole construction of our research projects and so on is designed so they pass more quickly. (007)

You are more likely to keep control as a supervisor rather than allow them to explore to quite the same extent. I think that’s the difference. When they choose their topic, you are more likely to channel them to a narrow field. And that’s because you know that it is more achievable. And the control is in terms of meeting them weekly, etc. (234)

To sum up, the results suggested that publications, external research grants applications, and higher degree research supervision had changed significantly for the academics. The types of publications and external research grants, as well as priority areas in research, had changed for a sizeable proportion of respondents in 1997 relative to 1986 and 1991. The time spent on these two activities and the quantity had significantly increased for a larger proportion of respondents.
Overall Approach to Research

The results presented earlier suggest that the approach to research had changed for a majority of the participants. This finding is further supported by the results in Table 10.10, and comments collected from both the questionnaires and interviews.

General change

The $\chi^2$ results from Table 10.10 suggested that most of respondents admitted that their approach to research had changed in 1997 compared to 1986 and 1991. Forty per cent of the respondents agreed that they had changed their approach to research in 1997 compared to 1986, with twenty-three per cent describing the degree of their agreement as strong. Similarly, when compared to 1991, thirty-eight per cent of the respondents were in agreement that they had changed their approach to research in 1997, with twenty-five per cent of the participants strongly agreeing with the statement. To reinforce the interpretation, the responses were dichotomised to combine the categories “strongly agree” and “agree” relative to “disagree” and “strongly disagree”. The results are shown in Appendix 18. Sixty-four per cent of the respondents agreed that their approach to research had changed in 1997 relative to 1986 while sixty-three per cent agreed that their approach to research had changed in 1997 compared to 1991.
Comments from the participants

Most of the comments received in this open-ended statement in the questionnaires, together with the results from interviews appeared to suggest that the approach to research had changed in favour of more publications and/or external research grant applications. A selection of the remarks made by the respondents are shown below.

Departments need academics to publish and get funds. (120)

I now publish more and get more grants. There is pressure to do it, it's all part of the game and important for the University. (077)

There is a much greater emphasis on applying for external fund as well as to publish. (011)
Publish or perish is the name of the game! No external grants -> limited funded activity for either staff or students in the lab. (211)

I am seeking quicker publishability. (017)

The comments from the interviews reflect an identical focus.

My approach to how I think of research has changed. It's much more strategic, and much less about what you're saying. I used to think it's about having an idea and talking about ideas. Now, it's about where you get the money from. (168)

I'm concentrating more on external research grants because only by external research, you can get funding. That's one way to get more funding and do more research, and that can produce more publications. (197)

My research now, I'm focusing on things that I can publish. I'm trying to do easy research that I could write papers on.
And I think if I can do that, I can get grants and things later on. (101)

I guess I’m less idealistic and have my behaviour as being shaped the way I was mentioning before in terms of thinking more about whether what I am doing is going to be publishable immediately rather than thinking about what I’m doing as something that’s very interesting in the long term... you tend to do things that you tend to break up into little packages so that you can publish it at different stages much more easily. So for no other reason than you need those publications every year. (013)

... before you used to do research that you thought was interesting, that you thought would be good whereas now you do research that you hope to get some money for. (196)

I have to say that I now think more in terms of fairly easy, quick publishable results than I have done in the past, about long term programmes that might bring out something of a real substance, real contribution, but which might not result in it being published for several years, and perhaps one paper in a good journal. Once upon a time, that will be enough to make your name around the place, and that’s all you needed. Now that only gives you one point... I’m about to work my butt off trying to apply for a large research grant, purely and simply because of the pressure from the university to do this. The importance is placed on large research grants because they are the ones that bring in the money from outside. (007)

Reasons for change in research approach

The reasons for the emphasis on publications and external research grants were primarily the incentives attached to these activities, in the form of funds and/or promotion. A typical comment was “It’s more external grants because you get more research index points and more notice is taken of that in terms of promotion” (290). This is in line with the
earlier significant association found between rewards and job activities in Table 10.1.

Another rationale for grant application was the need for funds. A respondent (051) pointed out that “External funds are necessary now that internal grants have dried up”. Other comments written in the questionnaire include “Although I already applied for (relatively small) grants in the late 1970s, the need to find additional finance for my department has induced me to apply for ever more and larger research grants” (055); and “Trying for external grants to fund research” (042).

It should be noted that some academics changed their approach to research to focus on publications and external research grant applications because of both personal interest and the incentive structure. Two typical comments are shown below.

I’m responding to pressure from University to some extent but also my personal goals have changed - as I become more confident and find areas that interest me and colleagues who share that interest, research is much more enjoyable and I can see the value in applying for external grants. (287)

I’ve moved to a place where I know I can get published readily. And I can get consultancies readily. I’ve moved out of the area I’ve started in. Not deliberately because I’m also interested in it but it’s also been part of the thinking. (168)
In summary, the findings on the research activities appeared to indicate that most of the participants had changed their approach to research. A sizeable proportion of them had changed their approach to higher degree research supervision, their types of publications and external research grants, as well as their priority areas in research in 1997 relative to 1986 and 1991. Overall, a majority of them tended to focus on research that could be easily published and/or that they could get funding for. In addition, most of the respondents devoted more time to publications and external research grant applications, and increased their quantity of publications and external research grants applications in 1997 compared to 1986 and 1991. Thus, the fifth hypothesis - the introduction of PIs is associated with a significant change in the approach to research by university academics - is supported.

The findings of the actual impact of the introduction of PIs on the work activities of the university academics presented so far cover paperwork load and approach to research. As another primary role of many university academics is to teach, the results on the approach to teaching will be presented in the next section.

Approach to Teaching

As in the previous two sections, analysis of the teaching activities involved a comparison of the change in activities (1) between 1997 and
1986, and between 1997 and 1991 (using a $\chi^2$ test), and (2) between these two periods (using a paired t-test). Where appropriate, the participants' comments are provided to support the statistical findings.

General change

A statement by statement analysis of the activities relating to teaching, from the General research and teaching activities and Specific teaching activities scales of the questionnaire are displayed in Table 10.11. As in the analysis of research activities, the results on teaching will first be on pressure, followed by the actual teaching activities.

The results in Table 10.11 indicated that pressures relating to teaching activities appeared to have increased. Over forty per cent of the respondents (section 3, statement 2) described the extent of the pressure from their institutions to teach more in 1997 relative to 1986 and 1991 as "increase a lot". When it comes to teaching better, the $\chi^2$ results were significant for the period of 1991-1997 but not for the period of 1986-1997. However, when the number of academics in the survey who responded with "a lot" or "quite a lot" were combined together, and compared to the number who indicated "a little" or "not at all", the results in Appendix 16 (Teaching section, statement 1) showed that about forty per cent of the respondents perceived a rise in pressure from their universities to teach better in 1997 relative to 1986 and 1991. As this
proportion was greater than ten per cent, the increase in pressure to teach better had been significant. Identical results were obtained when the responses for the other two statements - increase in pressure to teach employable skills and increase in pressure to pass coursework students - were dichotomised to combine the responses “a lot” and “quite a lot” relative to “a little” and “not at all”. These are found in Appendix 16 (Teaching section, statements 2 and 3). Approximately seventy per cent of the respondents believed that there was no rise in pressure to teach employable skills to students in 1997 compared to 1986 and 1991. A similar proportion was also convinced that the pressure to pass coursework students in minimum time had not increased over the same time periods. However, the approximate twenty per cent who did was sizeable enough (Appendix 17) to render the increase in these two pressures as significant.

When it came to teaching approach, a majority of the respondents reported no change in their approach. When the responses “a lot” and “quite a lot” were added together, and compared to “a little” and “not at all”, it was found that seventy-six per cent of the respondents did not perceive any change in their approach to teaching. This is displayed in Appendix 16 (Teaching section, statement 4). However, again based on Appendix 17, the remaining twenty-four per cent who perceived a change in their approach to teaching is sufficiently large to consider this change as significant. Thus the sixth hypothesis - the introduction of PI's
proportion was greater than ten per cent, the increase in pressure to teach better had been significant. Identical results were obtained when the responses for the other two statements - increase in pressure to teach employable skills and increase in pressure to pass coursework students - were dichotomised to combine the responses “a lot” and “quite a lot” relative to “a little” and “not at all”. These are found in Appendix 16 (Teaching section, statements 2 and 3). Approximately seventy per cent of the respondents believed that there was no rise in pressure to teach employable skills to students in 1997 compared to 1986 and 1991. A similar proportion was also convinced that the pressure to pass coursework students in minimum time had not increased over the same time periods. However, the approximate twenty per cent who did was sizeable enough (Appendix 17) to render the increase in these two pressures as significant.

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is not associated with significant change in the approach to teaching - is rejected. The reasons will be covered later in the section.

Table 10.11
Teaching activities: Chi-square test results

<table>
<thead>
<tr>
<th>Sect. no.</th>
<th>Survey items</th>
<th>Frequency of responses (%)</th>
<th>( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>3 2</td>
<td>The pressure from the University to teach more has increased or decreased now compared to:</td>
<td></td>
<td>(a)</td>
</tr>
<tr>
<td></td>
<td>(a) 1986 (N = 112)</td>
<td>47</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>(b) 1991 (N = 145)</td>
<td>41</td>
<td>35</td>
</tr>
<tr>
<td>6 1</td>
<td>The pressure from the University to teach better has increased now compared to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) 1986 (N = 114)</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>(b) 1991 (N = 146)</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td>6 2</td>
<td>The pressure from the University to ensure that I teach employable skills to my students has increased now compared to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) 1986 (N = 107)</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>(b) 1991 (N = 139)</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>6 3</td>
<td>The pressure from the University to ensure that the coursework students whom I teach pass within minimum time has increased now compared to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) 1986 (N = 113)</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>(b) 1991 (N = 142)</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>6 4</td>
<td>This increased pressure affects my approach to teaching. (N = 105)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>17</td>
<td>32</td>
</tr>
<tr>
<td>6 5</td>
<td>The number of student surveys carried out on my teaching (formal and otherwise) has increased or decreased now compared to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) 1986 (N = 105)</td>
<td>36</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>(b) 1991 (N = 140)</td>
<td>26</td>
<td>34</td>
</tr>
</tbody>
</table>

(a) For the purpose of presenting data using different scales on the same table, for statement 1-4 (section 6), 5=a lot, 4=quite a lot, 3=a little, 2=not at all, 1=don't know. For statements 2 (section 2) and 5 (section 6), 5=increase a lot, 4=increase a little, 3=no difference, 2=decrease a little, 1=decrease a lot. Degrees of freedom, df = 3 for statements 1-4. For statement 5, df = 4. * p < 0.05, ** p < 0.01, *** p < 0.001

Table 10.11 also showed that the quantity of student surveys on teaching used by most of the respondents (36 per cent) had “increased a
lot" in 1997 relative to 1986. A few academics in the study also stated that they were pressured to carry out student surveys on teaching. For instance, a respondent (096) pointed out that, "it is expected". An incentive for using teaching surveys seems to be for promotion. For example, an academic (097) said, "if you make an application for a promotion and you don’t have a teaching surveys test, then you’re severely disadvantaged, we’re told". However, when compared to 1991, most of the respondents (37 per cent) indicated no difference in the number of surveys used in 1997. It can be implied that few participants used teaching surveys in 1986. This explains the “increase a lot” in the quantity of surveys indicated by most of the respondents in 1997 when compared to 1986. By 1991, many of them had begun to carry out such surveys on their students. This could be the reason why most of them reported no difference in the quantity of surveys used in 1997 relative to 1991.

To make this finding and the above findings more concrete, the next step involved examining whether there was a difference in the comparison between the period of 1997 to 1986, and the period of 1997 to 1991, by means of a paired t-test. In this way, the question of whether the rate of increase and/or change in teaching activities had grown, slowed down, or reached its limits could be assessed.
Rate of change

The results in Table 10.12 showed two prominent characteristics. First, the mean values for pressure to teach more have remained almost similar between the two periods of 1986-1997 and 1991-1997. The implication is that there was no change in pressure to teach more between 1986 and 1991. In other words, this change in pressure had effectively been delayed until 1991. Second, although the values for other types of pressure and quantity of teaching surveys used had risen in the 1991-1997 period relative to the 1986-1997 period, the rise in the former period was not significantly higher than the latter period.
### Table 10.12
Teaching activities: Paired t-test between periods
(between 1997 compared to 1986, and 1997 compared to 1986)

<table>
<thead>
<tr>
<th>Sect.</th>
<th>No.</th>
<th>Survey items</th>
<th>N</th>
<th>Mean ± standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>The pressure from the University to teach more has increased or decreased now compared to</td>
<td>111</td>
<td>3.60 ± 0.98</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>The pressure from the University to teach better has increased now compared to</td>
<td>112</td>
<td>2.26 ± 1.05</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>The pressure from the University to ensure that I teach employable skills to my students has increased now compared to</td>
<td>98</td>
<td>1.78 ± 0.94</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>The pressure from the University to ensure that the coursework students whom I teach pass within minimum time has increased now compared to</td>
<td>103</td>
<td>1.83 ± 0.95</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>The number of student surveys carried out on my teaching (formal and otherwise) has increased or decreased now compared to</td>
<td>108</td>
<td>3.94 ± 0.87</td>
</tr>
</tbody>
</table>

*p < 0.05

Comments from the participants: Pressure and change in teaching

The results from the interviews also uncovered pressure to do more teaching. However, unlike research, a majority of the academics perceived the pressure as a result of teaching more students with staff loss and resource restraint, and not as a result of an introduction of any Pls for teaching or research.

The amount of teaching has been increasing because there are less people to do it, and less funds to do it with. (194)
The pressure to teach more has increased a lot because we’ve lost a lot of staff … there’s people teaching across four semesters. (286)

The pressure comes more from teaching more students with less resources. (307)

As mentioned earlier, the twenty-four per cent of respondents who indicated a change in their approach to teaching was determined to be significant. The change had been both positive and negative. Some participants had improved their teaching. They had mainly: (1) sharpened up their teaching objectives, or (2) put more care into transmission of knowledge - visual and print, or (3) consulted more with their students/tutors/peers.

The thing is that having these criteria makes one sharpen up one’s teaching objectives. (032)

I ‘sell’ my units more and am aware of working to keep the dynamics, pace and sense of relevance going well. (017)

I guess the thing that it makes me do is to talk to students a lot more about how they feel about the way we teach. (013)

We certainly put a lot more pastoral care into our teaching and efforts to pick up students who are having trouble earlier on to try to prevent them from failing. (024)

Those participants whose change in teaching approach were not so favourable mainly fell into two groups. One group was concerned about getting students through their courses without significant trauma, and this group also included those who had lower expectations for students.
Another group admitted to giving students what they want to avoid adverse evaluation.

I have a great concern that we’re lowering the standard to get them through. And we don’t like to rock the status quo to fail a student ... (286)

Back in 1988, the X Commission came through in this university and we got the highest failure rate in first year in any universities in Australia in Y. And they basically said, “You are not teaching properly”. Next year, our failure rate went from 23 per cent to 11, in one year. The Government basically said either pass these people or you’re going to get a penalty. No one wants to admit that they did it. And that’s the hard part. Everyone wants to say because we’ve suddenly become good teachers. 80

One of the things we’re trying to do is to make it as, not as easy as possible, but much easier for students to work through from first year through third year without too many failures and repetitions. (157)

Adjust level of teaching to group; generally lower standards and expectations. Teaching more “facts” and stuff rather than ways of thinking and critical evaluation. (068)

Range of student abilities is wider. This leads to a dilution of course material to ensure satisfactory pass rates. (095)

I really shouldn’t use the term spoon-feeding but there’re more hand-outs. Everything is spelt out very logically. (207)

I have not changed basic teaching but I need to assess less, teach fewer concepts, have lower ambitions for students. (167)

Content of the subjects is more influenced by what are perceived “immediate needs” and we accommodate lower levels of knowledge among students. (230)

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80 The name of the commission (X) and the discipline (Y), as well as the identification of the interviewee have been withheld for confidentiality purposes.
To give you an example, study guides are required now because students demand it. If you don’t provide study guides, you’re considered to be a poor lecturer. And the study guides have become thicker and thicker. That is because if one lecturer has provided the reading list, then you have to provide it as well. In the sense of not the references but for lecture one, you read pages one to nine of this text and this particular article... My study guide is thicker now. I put in a lot more materials because I’ve got students who like it. (034)

Thus, the results suggested that a possible rationale for the change in teaching approach is the teaching PIs, particularly student surveys on teaching. The comments listed above showed the participants’ concerns over getting as many students through their courses as possible, for instance by reducing the ambitions for students. It was earlier pointed out that a significant relationship existed between Teaching surveys (promotion) and Specific teaching activities scale (Table 10.1). The implication was that respondents who perceived a link between their university promotion system and favourable student surveys were likely to change their teaching activities. The results in Appendix 15(b) (statements 3) indicated that a sizeable half of the respondents believed that academics who received favourable student surveys had a better chance of being promoted. Although teaching surveys were not linked to allocation of institutional funding at the time of this survey, the fact that they were linked to the university promotion system appeared to be quite effective in terms of changing the academics’ approach to their work.

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81 One of the universities surveyed started internal funding based on selected teaching PIs in 1997.
Another possible reason for the change in the teaching approach is the increased pressure associated with the teaching PIs. The results in Table 10.11 showed that pressure to teach more, teach better, teach employable skills, and ensure minimum completion time for coursework students have all increased for a sizeable proportion of the respondents in 1997 relative to 1986 and 1991. Based on the pressure-effort graph (Figure 3.2) in X-efficiency theory, it is postulated that an increase in pressure applied to employees could increase their effort levels up to a certain point. It is thus possible that the rise in pressure associated with these teaching activities could encourage the respondents to change their approach to teaching towards increasing their performance on these activities.

To sum up, the pressures associated with teaching activities have increased for a sizeable proportion of respondents in 1997 compared to 1986 and 1991. The shift in the approach to teaching had also been significant. The participants who had improved their teaching approach discussed the positive results from their change, while those who had chosen to concentrate on pandering to students’ superficial needs, including having lower expectations for students, reported dissatisfaction with the change.
Impact of Performance Indicators on Research and Teaching

The results appeared to indicate that the introduction of PIs has been associated with a change in research and teaching. Although these shifts in research and teaching had been both positive and negative, a larger proportion of the respondents indicated a change in the negative direction. In addition, there were participants who did not appear to be affected by the introduction of PIs in terms of change in pressure and/or work activities. These findings from the questionnaires are supported by those from the interviews displayed in Table 10.13.
Table 10.13
Personal impact of PIs: Results from interviews

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>%</th>
<th>Examples of academics’ comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No impact</td>
<td>14</td>
<td>33</td>
<td>Whether the university wants me to teach better or not is going to make no difference. I’ll try my best. (101)</td>
</tr>
<tr>
<td>2. Positive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Teaching</td>
<td>6</td>
<td>14</td>
<td>I suppose the knowledge you are going to have SPOT test done tends to make you think about ways of improving your teaching. (053)</td>
</tr>
<tr>
<td>(b) Research</td>
<td>4</td>
<td>9</td>
<td>It certainly raised our research output. (245)</td>
</tr>
<tr>
<td>3. Negative</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Teaching</td>
<td>13</td>
<td>30</td>
<td>I have to simplify my offerings. (016)</td>
</tr>
<tr>
<td>(b) Research</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Publications</td>
<td>14</td>
<td>33</td>
<td>It has shifted towards the ones that score more points in the research index ... (024)</td>
</tr>
<tr>
<td>- External research grants</td>
<td>10</td>
<td>23</td>
<td>I’m applying for everything that moves. (286)</td>
</tr>
<tr>
<td>- Supervision of post-graduate research students</td>
<td>7</td>
<td>16</td>
<td>I guess I’m trying to give simple projects now. (101)</td>
</tr>
<tr>
<td>(c) Paperwork</td>
<td>11</td>
<td>26</td>
<td>It’s the time which is spent trying to just keep up with filling in the forms ... it’s a distraction. (123)</td>
</tr>
<tr>
<td>(d) Other</td>
<td>8</td>
<td>19</td>
<td>I’ve moved to a place where I know I can get published readily. And I can get consultancies readily. (168)</td>
</tr>
</tbody>
</table>

Number interviewed = 43

Having found that there was a significant change in research and teaching, the next step would be to determine whether the proportion who changed their research was significantly different from that who changed their teaching. This would be attempted in the next sub-section.
Changes in Research and Teaching: A Comparison

The results indicated that the proportion of respondents who had changed their research varied from those who had changed their teaching. This applies to both pressure and approach. Any differences in these proportions can be formalised. Using the formula in Appendix 19, it could be determined whether there was a significant difference in proportions between these two activities.

In Table 10.4 (section 3, statement 4), ninety and eighty-nine per cent of the respondents indicated an increase in pressure to do more research in 1997 relative to 1986 and 1991 respectively. In contrast, the proportions of respondents who reported a rise in pressure to do more teaching in 1997 relative to 1986 and 1991 were respectively seventy-four and seventy-six per cent (Table 10.11, section 3, statement 2). This is a difference in proportion of respondents between research and teaching of sixteen per cent in the 1986-1997 period, and thirteen per cent in the 1991-1997 period. Since these percentage differences were greater than 0.04 calculated in Appendix 19, the implication was that the proportion who perceived increased pressure to do more research was significantly higher than that who perceived increased pressure to do more teaching.
The survey also assessed pressures from more specific research and teaching activities. In Table 10.4 (section 4A, statement 1), seventy-two and seventy-three per cent of the respondents felt that pressure to publish had increased in 1997 relative to 1986 and 1991 respectively. In the same table (section 4B, statement 1), eighty-seven and eighty-five per cent believed that pressure to apply for external research grants had risen in the same two periods respectively. When it came to pressure to ensure minimum time completions for higher degree research students, the proportions were fifty and forty-seven per cent for the respective periods of 1986-1997 and 1991-1997 (Appendix 16, Higher degree research supervision section, statement 1). The proportions for teaching are found in Appendix 16 (Teaching section, statements 1 to 3). The proportions who reported increased pressure to teach better were thirty-nine and thirty-four per cent for the periods of 1997 compared to 1986 and 1991 respectively. In addition, the proportions who felt increased pressure to teach employable skills were twenty-three and twenty-two per cent in the same two respective periods. The proportions who perceived increased pressure to ensure minimum time completions for coursework students were twenty-one and twenty per cent in the same two periods. Based on Appendix 19, the proportion of respondents who perceived increased pressure in the above research activities was found to be significantly greater than that in teaching activities.
The proportion whose approach to research had changed was
determined to be significantly higher than that of teaching. Twenty-four
per cent of the respondents (Appendix 16, *Teaching* section, statement
4) admitted a change in their approach to teaching compared to sixty-
three per cent (Appendix 18, statement 5) who indicated a change in
their approach to research. Again, according to calculations from the
formula in Appendix 19, this difference is statistically significant.

The significant results obtained would, therefore, suggest that although
there had been a significant change in both research and teaching, the
proportion of respondents who changed their research was significantly
greater than those who changed their teaching, in terms of pressure and
approach. It appeared that the introduction of PIs did heighten pressure
for the academics to enhance their performance on the PIs. PIs also
seemed to influence the participants’ behaviour to increase their
performance on the PIs. The effectiveness of PIs in bringing about
change within the individual academics was shown to be successful
when they were adopted by the university, particularly into the university
promotion structure. An example would be student surveys on teaching.
However, the changes in behaviour as a result of the PIs appeared to be
further enhanced when linked to funding, as was the case for research
PIs but not teaching PIs.
Priorities Between Research and Teaching

Having found that the proportion of respondents who changed their research was significantly greater than those who changed their teaching, it is now relevant to examine whether the application of PIs has significantly altered their priorities between research and teaching. This is particularly important as the earlier results suggested that the extent of change in the participants' work activities were affected by the presence of extrinsic rewards, and most of them were convinced that research was rewarded over teaching. The results in Appendix 18 showed that for the proportion of respondents (48 per cent in 1986-1997 period, and 47 per cent in 1991-1997 period) who believed that their priorities between research and teaching had changed, there was almost the same proportion (49 per cent in 1997 relative to 1986, and 52 per cent in 1997 relative to 1991) who believed that their priorities had not changed. However, since forty-eight per cent is greater than ten per cent (Appendix 17), the proportion of respondents whose priorities between research and teaching had changed is significant.

Out of the fifty-seven respondents who provided reasons for their change in their priorities between research and teaching,\textsuperscript{82} seventy-five per cent of them said that they had shifted towards research because of

\textsuperscript{82} When the responses for the "agree" and "strongly agree" were grouped together for the question on a change in priority between research and teaching, a total of fifty-five academics agreed that their priorities had shifted for the period of 1997 compared to 1986. When compared to 1991, sixty-nine academics agreed that their priorities between research and teaching had changed in 1997.
the rewards attached. Typical comments included “The real situation is that research is rewarded and teaching is not” (239), and “In my own case, there’s been more and more pressure to get more involved in research because you’re not going to get any promotional development unless you do it” (196). An interviewee (125) said,

... they see where they get their brownie points and they work at it. That’s after all the basic psychological principle of rewarding someone. If that’s what you want people to do, that’s what you reward. And yes, if the more of that I’ve got to do, I do it for greater reward, I will drop off other things.

Indeed, some respondents admitted that their teaching had deteriorated.

Revision of teaching materials has had to decrease to keep up research + I have more research students now than in 1986 or 1991. (038)

Pressures to do research and obtain funding have reduced the attention given (and due) to teaching. Less time for preparation, marking, and personal involvement. (209)

Out of the group of respondents who had focused on research because of the rewards, two of them actually attributed their shift to their effort on retaining employment. “As a contract staff, I must be aware of strategies to keep or renew my contract” (293), and “to retain employment... Being a good teacher won’t be enough” (279).
On the other hand, there were some respondents who focused on research more than teaching for reasons other than, and in addition to, the rewards. They constituted nine per cent and four per cent respectively. The remarks included “More emphasis on research as my doctorate is completed and I have a more senior position in the teaching staff” (183), and “You need to balance your activities equally between teaching and research. As a university academic, you must contribute to conducting research to increase body of knowledge for your discipline” (262).

In contrast to the proportion of respondents who had shifted towards research, twelve per cent of the fifty-seven academics emphasised that their shift had been towards teaching. From the comments, it appeared that their shift was primarily due to external factors, such as change in job, or completion of research degrees: “I have changed job - and have moved more firmly into teaching” (006), and “I was a PhD student in 1986 and 1991, and so my priorities were research even though I was employed as a P-T lab demonstrator. Now my job is to co-ordinate lab classes” (111).

Thus, it appeared that the introduction of PIs had significantly altered the respondents' priorities between research and teaching. Academics whose priorities had shifted towards research were largely doing it for
the incentives, while those who leaned towards teaching tend to do so for reasons other than incentives, such as a change in position.

**Rationale for Some Academics not Changing**

Although a sizeable proportion of the participants showed changes in their research and teaching activities, there were some who resisted the pressures to change as a result of the introduction of PIs. These participants, it seems, responded differently from the majority, in that the application of PIs had no effect on their work activities. The comments derived from the questionnaires and interviews were used to provide some insight into the reasons for their absence of change in research and teaching. These reasons were found to be the intrinsic qualities of the individual academic (such as his/her interests), and the presence of external constraints.

One reason for the absence of a shift in the types of publications was because they had always been active researchers. In other words, their main vehicle of publications happened to generate relatively more points in the current university index (e.g., refereed journals, and book chapters), or they had more or less decided on their preferred main source of external funding. A respondent (025) specified in the questionnaire, "I always concentrate on refereed journals". Below are some remarks collected in the interviews.
No. I've been an active researcher all my life. I've published about 120 journal articles, about 60 conferences, book chapters, and books. (226)

No, it hasn't changed. My research has always been journal articles, book publications, and postgraduate students. It has always been that for the last 24 years. (016)

The lack of change in the categories of publications or grants could also be due to other personal factors, such as personal pride in their work, or their wish for personal development. A respondent (163) explained in the questionnaire, "I refuse to choose carrots even if it costs me". An interviewee (245) said,

If I'm asked to do something, whether it's refereed or not, I'll do it. I'm here to help the profession, and I'll do it whether or not they think it's a valid thing which often isn't a newsworthy stuff.

Similarly, the participants whose approach to teaching had not changed explained that they took pride in their teaching and had always put a great deal of effort into their teaching. Comments received included "it hasn't really affected my personal approach because I've always taken my teaching seriously. So I've always wanted to do as good a job as possible. That's been my aim" (194), and "It hasn't impacted me because I have certain personal pride in what I put out towards the students anyway" (238).
The participants who perceived no change in their priorities between research and teaching also mentioned about their enjoyment of research, teaching or both research and teaching. For instance, "Have always had a high priority for research" (141), "Has always been about 50 (teaching) - 30 (research) - 20 (administration/community service)" (307), and "I always believe teaching and research are both essential. You cannot have one without the other one. You have to be a good teacher. I have to be a reasonably good researcher to know the latest work" (197).

The external constraints which contributed to lack of change in the types of publications and external research grants included time, perceived lack of support from the institution, lack of PhD qualifications, or study commitments. Comments included "I refuse to apply (for external grants) considering the inability of the university to keep the budget, supply adequate staff, etc." (040), "I'm not trying for the ARC ones. Without a PhD, it's not worth it" (207), "totally concentrating on getting a PhD - no external grants or publications - no time" (190), and "I would like to (change the type of publications) but I haven't got the time" (225). The highly competitive environment in grant applications, in particular the national competitive grants, may also discourage any significant change in the types of grants applied. An interviewee (034) admitted that, "If opportunity exists, I would shift to applying to funding bodies like ARC
and NHMRC, and so on.” but he was aware that, “in research you
cannot be choosy because everybody is after funding”.

When it came to teaching, the participants indicated that their lack of
change in teaching approach was constrained by the perceived lack of
support from the university, including lack of rewards for teaching.
Comments included “People say teaching is important but they don’t
assist you in doing it” (044), “The University says it wants “better”
Teaching but takes away resources + wants more students/teacher”
(038), “Teaching more for less - a lot less” (275), and “More expressions
of importance but does not match the reality” (098).

It should be pointed out that there was another group of participants
whose main categories of publications have not changed but they
admitted to thinking or taking steps to shift their priorities towards those
that they perceived to be rewarded in the current index. A few of their
statements are presented below.

I know all of us now are getting things out that can be
refereed, that can have the university’s name on them
faster, and more frequently, and not necessarily as
thoughtfully. Now I’m not one of those people because I
don’t do a lot of that. But I know it’s inevitable, and I’ll have
to start to or I’ll start to look like I’m not performing on that
particular index. (168)

My main type of publications is still refereed international
journals. But I’m now starting to consider the first time in
my life, publishing in national journals. I haven’t yet but I’m
looking in doing that. I’m also looking at publishing in
journals that are second stream journals. I’m also looking
at journals which are supposedly refereed but which in fact you pay page costs. They are refereed in quotes but the point in fact, if you pay the page, they'll still publish anything. (007)

Recommendations on Performance Indicators

It arises naturally from this study to consider the perceptions of academics as to how the application of the current PIs in universities can be improved. Although this issue is not the main focus of the study, a question on this was asked in the interviews. Appendix 20 summarises the results collected from the interviews.

Conclusion

In summation, this study not only proves that the introduction of PIs, particularly their link to research funding, has witnessed changes at the university administration level, but that it has also had an impact on most university academics. The first five hypotheses for this study which have all been supported, are listed below.

H₁: PIs used by the Federal Government will be adopted by the universities.

H₂: The introduction of PIs by the Federal Government will encourage universities to place a high priority on the activities measured by the PIs.
H₃: The university academics in general have a negative attitude towards the PIs currently in use in their universities.

H₄: The introduction of PIs is associated with a significant increase in paperwork for the university academics.

H₅: The introduction of PIs is associated with a significant change in the approach to research by university academics.

The sixth hypothesis - The introduction of PIs is not associated with a significant change in the approach to teaching by university academics – was not supported. The results of the survey showed that although a majority of the academics had not changed their approach to teaching, the proportion who had was calculated to be sufficiently significant to reject this hypothesis. The main findings of this study, and conclusions drawn from these results, as well as their implications for the application of PIs are presented in the next chapter.
CHAPTER ELEVEN: SUMMARY AND CONCLUSIONS

Introduction

The main purpose of this study is to examine the consequences of the introduction of PIs on research and teaching in four different Australian tertiary institutions which are representative of the types of universities found in the Unified National System. This chapter provides a summary of the main findings of the study, and subsequently states the conclusions drawn from these findings. The final section of the chapter indicates the implications of the results of the study for the development and application of PIs in higher education.

Summary of Findings and Discussion

In their various higher education policies, both the past Labor Government (e.g., Dawkins, 1988) and the present Coalition Government (e.g., Kemp, 1998) focused on two central points. First, the Government does not believe in interfering with the internal management of the higher education institutions. Second, since these universities are primarily dependent on Federal funding, they should be accountable to external parties, such as the Federal Government and community. PIs, particularly based on outputs and outcomes, are then supported as the solution to these two concerns. PIs are postulated to be useful for accountability purposes, and it is claimed, that they can be
introduced without impinging on the universities' autonomy and internal management. Yet, the findings of this study showed that the internal policies and priorities of the universities were essentially a reflection of the Government's own initiatives (Chapter 8). The introduction of PIs by the Government has been replicated at the institutional level. The construction of the research PIs in the Government's Composite Index to distribute the Research Quantum saw the same set of PIs being applied by the universities to distribute a newly established internal research funding which is identical to the Research Quantum. Even the weights assigned to these PIs mainly mirror those of the Government. In addition, the institutions have been found to reorganise their internal policies to focus on the activities measured by these PIs. Indeed, whether intended or not, the introduction of PIs appeared to increase the Federal Government's control over the universities. These findings are supported by several Australian scholars. For example, Karmel (in Osmond, 1998) stated that the Federal Government influences universities' behaviour and outcomes to such a large extent that "the universities fell into line so rapidly in spite of their traditional assertions about university autonomy" (p. 3). Similarly, in its review of higher education financing and policy, the Government-appointed West Committee (1998, p. 82) reported that "each university's decision about resource allocation and quality are driven by government funding decisions". It went on to explain that the universities' financial dependence on the Federal Government means that "it is only natural
that they respond primarily to the signals and decisions of the central funding agency” (p. 82).

The survey of university academics uncovers eight important findings. First, a majority of the academics surveyed in the four universities have a negative attitude towards the PIs used in their institutions (Figure 9.1; and Appendix 13). In particular, they felt that the introduction of PIs has been accompanied by research being rewarded over teaching, in terms of promotion and funding (Appendix 15, statement 1; and Table 10.1). Second, most of the respondents perceived a link between research PIs - publications count, external research income, and higher degree research completions - and their university reward system. In contrast, the proportion who believed in the importance of teaching PIs - teaching surveys, graduate employment outcomes and coursework completions – in determining rewards were not significantly different from those who were not convinced. Thus, although a majority of the respondents perceived that their university reward system was tied to the PIs for research, the proportion who were convinced of the linkage to PIs for teaching was considerably less (Appendix 15). It should be pointed out that research has always been perceived by academics, in Australia and overseas, as being more rewarding than teaching, in terms of career and money (Sowell, 1990). However, the formation of a significant amount of PI-based funding for research with no comparable funding or amount for
teaching appears to make this perception of research being rewarded more than teaching more marked.

Although the introduction of PIs affected the respondents' approach to research and teaching differently, with some exhibiting no change whatsoever, while others reported positive or negative results, it was the unintended consequences that were prevalent. One of these is increased paperwork load. Therefore, the third result of the present study which should be emphasised is the significant rise in paperwork associated with research activities, particularly publications and external research grant applications (Figure 10.2; and Table 10.2). This finding of higher paperwork load supports the literature on the dysfunctional effects of the application of PIs in Chapter Two. In this study, the increase in paperwork was primarily due to the PIs themselves and duplication in reporting. This in turn created immense frustration among the respondents who felt that the increased paperwork load distracted them from their research and teaching. The implications of the rise in paperwork, and the rise in time spent on publications and external research grant applications on the quality of research and teaching, will be discussed in the next section.

A review of the unfavourable consequences of the introduction of PIs in Chapter Two also highlights the possibility of goal displacement (to focus on the activities measured by the PIs), and strategic work behaviour.
The findings in the present study confirm the literature. The fourth prominent result is that, for a majority of the respondents, the introduction of PIs has been associated with a significant change in their approach to research (Appendix 18). The main focus in research appear to be on publications and external research grant applications. These findings support other Australian studies (Harman and Wood, 1990; McInnis, 1992). In the present study, academics appeared to be under pressure from their universities to publish and apply for external research grants (Table 10.4). Their time devoted to publications and external research grant applications and their quantity of publications and external grant applications have significantly increased (Tables 10.6 and 10.8). In addition, the respondents appeared to be reaching their limits in terms of heightened pressure to publish and apply for grants and increased time spent on producing more publications and external research grants applications (Tables 10.5, 10.7, and 10.9). McInnis, Powles, and Anwyl (1994) have earlier suggested that the pressure to publish and research has intensified to unrealistic levels and expectations among Australian academics. This study confirms that finding. A sizeable proportion of the respondents’ approach to supervising higher degree research students have also changed (Appendix 16); this activity is found to occur over a shorter time period. To put it another way, good performance in research appears to be based on focusing on the activities measured in the Composite Index and increasing the quantity produced from these activities.
It should be pointed out that many of the respondents from the “newer” universities felt a marked rise in pressure to do research between 1986 and 1997. The reasons include the strong teaching traditions of the precursors of the new universities and their desire to compete with the “older” universities for research funds and prestige. This finding is supported by a earlier study by Moses (1992) who described the pressure faced by academic staff to obtain external research funds in some of the newer institutions as “oppressive”.

The practice of submitting multiple applications to various external research funding bodies is also revealed in this study. This recent trend of applying to a large number of research funding agencies with little hope of success was mentioned on several occasions (Quest for funds, 1996; Maslen, 1997). The main reasons given by the respondents also support the literature. The need for money in a climate of resource constraint, together with the prestige of winning external research funds (as the latter is one of the PIs in the Composite Index) contribute to a highly competitive environment for external grant applications.

The significant shift in the respondents’ approach to research, to the main activities measured by the research PIs has also involved the engagement in strategic behaviour. The concern shared by many respondents and scholars (Barnett, 1992; Cave, Hanney, and Kogan, 1991; Morrison, Magennis, and Carey, 1995) that the introduction of PIs
would motivate academics to engage in strategic work behaviour has actually been witnessed in the present study. For example, some respondents published shorter papers, and/or undertook research that is easily publishable in an effort to increase the number of publications.

The fifth major finding is the change in approach to teaching by a sizeable proportion of respondents (Appendix 16). Although there were some positive changes, like better transmission of knowledge, most of the changes had been negative, such as less assessment, and dilution of course materials.

The sixth significant observation in this survey is that although there were changes in both research and teaching, the proportion of respondents who changed their research was significantly greater than those who changed their teaching. Although a majority of the respondents felt an increase in pressure to do more research and teaching in 1997 compared to 1986 and 1991, the percentage in the former activity was greater than that in the latter activity. The same applies to pressure from specific research and teaching activities. A sizeable proportion reported a rise in pressure to teach better, teach employable skills, and ensure minimum completion time for their coursework students. However, a larger proportion complained about the increase in pressure to publish, apply for external research grants, and ensure minimum completion time for their supervised higher degree
research students. Similarly, sixty-three per cent indicated a change in their approach to research in contrast to twenty-four per cent who perceived a change in their approach to teaching. The fact that a larger proportion of respondents were convinced of the linkage between their university reward system and PIs for research than teaching could be one contributing factor for the difference in the change between research and teaching (Appendix 15). In particular, the presence of PI-based funding for research with no comparable one for teaching (including in terms of resources and prestige) may be associated with a smaller percentage of respondents who indicated an increase in pressure to improve their teaching performance and a change in their teaching approach.

This leads to the seventh significant result in this study of the association between rewards and behaviour (Table 10.1). The significant relationship between the Perceptions of university reward system scale and (1) the General research and teaching scale, and (2) the Specific research activities scale means that respondents who perceived a link between PIs for research and their university reward system were more likely to do more research and teaching, change their approach to research and their priorities between research and teaching, as well as increase their activities in publications and external research grant applications. Similarly, the significant relationship between Teaching surveys (promotion) and the Specific teaching activities scale means
that academics who thought teaching surveys were important in promotion were likely to change their approach to teaching, and increase the number of teaching surveys. It appears that the rewards associated with research PIs (promotion and funds) guided the respondents' behaviour in research activities, while the rewards associated with teaching surveys (promotion) influenced their behaviour in teaching activities. In other words, the respondents' behaviour in research and teaching seemed to be dependent upon the presence of rewards. On the other hand, those who showed no change in their research and/or teaching activities tended to be affected by factors other than extrinsic rewards, namely intrinsic rewards.

The eighth prominent finding is that almost half of the respondents indicated a change in their priorities between research and teaching (Appendix 18). Out of this, seventy-five per cent reported a shift towards research because of the rewards attached. It is likely that this group of academics believed that research was better rewarded than teaching. A few of the participants who chose to concentrate on research admitted that it was at the expense of teaching, and they resorted to strategic practices, such as employing research funds, to maintain minimum teaching responsibilities. The likely effects of this shift on teaching itself are discussed in the following section.
PLs have only been introduced into the Australian higher education system in recent years. The application of publications count, external research income, and number of higher degree research completions to determine the amount in the Research Quantum to be allocated to universities started in 1995. As this is less than five years between the period that PLs were applied, and the period that this survey was undertaken (1997), the effects of the introduction of PLs uncovered in this study are significant particularly when compared to the age of these four universities (which vary between 25 and 87 years).

Although there were some academics who were not affected one way or the other by the introduction of PLs, for most of the participants, the application of PLs has led to changes in their work behaviour. There were both positive and negative changes observed although the latter were more widespread than the former. An outcome of the establishment of PI-based funding for research reported in this study is the availability of funds for academics to carry out research, which is an advantage from the perspective of encouraging research. This is particularly effective for those academics who did not undertake research or did minimum research before the introduction of PLs. Participants who were active researchers before the introduction of PLs not only gained financially in terms of access to funds to carry out their research, but they also benefited from the recognition given to their work in research. Increase in research in this context essentially means
increasing the number of publications and external research grant applications. Another positive change in research for some participants is an improvement in supervision of higher degree research students - requiring the students to plan effectively (design of a time plan), and to submit their draft chapters frequently, as well as more contact with students - all in an effort to ensure completion within a shorter time period. When it comes to teaching, some participants have sharpened up their teaching skills in terms of better teaching objectives, better transmission of knowledge to students (both visual and print), and closer contact with students and tutors.

On the other hand, the negative effects of the introduction of PIs outnumbered the positive effects. One of these negative consequences is a change in the approach to research to focus on the three PIs of the Composite Index. Quantity appears to rule as most of the respondents strive to increase the number of their publications and external research grant applications. The respondents who admitted to a shift in their types of publications and external grants largely focused on those which were weighted highly by DEETYA. Furthermore, in a bid to maximise the number of points they could gain from their institutional PI-based research funding schemes, several of them have resorted to strategic behaviour, such as undertaking potential publishable research which could easily find a market, and giving higher degree research students the types of projects which could be completed within a short time.
period. Similarly, in teaching, in an effort to ensure a satisfactory pass rate, strategies used include lower expectations for students, dilution of course materials, and less assessment. The conclusions drawn from these findings are discussed in the following section.

Concluding Observations

The effectiveness of linking PIs to government funding in terms of the incorporation of these PIs into institutional policies has been highlighted in this study. The application of the fiscal federalism theory into this study has provided not only a clearer understanding of the introduction of PIs, but also a satisfactory explanation for the internal structural changes to the universities as a result of this introduction of PIs. In the fiscal federalism framework, it is postulated that the allocation of grants by the Federal Government is tied to the conditions set by the allocator. This methodology is proven here in that the receiver of grants (higher education institutions) have been found to conform to the desired priorities and goals of the provider (Federal Government). The methods and conditions set out by the Federal Government in the allocation of the Research Quantum, in particular, act as a powerful pressure and incentive for the universities as well as their academic members to comply with the demands of the Federal Government.
Similarly, the effectiveness of linking PIs to institutional reward system (promotion and funding) in terms of changing the behaviour of academics has been illustrated in this study. A significant proportion of the participants indicated that their approach to research and teaching have altered, particularly towards those activities counted in their institutional PI-based funding schemes. The application of job motivation theories on performance-contingent rewards has helped to clarify the significant association between institutional rewards and academics’ behaviour. On the other hand, the application of the literature on academic intrinsic job motivation has provided a satisfactory explanation for the lack of change in the work activities of a small proportion of academics.

More importantly, this study challenges the mainstream view of the development of PIs based on efficiency. A major flaw in the application of the neoclassical production function theorem in the development of PIs is the treatment of all production identities as homogenous. This has led to the treatment of labour as nothing more than a homogenous, numerical, and mechanical identity. This assumption of homogenous production identities is a faulty postulation due to the fact that no universities, disciplines, sub-disciplines, and academics are alike in all respects. For instance, the comments collected from the respondents

83 The significance of financial incentives in influencing institutional management has been reported in past studies (Marceau, 1993; OECD, 1990).
showed that the PIs in the Composite Index (including the categories of publications recognised by DEETYA) may not be suitable for all disciplines and even sub-disciplines because of their different research traditions and patterns. The outcome of the application of these PIs may well be standardisation in the operations and outcomes of the identities. As reported in the earlier section, all four universities surveyed were found to have established incentive funding for research which were identical to the Government’s Research Quantum, and based on an identical set of PIs, with more or less similar emphasis on the importance of these PIs. For the individual academic, research now literally means concentrating mainly on the quantity of publications and quantity and amount of external research grants. Since the universities and most of the academics surveyed were found to be focusing on maximising the number they could produce in these PIs, the term “diversity” in higher education as repeatedly found in higher education policies, and statements by past and present Ministers of DEETYA (Dawkins, 1987; Kemp, 1998) is disputable. This finding is supported in the recent West report (1998). In its review of higher education financing and policy, the West Committee (1998, p. 87) stated that “the current policy and funding framework provides little incentive for institutions to be different or to innovate”. Accordingly, if diversity is an important priority of the Government, the present finding of similarities in the institutions’ management of research and the academics’ work behaviour will call into question the Government’s achievement of
diversity. Therefore, the development of PIs based on neoclassical economics may not have generated the most efficient outcome because the assumption of homogenous production identity may encourage standardisation and discourage diversity and innovation in terms of operations and outcomes.

The attainment of efficiency can also be hindered by the time factor. As elaborated in Chapter Three, time is not taken into account in neoclassical economics. Thus, in the development of PIs based on neoclassical economics, time will not be taken into account. One of the findings in this study was that the amount of paperwork required of the respondents has increased significantly. Given the limited amount of time in a day that an academic has to carry out his/her tasks, this significant rise in the amount of time needed to do unproductive petty paperwork would result in significantly less time left for the generation of productive output, be it in research or teaching. Therefore, the introduction of PIs may not have improved academic efficiency in the ways which might have been expected.

In addition, the reported increase in the amount of time spent on publications and external research grant applications mean that the academic will have less time to do other work, on research itself, or in other activities, such as teaching. Less time devoted to these work activities might affect the quality of research and teaching. This is
because the current PIs for research and teaching examined do not reflect all the facets of research and teaching. In addition, Marginson (1993) has stated that although a focus on inputs and outputs enables the development of PIs (i.e., the Composite Index), "input-output analysis cannot produce a comprehensive description of all educational activity ..." (p. 90). It has been earlier discussed in Chapter Two (Table 2.2) that there are various possible ways to assess research performance. Therefore, an academic who devotes his/her time to increasing the number of publications, external research grant applications, and higher degree research students supervised may not necessarily be improving his/her quality of research.

Although a majority of the respondents did not perceive a fall in the quality of their publications, the fact that they were pressured to increase the number of their publications had induced several of them to resort to sacrificing quality for quantity, as revealed by the comments received in the questionnaires and interviews. This could, in the long term, affect the quality of publications produced by academics.

For almost half the respondents, the time factor could also unfavourably affect the quality of teaching as a result of the shift to research over teaching. More time devoted to research meant less time left for teaching or preparing teaching materials. In fact, some respondents revealed that they had either bought themselves out of teaching, or their
teaching had deteriorated because of their focus on research. The 1997 OECD report on Australian higher education system has indicated that the quality of teaching in undergraduate courses was affected by "the decline in unit resources and ... higher priority given by many academic staff to research over teaching" (p. 12). As one of the main functions of an institution of higher learning is teaching, one can question the effectiveness of PIs in terms of their long-term effects on the quality of teaching. In addition, among other things, the reputation of a university rests upon the quality of its outputs, be it in research or teaching. Since reputation influences the ability of the university to attract students and staff, a drop in teaching quality might contribute to a drop in the number of students. In the Australian context, a fall in student number may mean less income generation from full-fee paying students, particularly international students. Moreover, the quest for economic growth based on the concept of efficiency cannot be attained if the quality of teaching declines. This is because poor teaching quality can lead to a less knowledgeable pool of university graduates who will be less productive, resulting in lower economic growth (Lucas, 1988; Romer, 1989).

Quality has become particularly popular in the 1990s as a result of Government policies (see Chapter Four). This includes the quality of research and teaching (e.g., Kemp, 1997a). However, the direction of the findings in this study may run counter to the Government's goals. For instance, the fact that, as a matter of strategy, several respondents have
started to produce more but lower quality publications because of the pressure to publish, challenges the terms of “quality” and “efficiency” in education in the long run.

An alarming trend uncovered in this study is that, as a result of the introduction of the Composite Index, academics have been under intense pressure to conform to the priorities of their university administration which were essentially a reflection of the Federal Government. In particular, the pressures to publish and apply for external research grants among the respondents appeared to be reaching their limits. In his exposition of the X-efficiency theorem, Leibenstein (1976) strongly argued that an unnecessary high amount of pressure could lower the productivity of labour, as shown earlier in Figure 3.2 in Chapter Three. As the time spent and quantity of publications and external grants applications also appear to be reaching their limits, there is a likelihood that a further rise in pressure in these research activities will be counterproductive to both the universities and Government in terms of achievement of efficiency.

Furthermore, the practice of submitting multiple applications is likely to lead to “a greater number of applications to be processed than would otherwise would be the case” as was the case for the Large Australian Research Council Grants, (DEETYA, 1997b, p. 7). Based on an Australian Research Council commissioned report, this practice of
multiple applications would be a disadvantage as the Australian Research Council lacked sufficient administrative support including enough assessors from the Humanities discipline (Osmond, 1997). Therefore, it seems that the increase in quantity of external research grant applications may require considerable time, effort, and cost for both the applicant as well as the external research funding body concerned. This, again, is unlikely to be desirable for the higher education system from an efficiency point of view.

It is generally accepted that a theory should be judged by its usefulness. Applying this criterion, it is not difficult to reach the verdict that the current approach used to develop the PIs which is examined in this study has failed to totally achieve its goals in that there have been negative unintended consequences.

In the current economic and political climate, it is most unlikely that the role of PI will be diminished. On the contrary, it is likely that its application will increase, primarily because it is easier to be seemingly objective rather than subjective. Therefore, to the degree that PIs are generating dysfunctional behaviour, to that degree they need to be modified and improved. The implications for the development and application of PIs are covered in the following section.
Implications for the Development and Application of Performance Indicators

A major finding in this study was the perception by many respondents that research was provided with recognition in their universities, but teaching was either not provided with sufficient recognition or with no recognition at all. The Teaching Excellence Awards found in many Australian universities and the recent introduction of the Australian Awards for University Teaching by the Coalition Government (Kemp, 1997a) are both relatively small in terms of monetary gains, and limited to a few academic staff. On the other hand, the amount set aside for the internal PI-based funding for research in many universities are relatively large as they are derived from the Government's Research Quantum and Research Infrastructure Block Grant. In addition, the internal PI-based research funding schemes in many institutions are developed in such a way that any academic staff member can have access to it as long as they meet the criteria, ie. they publish, receive external research grants, and/or supervise students who have completed their postgraduate research degrees. Although any member of academic staff can apply for the teaching awards, in the end, these awards are given to a selected few. Duhs (1992, p. 11) had earlier clarified that the inability of the introduction of teaching award to stimulate improvement in
teaching quality "is attributable simply to the fact that the awards to
individual staff are both small and improbable." 84

Although some extrinsic rewards are required to sustain academic
motivation (Moses, 1995), this study does not suggest in any way that
an increase in extrinsic rewards will motivate academic staff to teach
better. Indeed, there are several researchers who rejected this view
(McKeachie, 1979; Ramsden, 1992). Moreover, the finding from this
study is that institutional rewards influence work behaviour, ie. rewards
cause a change in research and teaching. This is different from an
improvement in research and teaching. Improvement may require
increased support. This is consistent with an earlier survey on Australian
academics by Gough, Taylor, and Bundrock (in Maslen, 1997). Similarly,
the former head of the Higher Education Council, Gordon Stanley, had
stated that although universities have progressively specified what is
required in terms of performance by their academic staff, they have not
put "nearly enough effort into what enables such performance to occur"
(de la Harpe, 1995, p. 3). Thus, an improvement to teaching is
dependent upon not only the availability of human and financial
resources to enable staff to perform to their maximum ability, but more
importantly, it relies on a shift in attitude towards recognition of good
teaching at all levels of the higher education system. The latter includes

84 McNaught and Anwyl (1993) provide a comprehensive coverage of the problems
associated with teaching excellence awards.
"a change in attitude towards recognition of the professional teacher's role in higher education and an understanding that teaching can be a challenging and satisfying activity" (Ramsden, 1992, p. 253).

As indicated earlier, the introduction of PIs based on the neoclassical paradigm has contributed to the collection of data that are liable to significant errors because individual human behaviour was never taken into account. As the behaviour of academics is central to the university, it is necessary to take account of all aspects of their behaviour in developing PIs. Centrally, PIs are very powerful in generating effects.

The development of an improved set of PIs should seek participation from university academics. A majority of the participants complained that the PIs were not representative of the work that they did. For instance, the PIs failed to take into account the qualitative aspects of performance and environmental factors, such as the discipline. This prompted a large proportion of the interviewees to recommend for the development of a better set of PIs which takes into consideration these moderating factors, in consultation with them (Appendix 20). Since its establishment, the Composite Index has been attacked on numerous occasions by Australian scholars and Government-appointed committees (Harman, 1998; Review Committee, 1998). The literature on PIs also indicates that the application of PIs should involve a continuous assessment and improvement of the PI system (Posner and Rothstein, 1994). Since its
establishment in 1995, the PIs in the Composite Index have remained unchanged. Even their weightings by DEETYA have stayed constant since 1996. Perhaps then, it is time for the design of a better set of PIs for higher education with active participation by the people responsible for determining the outputs of these institutions, and who are affected by the application of these PIs - the academic staff. This process is likely to be costly and time-consuming. Nonetheless, if the Federal Government truly believes that "people are our most important asset" (Management Advisory Board and Management Improvement Advisory Committee, 1994, p. 3), and wants to be the "clever country" in order to be internationally competitive, it should seek input from university academics at all stages of the development and implementation of the PI system.

A potential risk witnessed in this study is that the application of PIs for research and teaching can promote a set of superficial criteria for these work activities. Regardless of rank, it is highly likely that academics are at various levels of competence in the different facets of their work, whether this is research or teaching. Thus, the challenge for the development of PIs is to avoid a focus on specific areas (such as quantity over quality, or research over teaching), or to some absolute standards. The application of PIs should instead bring about change within the individual academics to acquire new skills and perspectives about their research and teaching. Therefore, the development of PIs
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should not occur in a vacuum. As indicated earlier, the development of PIs should involve university academics. There should also be a commitment from the Government and the institutions to provide support and resources for innovations in research and teaching. This will include creating a culture that sees both research and teaching as integral and valued parts of academic life (McNaught and Anwyl, 1993).

Although the results of this study show that PIs have their limitations and can be potentially exploited for adversarial purposes, given the current climate of a fascination with performance measurement, to call for an end to the use of PIs is not warranted or possible. This has been pointed out by Hattie (1990, p. 249-250):

... if we do not, as educationalists, enter into this debate very quickly to make sure that the performance indicators are not only appropriate, but are used in an appropriate way, then the government is going to make these decisions for us. We could debate the beauties and disasters of performance indicators for hours, but while we do this, the government is merrily introducing the scheme... It is obviously too late to argue that the discussion of performance indicators should not have started in the first place but we can change the game by arguing for more appropriate performance indicators to evaluate departments. The march towards performance indicators has begun and although there is little evidence to suggest that a blockade will stop that march, we may be able to deflect it down a different path and make it respond to our drumbeat.

This was followed by a suggestion by Ranson and Stewart (1994, p. 231) to use PIs: "...but not placing complete reliance on them, rather seeing them as one means of informing and judging". Therefore, the art
in assessing performance by PIs actually lies in knowing when to allow
the PIs to supplement the monitoring of the performance of universities,
and thereby enhancing research and teaching in these institutions, and
when to oppose the PIs because they detract from the attainment of
research and teaching of the highest quality.
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APPENDICES
Appendix 1

Federal funding in the Unified National System

Educational Profile

Since 1990, educational profile-based funding arrangements are applied solely to members of the Unified National System. The governing council of every university under the Unified National System is now required to develop an educational profile which determines its broad policy framework for its major areas of activity. The educational profile consists of: (1) a statistical return covering teaching activities and student load, (2) a quality improvement plan, (3) an equity plan, (4) an Aboriginal and Torres Strait Islander education strategy, and (5) a capital management plan (Commonwealth of Australia, 1997). Since Higher Education: A Policy Statement (Dawkins, 1988), universities are also required to submit research management plan, and teaching plan. The research management plan outlines the institution's research strategy, such as the institution's mission and goals for research, and the internal funding arrangements and activities to support and encourage research. The teaching component of the profile include the expected teaching activities to be undertaken by the institution, such as the student load and commencements. In this way, the educational profile is used to determine the performance of the institution. The
educational profile is also used to ascertain the amount of the annual block operating grants received by the universities from the Federal Government.

**Operating grants**

Under the Higher Education Funding Act 1988, block operating grants are provided to public tertiary institutions annually on a continuous triennial basis, for a specified student load, and in the interest of an agreed educational profile between the Federal Government and the university concerned. The amount for 1997 was $4.8 billion (DEETYA, 1998). The block operating grant is made up of 4 components.

(1) The teaching component forms the bulk of the operating grant, and is largely based on student load. It supports expenditure on activities such as academic and general salaries, minor capital works, and non-salary items related to teaching (e.g., libraries). In 1997, it was around $4.3 billion, which was 89.6 per cent of the operating grant.

(2) The research component, or more appropriately the Research Quantum (RQ). It is to fund research activities and infrastructure not associated with teaching activities and research training. In 1995, the composite index (CI) of the RQ was designed by a working party comprising of representatives from the Australian Vice-Chancellors
Committee, Department of Employment, Education, and Training, Australian Research Council, and Higher Education Council, replacing the former competitive grants index which was based on success in winning Federal research grants (Industry Commission, 1995). The formula added research output indicators (publications and higher degree completion) to the input indicators (national competitive research grants). In addition the latter measures were extended to include Other public sector research funding, such as the State government, and Industry and other funding for research.

### Table A.1


<table>
<thead>
<tr>
<th>Year</th>
<th>Input indicators</th>
<th>Output indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>National competitive grants ($)</td>
<td>Other public sector grants ($)</td>
</tr>
<tr>
<td>1995</td>
<td>75%</td>
<td>5%</td>
</tr>
<tr>
<td>1996</td>
<td>-----------</td>
<td>82.5%*</td>
</tr>
<tr>
<td>1997</td>
<td>-----------</td>
<td>82.5%*</td>
</tr>
<tr>
<td>1998</td>
<td>-----------</td>
<td>82.5%*</td>
</tr>
</tbody>
</table>

Sources: Murdoch University, 1995; University of Western Australia, 1998.

* Instead of separate percentages of weightings for the different categories of input indicators, the National competitive grants (NCGs), Other public sector grants, and Industry and other funding were weighted 2.5, 1, and 1 respectively within the single assigned value. In 1997, the weighting for NCG was decreased to 2.

Controlled entity funding was included in Other public sector research funding and Industry and other funding categories in 1997 with a
weighting of 50%, increasing to 100% in 1998. Syndicated Research
and Development funding in the CI was introduced at 50% value in
1997, and 100% from 1998.

Under normal circumstances, the data on the indicators were based
on the past two to three years. As an example, the determination of
the 1996 allocation of the Research Quantum was based on the data
for 1993 and 1994. However, due to the high error rate in the 1994
publications data (Illying, 1996), the 1997 Research Quantum
allocation used 1994 and 1995 financial and completions data but
only 1995 publications data (University of Western Australia, 1998). In
1997, the Research Quantum constituted $222 million, which was
about 4.6 per cent of the block operating grant (Commonwealth of
Australia, 1998).

(3) The capital component is used to support funding for minor capital
works, including maintenance and refurbishment of existing
infrastructure. In 1997, the amount spent by DEETYA was $261
million (Commonwealth of Australia, 1998), which was 5.4 per cent of
the operating grant.

(4) The Aboriginal support component provides funding to institutions
for support services for Aboriginal students and Torres Strait Islander
students.
Other National Competitive Grants

In addition to the operating grants, the universities also receive other Federal funds for research and teaching. This “dual funding system” for research originates in 1965 with the establishment of the Australian Research Grants Committee (Industry Commission, 1994).¹ According to the Senate Standing Committee on Employment, Education and Training (1994), there are over forty Federal targeted schemes and about seventy-eight nationally competitive schemes for research in Australia. The largest of these are the Australian Research Council (ARC) and the National Health and Medical Research Council (NHMRC). The ARC was set up in 1988 to replace the Australian Research Grants Committee in response to Dawkins’ (1988) *Higher Education: A Policy Statement*. It provides grants to individual researchers and groups of researchers across all disciplines except in clinical medicine and dentistry (which are funded through the NHMRC). The Research Infrastructure Block Grants is an example of the research funds provided by the ARC.² The funding for the ARC was provided by a “clawback” of Aust$5 million in 1988 (Dawkins, 1990) Thus, when it comes to research, while a substantial

¹ The Australian Research Grants Committee was established as a result of the Martin Report (1984). The Australian Research Grants Committee concentrated on pure basic research, and assessment was based on peer review.

² The allocation of Research Infrastructure Block Grants is based on institutional success in winning national competitive grants.
proportion of institutional funds is derived from the Research Quantum and research training components of the basic operating grants, specific Federal research support can be obtained from the ARC and other national granting bodies.

The dual funding for teaching began in 1992 with the formation of Committee for the Advancement of University Teaching (CAUT). The purpose of CAUT was to promote good practice and innovation in teaching. The 1993 National Teaching Development Grant was set up to support teaching development projects that will lead to improvements in teaching, learning and assessment within the university sector (Baldwin, 1992). In 1996, the Committee for University and Staff Development (CUTSD) was set up to replace CAUT and Commonwealth Staff Development Fund (Osmond, 1996). It was the Federal Government's intention for CUTSD "... to identify and promote good teaching, learning and staff development practices and foster innovation in these areas" (Vanstone, 1996, p. 14). The competitive awards are provided to individuals as well as groups of academic and administrative university staff.
Appendix 2

Details and Limitations of Selected Performance Indicators for Research and Teaching

Publication count
Details - Two types: (1) straight count involves counting the number of publications, & (2) weighted count deals with counting the number of publications using a weighted scale for different types of publications.

Limitations - (1) Subject to individual factors (e.g., reputation of author), & environmental factors (e.g., amount of resources).
(2) Different disciplines have different publishing modes (Cave, Kogan, and Hanney, 1991; Ramsden, 1994).
(3) Difficulty in deciding on the types of publications to include. Given (2), the inclusion or exclusion of certain types of publications may work against certain disciplines.
(4) Problem with devising a satisfactory weighting scheme for the different types of publications.
(5) No differentiation among the publications for quality or significance.
(6) Neglect the length of publication, thus encouraging the publication of short articles in an attempt to maximise research output (Creswell, 1985; Johnes and Taylor, 1990).

Research Income
Details - DEETYA distinguishes the amount received among different sources of income, namely from national competitive schemes (such as, ARC), the industry, and other public sectors (such as, the state governments). Research income is easily available, comprehensible and measurable.
In comparison to publication count which has a time lag between completion of work and its appearance on a paper, research income is said to provide a more up-to-date picture of the research output of departments (Webster, 1981).

Limitations - (1) Subject to moderating factors, such as age of institution.
(2) Different disciplines vary in their requirements for research funds (Johnes and Taylor, 1990; Smith, 1987; West, Hore, and Boon, 1980). For instance, natural and engineering sciences tend to have higher average grants than the humanities or social sciences (DEET, 1992). Some grant schemes are aimed
Research Income (cont.)

at specific disciplines. Universities with medical and dental schools have a higher chance of winning funds from NHMRC
than other universities (CQAHE, 1995). Professor Andrew Glenn
(1998, p. 26), the Pro Vice-Chancellor (Research) in Murdoch
University, explained that, "since fundings attracted by medical
schools can constitute 35 to 50 per cent of total university
research funds, this can have significant impacts on per-capita
research funding".

(3) Research income has been criticised to be a poor reflection
of research output, based on three main reasons:
(a) Research income is an input, not an output of research
(Cave and Hanney, 1990; Harris, 1989; Smith 1987). On that
basis, the sole reliance on it as a measure of research output is
misleading. In contrast, Cave, Hanney and Kogan (1991) have
argued that because research income is an input into the
research production process, it should be taken into
consideration in the evaluation of research productivity. In other
words, when viewed as an additional input into universities or
departments, research income should be reflected in higher
output.
(b) Like publication count, research income has been argued to
bear no significant correlation with the quality (or even the
quantity) of research produced from that income (Johnes and
Taylor, 1990; Smith, 1987).
(c) Some authors, such as Cave, Kogan and Hanney (1991)
have questioned whether the market value of research is a true
measure of its value. While the capacity to win grants,
particularly in obtaining "repeat purchases", could be taken as a
sign of success in the market place (Cave, Hanney, and Kogan,
1991)\(^3\), research is argued to be a public good, that is, its
benefits are not limited to the funding bodies but to the public as
well (Johnes and Taylor, 1990).
(4) May signify the university's ability to respond to government's
priorities, rather than its achievement of high research
productivity. Governments, including the Australian Government
have their own priorities for the higher education sector. West,
Hore, and Boon (1980, p. 33) had maintained that, "grant giving
bodies have their own priorities, so that some fields attract more
grants for reasons such as perceived social worth, etc, that are
not related to research itself".

\(^3\) If the allocation of funds is regarded as a result of competition among universities
or departments in the marketplace for research grants, then the allocation of
research income may be viewed as a measure of market share (Cave, Hanney, and
Completion rates

Limitations - (1) Subject to moderating factors: (a) individual factors, such as student’s health, (b) university-related factors, such as student-staff ratio and length of course. A high student-staff ratio was suggested to increase the risk of a lower completion rate because less personal supervision are available to students. A course with a longer duration has also been expected to decrease completion rate because of the greater likelihood that a problem would arise with time (Johnes and Taylor, 1990). (2) The interpretation of higher degree research completions is problematic as the number of higher degree research students are often not large in many institutions. The results will be highly sensitive to, and easily distorted by, extreme individual cases.

Student evaluation of teaching

Details - “Student evaluation of teaching is the most direct way in which teaching can be evaluated” (Cave, Hanney, and Kogan, 1991, p. 104). Students’ ratings on teaching were reported to correlate well with: (a) the quality of student learning (Entwistle and Tait, 1990; Ramsden, Martin, and Bowden, 1989), (b) the ratings of lecturers (Marsh, 1987; Murray, 1984), and (c) the ratings of graduates (Eley and Thomson, 1993; Ramsden, 1991), as well as (d) are valid and reliable (Marsh, 1987).

Limitations - (1) There is no consensus on a clear and specific criterion of effective or good teaching. Teaching is believed to be a complex activity (Lally and Myhill, 1994; Marsh, 1987; Marsh and Roche, 1994). (2) Subject to moderating factors: individual and environmental.

Employment outcomes of graduates

Details - The Graduate Destination Survey is carried out by the Graduate Career Council of Australia annually to monitor the employment status of recent graduates in Australian universities. It also takes into account the proportion of graduates who goes on to undertake full-time studies.

Limitations - (1) Subject to moderating factors. The employment status of a graduate can be due to factors not associated with the quality of teaching received earlier (Johnes and Taylor, 1990). The employment rate of graduates is sensitive to: (a) the subject mix of the graduates (DEET, 1993c; Johnes and Taylor, 1990). DEET (1993c, 1996b) reported that a greater proportion of graduates from health and science found full-time employment compared to those from other disciplines;
Employment outcomes of graduates (cont/)

(b) the sub-fields and level of course. In the fields of Arts, Humanities, and Social Sciences, the employment rates of graduates range from forty per cent in the Visual and Performing Arts, to seventy-six per cent in Social Work, Counselling, and Religion and Theology (DEET, 1993c). Graduates with honours bachelor degrees or postgraduate qualifications experienced a higher employment rate than graduates with lesser qualifications (DEET, 1993c; DEET, 1996b);

(c) economic trends. The economic recession in Australia has been reported to affect the employment rates of graduates (DEET, 1996b);

(d) regional labour market conditions. In 1991, the employment options for graduates were poorer in the states of Victoria and South Australia than those in other Australian states (DEET, 1993c); and

(e) the employment status of the student before graduation. Students in full-time employment during their final year of study are more likely to be employed at the time of survey than those who were not employed at their final year of study (DEET, 1996b).

(2) Variation in the response rates from the universities can pose a problem.
# Appendix 3

**Chronology of key events and Federal reports on Australian higher education system: The move to performance indicators**

## A. Forties to the sixties

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1940+</td>
<td>Some Federal funding, war-related. Federal's interest in higher education commenced after World War II. The aid provided was primarily given to assist tertiary education institutions to enrol large numbers of returned service personnel (Karmel, 1988; Smart, 1990). The period from mid-forties to the end of the decade signalled the first phase of post-war expansion of higher education, in size and number (DEET, 1993a).</td>
</tr>
<tr>
<td>1951</td>
<td>Under the terms of the States Grants (Universities) Act, the Federal Government provided 25% of the recurrent funds to universities. The State Government was still the main source of funds for universities.</td>
</tr>
<tr>
<td>1952</td>
<td>Crisis in finance of Australian universities. Funds were eroded by salary increases and inflation (DEET, 1993a). The Australian Vice-Chancellors Committee called for a national inquiry into the state of universities.</td>
</tr>
<tr>
<td>1958</td>
<td>The Murray Committee (1957) indicated that the Federal Government's involvement in higher education is necessary and vital for the upgrading and expansion of tertiary education (Lindsay, 1982). The recommendations include the Federal Government's assistance to the States in financing the universities by a system of matching grants, and expansion of the higher education system under the direction of the Australian Universities Commission, a statutory body set up to advise the government on university matters.</td>
</tr>
<tr>
<td>1965</td>
<td>The release of the Martin Report by the Committee on the Future of Tertiary Education in Australia led to the creation of the binary system of higher education. It was envisaged that the Australian higher education system would be diversified through the establishment of colleges of advanced education offering sub-degree courses with strong technological and vocational emphasis. Colleges of advanced education would only have a teaching mission and thus funded accordingly while the universities were funded for both teaching and research. This diversification managed to contain costs in the</td>
</tr>
</tbody>
</table>
wake of higher education expansion; the colleges of advanced education were funded one third less than the universities (Mahony, 1990). The Committee also observed little improvement in teaching methods, and stressed the importance of better assessment methods for teaching in the application for new positions and promotion for academic staff.

1967
Third phase of post-war expansion of higher education, mainly in advanced education sector. Lasted until 1977/78 (DEET, 1993a).

B. The seventies


1976 Compared to 1975, there was a reduction in total Federal grants for higher education. Lasted for over a decade (DEET, 1993a).

1977 Federal Government introduced rolling triennial funding in a bid to closer control expenditure (DEET, 1993a).

The Australian University Commission, Australian Commission of Advanced Education, and Technical Advanced Education Commission combined to form the Tertiary Education Commission (TEC) which was responsible for all higher education funding. TEC became Commonwealth Tertiary Education Commission (CTEC) in 1981.

1979 In Education, Training and Employment: Report of the Committee of Inquiry into Education and Training, the Williams Committee reported on the deficiencies in university management and the poor state of information gathered. The Committee pointed out the importance of adequate and reliable information for decision-making by governing bodies. The need for more extensive and rigorous evaluation of institutional performance (both internal and external) was also identified.

CTEC established the Evaluations and Investigations Program to promote a climate of critical self-assessment across the higher education system and within institutions.
C. The eighties

1981 In answer to the Williams Committee's request to improve the quality of teaching, the Academic Development: Report of AVCC Working Party was released. The recommendations included formalised systems of evaluating teaching (as part of a formal program for regularly evaluating performance), and the incorporation of teaching into the incentive or reward structure to encourage effective academic staff performance.

In its Report for Triennium 1982-1984, CTEC advocated the concentration of research funds in universities on individuals and groups of researchers of high quality. It went on to suggest the establishment of directly funded Special Research Centres, ten of which were formed in 1982 (Allen, 1988).

1982 In Report on Tenure of Academics, the Senate Standing Committee on Education and the Arts repeated AVCC's call for formalised evaluation of teaching, and urged the adoption of periodic reviews of individual academic performance.

1984 In Report of a Study Group on the Measurement of Quality and Efficiency in Australian Higher Education, Linke et al. explored the concept of educational efficiency to some detail. A range of criteria which could be used as indicators of quality and efficiency was proposed.

1986 CTEC introduced the discipline assessment program in the Evaluations and Investigations Program to seek ways to improve efficiency and quality, including areas where waste of resources could be avoided.

Two of CTEC's reports pointed out the inadequacies of evaluation procedures in higher education: Review of Efficiency and Effectiveness in Higher Education and Quality Measures in Universities. Both reports supported the implementation of procedures for systematic and regular evaluation of quality and performance. In the former report, the Hudson Committee (CTEC, 1986) supported "... the development of improvement in arrangements for monitoring and distributing research funds according to performance and effectiveness in research" (p. 8), and "... the establishment in all higher education institutions of schemes for regular assessment of performance of staff members " (p. 180). The former report proposed that the Federal should "... take the initiative to establish a national centre for the collection and dissemination of tertiary education statistics as a matter of
priority" (CTEC, 1986, p. 267). Performance indicators were covered in both reports, including examples of four types of performance indicators: internal, external, operating, and those related to research (produced by IMHE of the OECD).

In *Departmental Reviews in Higher Education Institutions*, amongst other things, Moses and Roe attempted to evaluate the efficiency and effectiveness of the reviews. The researchers elaborated on the possible misuse of performance indicators as well as their benefits. From this CTEC-funded study, they drew up a list of possible quantitative and qualitative performance indicators covering six areas: general and contextual, quality of research performance, quality of teaching performance, quality of organisation or administration of department, and quality of contribution to community and to profession.

1987

Establishment of Department of Employment, Education and Training (DEET), responsible for programs for higher education. DEET became DEETYA (Department of Employment, Education, Training, and Youth Affairs) in 1996.

CTEC was disbanded, and replaced by National Board of Employment, Education and Training (NBEET). NBEET acts in advisory capacity to the Federal on the total spectrum of employment, education and training issues. It is supported by four councils: the Australian Research Council, the Higher Education Council, the Schools Commission, and the Employment and Skills Formation Council.

Release of *Higher Education: A Policy Discussion Paper* (Dawkins, 1987). The Federal Government indicated its intention to develop a comprehensive and nationally consistent statistical base of higher education, as well as incorporate performance indicators into the higher education funding system.

1988

In the report, *Setting the Course: Inquiry into the Efficiency and Effectiveness of Institutional Practices in the Higher Education Sector*, the House of Representatives Standing Committee on Employment, Education and Training reported that despite reservations about the way in which performance indicators might be used, and the effort required to construct them, including warnings against their application at the system-wide level except where institutional goals are similar, they endorsed the development of performance indicators by institutions. They also supported the introduction of staff assessment procedures to improve the quality of teaching and research.
Establishment of the AVCC/ACDP Working Party on Performance Indicators. Performance indicators of institutional context, as well as those for teaching, research, and professional services were identified. The Working Party (AVCC/ACDP, 1988) opposed the use of performance indicators "... in any purely mechanical fashion as in formula funding ..." (p. 2) but acknowledged that "... in the context of a process of expert review, performance indicators form part of the necessary raw material of evaluation and assessment" (p. 1).

Release of Higher Education: A Policy Statement (Dawkins, 1988a), showing a virtually unchanged government perspective on the future direction of higher education in Australia. The control on the higher education sector by the Federal is strengthened with the formation of the Joint Planning Committee between the Federal and the State governments to consult the States on higher education policy and developments "... consistent with the Commonwealth's national priorities" (Dawkins, 1988a, p. 73).

1989

In Committee to Review Higher Education Research Policy: Report, the Smith Committee supported the evaluation of institutional performance in higher education funding program. Performance indicators on research were also covered.

In Research for Australia: Higher Education Contribution (Dawkins, 1989a), the Federal Government reiterated its commitment to use performance indicators to assess institutional performance, and in determining operating grant.

D. The nineties

1990

Release of Higher Education: The Challenges Ahead. Performance indicators were suggested by HEC to be useful in augmenting the approval of peers and employers in institutional quality control.

In Priorities For Reform In Higher Education, the Senate Standing Committee on Employment, Education and Training voiced their concerns about the limitations of performance indicators, particularly the failure to reliably measure the quality of education. However, they agreed that the indicators
are "... potentially useful in allocating resources within departments or institutions ...").

University funds were derived from Federal (73%) and State (5%) governments, students (10%), donations, bequests and investments (12%) (DEET, 1993b).

1991

In Higher Education: Quality and Diversity in the 1990s, the Federal Government announced that it "... has no intention of prescribing performance indicators to be used by institutions, nor will normal operating grants be redistributed on the basis of comparative quantitative indicators" (Baldwin, 1991, p. 4). The main application of indicators was claimed to be at institutional level, oriented to specific missions of the universities, and would constitute one input informing qualitative judgments about performance, and not as a substitute for such judgements. It also announced a comprehensive set of measures to enhance the quality of higher education, including seeking HEC's advice on the appropriate strategies.

Release of Linke et al.'s study on Performance Indicators in Higher Education (DEET, 1991). Twenty-seven performance indicators, covering institutional context, teaching and learning, research and professional services, and participation and social equity issues, were identified.

In An Evaluation of a Model for Allocating Funds Across Departments Within a University Using Selected Indicators of Performance, Hattie et al. developed a resource allocation model for use within university to incorporate performance indicators for evaluating "research attainment". The group identified research performance indicators which could be applied to all departments, and another list for those specific to discipline groups.

1992

In Higher Education: Achieving Quality, HEC(1992a) recommended the formation of a quality assurance mechanism to conduct quality reviews of teaching and learning, research, and community services. The Committee for Quality Assurance in Higher Education (CQAHE) was subsequently established to conduct annual quality reviews on participating universities, beginning from 1993. The "prize money" was Aust$80 million.

1993

Release of NBEET's Research Performance Indicators Survey. Seven indicators were recommended. There were publication of research results in (1) refereed journals, (2)
are "... potentially useful in allocating resources within departments or institutions ..." (p. 133).

University funds were derived from Federal (73%) and State (5%) governments, students (10%), donations, bequests and investments (12%) (DEET, 1993b).

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1993

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journals weighted by citation impact, (3) refereed conference proceedings, (4) commercial books reviewed by peers, and (5) chapters in commercial books reviewed by peers, as well as (6) major refereed conference presentations, and (7) competitive peer reviewed grants.

Publication of DEET's *National Report on Australia's Higher Education Sector*. The last chapter is devoted to performance indicators with tables of data among universities.

Institutions would receive funding direct from the Federal Government rather than via the state. In return, the universities would be directly accountable to the Federal Government for the expenditure of the grants. As a result, institutions became increasingly under the control of the Federal Government.

1994

Release of ARC's *Quantitative Indicators of Australian Academic Research*. Apart from competitive peer reviewed grants, all six performance indicators advocated by NBEET's *Research Performance Indicators Survey* in 1993 were examined.

Release of DEET's *Equity and General Performance Indicators in Higher Education*. A set of equity indicators was defined and evaluated to augment the set of performance indicators from Linke et al.'s study. A computer package was also developed, to allow the extraction of data from DEET, as well as to calculate the full set of performance indicators, to enable institutions to analyse and review their own performance.

In Report of 1994 Quality Reviews, the CQAHE considered the Course Experience Questionnaire and Graduate Destination Survey - measuring graduate satisfaction (and teaching quality), and positive graduate outcomes respectively, to be two valuable performance indicators for teaching.

In *Quality Management in Universities*, Piper uncovered some measures taken by Australian universities to improve the quality of their management, including in the areas of research and teaching.

Release of *Diversity and Performance of Australian Universities* by DEET. Fifty indicators, grouped under students, staff, finance and service, and teaching and research, were illustrated for comparison across the universities.
Establishment of the Joint Working Party on Higher Education Indicators, with representatives from AVCC, DEET, ARC, and HEC.

1995

In Report of 1995 Quality Reviews, CQAHE indicated that performance indicators were used to analyse research outcomes, e.g., research earnings, publications, and higher degree completion. The amount allocated to the reviews dropped to $50 million in 1995 (Harrold, 1995). The gap in the amount distributed to universities placed at the top and bottom groups also decreased from a six-fold difference in 1994 (the release of the first quality review) to a ratio of two to one (Maslen, 1995).

Via the new composite index, the revised Research Quantum incorporated performance indicators on research output and links with non-Federal grants (e.g., the industry) to the indicator on competitive national grants, in the allocation of funds to the universities.

Release of the report on Higher Education Management Review. The Hoare Committee stated that improved management of universities could lead to improved efficiency. They urged the development of performance indicators within universities for trend analysis rather than institutional comparison. They also noted that the administrative burden associated with varying reporting requirements of both Federal and State legislation was a significant source of inefficiency.

Release of Evaluation of Research Performance: A Review of Selected Input and Output Characteristics. Specific performance indicators for research, namely, publication count, citation, and research grants, as well as certain personal and environmental moderating variables of research performance were examined by Linke.

1996

In Diversity in Australian Higher Education Institutions, 1994 by DEET, the performance of the universities across sixty-eight performance indicators are displayed under four main groups: students, staff, resources, and research.

In the Higher Education Budget Statement, Vanstone announced several changes to the higher education sector. These include: (1) the establishment of an independent agency to carry out the quality assurance reviews on institutions; (2) the use of quantitative performance indicators in the quality assessment exercise; (3) the formation of the Committee for University Teaching and Staff Development to replace the CAUT and Commonwealth Staff Development
Fund; and (4) the wind-up of NBEET. HEC and ARC will be established as independent bodies, providing advice directly to the government.

The Australian Awards for University Teaching (which included the Australian University Teacher of the Year Award) was introduced to raise the status of teaching.

Internet forms were used for the first time for specific national competitive grant applications in an effort to decrease the number of copies lodged with each application, and to save costs.

In Higher Education Funding report for the 1998-2000 Triennium, Kemp devoted a section to performance indicators - their purposes, their requirements, the list used, and the composite index (which included their weightings).
Appendix 4

Interview questions

1. (a) Are you happy with the choice and process in which the current performance indicators are used in this university?
   (b) Overall, are you happy with the move towards the use of performance indicators in this university?

2. Do you think that the use of performance indicators has affected the quality and quantity of research and teaching in this university? (Note: Ask for publications, external research grant applications, higher degree research supervision, and teaching.)

3. Have the use of performance indicators modify your approach to research and teaching in any way? (Note: Ask for publications, external research grant applications, higher degree research supervision, and teaching.)

4. An alleged disadvantage of performance indicators is their link to control. In particular, the use of performance indicators has been claimed to help the Federal Government to increase its control over the universities, and in some cases help the university management to increase its control over academics. What is your opinion on this?

5. In terms of benefits, it has been said that the use of performance indicators can improve the work performance of certain people, such as new academics. What is your opinion on this?

6. Do you think that you and other university academics need performance indicators to know that you have done a good job?
7. So overall, do you think that performance indicators have brought more advantages than disadvantages to you and other academics within this university?

8. Do you have any suggestions on how to improve the use of performance indicators in this university?
Appendix 5

Questionnaire
The term "research" here includes provision of professional consultancy, and **supervision of postgraduate (Honours, Masters and PhD) research students.**

The term "teaching" here includes preparation of teaching materials, and coordination e.g., study guide instructions.

The term "performance indicator" is here defined as quantitative and/or qualitative data that is collected uniformly at regular intervals to guide in the achievement of identified goals and objectives. Examples of research performance indicators include number of publications, number and value of external research grants received, and postgraduate research student completions. Examples of teaching performance indicators include student surveys on teaching (including the Course Experience Questionnaire), student completions, and graduate employability. The performance indicators referred to here are the actual performance indicators in existence in your University now, which may or may not be the ideal set which you have in mind.

Section 1 - Performance indicators

Please indicate your agreement or disagreement with each statement on the merits and demerits of performance indicators in your University by ticking the appropriate box.

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Don't know</th>
</tr>
</thead>
</table>

1. I am not happy with:
   (a) the **choice** of the current performance indicators used in this University.
   
   [ ] [ ] [ ] [ ] [ ] [ ]

   (b) the **process** in which current performance indicators are used in this University.
   
   [ ] [ ] [ ] [ ] [ ] [ ]

   If you agree to either 1(a) or 1(b), please give reasons.

2. The use of performance indicators brings more advantages than disadvantages to academics in this University.
   
   [ ] [ ] [ ] [ ] [ ] [ ]

3. Academics in this University do not need performance indicators to know that we have done a good job.
   
   [ ] [ ] [ ] [ ] [ ] [ ]

4. Performance indicators help the Australian Commonwealth Government to:
   (a) increase its control over this University.
   
   [ ] [ ] [ ] [ ] [ ] [ ]

   (b) monitor the performance of this University.
   
   [ ] [ ] [ ] [ ] [ ] [ ]

   (c) provide direction to this University as to the desired goals of the Government.
   
   [ ] [ ] [ ] [ ] [ ] [ ]

5. Performance indicators help this University to:
   (a) increase its control over academics' work.
   
   [ ] [ ] [ ] [ ] [ ] [ ]

   (b) monitor the performance of academics' work.
   
   [ ] [ ] [ ] [ ] [ ] [ ]
(c) provide direction to the academics as to the desired goals of this University.

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tbody>
</table>

6. Performance indicators help academics in this University:

(a) to be accountable for our work.
(b) to have a better knowledge of the goals of this University.
(c) by providing feedback on our work performance.
(d) to improve the quality of our research.
(e) to improve the quality of our teaching.
(f) to improve the work performance of specific academics (e.g., new academics)

If you agree to statement 6(f), please elaborate.

7. The literature on performance indicators suggests that performance indicators can encourage dysfunctional work behaviour in some academics (e.g., performing well in those activities measured by the indicators but ignoring or performing badly in other areas not measured by the indicators, submitting the same research findings in multiple journals, reporting incremental variations to a particular research findings in a series of publications, or reporting invalid data).

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
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</table>

If you agree to statement 7, please elaborate.

8. I am happy with the move towards the use of performance indicators in this University.

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Don't know</th>
</tr>
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<tbody>
<tr>
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</table>

Please give reasons for your response.
Section 2 - Reward system
Please indicate your agreement or disagreement with each statement about the reward system in your University by ticking the appropriate box. Internal research funds in statements 2-4 include performance-based funding.

1. High performers in research have a better chance than high performers in teaching of getting:
   (a) promoted
   (b) internal funds

2. Academics who have more publications have a better chance of getting:
   (a) promoted
   (b) internal funds

3. Academics who receive more external research grants have a better chance of getting:
   (a) promoted
   (b) internal funds

4. Academics who have a high proportion of supervised students who passed their postgraduate research degrees have a better chance of getting:
   (a) promoted
   (b) internal funds

5. Academics who receive favourable student surveys on teaching have a better chance of getting:
   (a) promoted
   (b) other benefits (please elaborate)

6. Schools/departments with a high graduate employment rate have a better chance of getting benefits than schools/departments with a low graduate employment rate.

If you agree to statement 6, please elaborate.

Section 3 - Research and teaching
Please indicate your judgement about your balance between research and teaching by ticking the appropriate box.

1. My teaching has increased or decreased now compared to:

   (a) 1986
   (b) 1991
2. The pressure from the University to teach more has increased or decreased now compared to:

<table>
<thead>
<tr>
<th></th>
<th>Increase a lot</th>
<th>Increase a little</th>
<th>Decrease a little</th>
<th>Decrease a lot</th>
<th>No difference or not relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) 1986</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(b) 1991</td>
<td></td>
<td></td>
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</tbody>
</table>

3. My research has increased or decreased now compared to:

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<thead>
<tr>
<th></th>
<th>Increase a lot</th>
<th>Increase a little</th>
<th>Decrease a little</th>
<th>Decrease a lot</th>
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<tbody>
<tr>
<td>(a) 1986</td>
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<td></td>
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</tr>
<tr>
<td>(b) 1991</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

4. The pressure from the University to do more research has increased or decreased now compared to:

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<tr>
<th></th>
<th>Increase a lot</th>
<th>Increase a little</th>
<th>Decrease a little</th>
<th>Decrease a lot</th>
<th>No difference or not relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) 1986</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) 1991</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. My approach to research has changed now (e.g., concentrating more on applying for external research grants, or publications) compared to:

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Don't know or not relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) 1986</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) 1991</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you agree to either statement 5(a) or 5(b), please elaborate.

6. My priorities between research and teaching have changed now compared to:

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Don't know or not relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) 1986</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) 1991</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you agree to either statement 6(a) or 6(b), please elaborate and give your reasons.
Section 4 - Publications, research grants, and research student supervision

Please indicate your judgement about your research by ticking the appropriate box.

A. Publications

1. The pressure from the University to publish has increased now compared to:

<table>
<thead>
<tr>
<th>A lot</th>
<th>Quite a lot</th>
<th>A little</th>
<th>Not at all</th>
<th>Don't know or not relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   (a) 1986
   (b) 1991

2. My time spent on publications has increased or decreased now compared to:

<table>
<thead>
<tr>
<th>Increase a lot</th>
<th>Increase a little</th>
<th>Decrease a little</th>
<th>Decrease a lot</th>
<th>No difference or not relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   (a) 1986
   (b) 1991

3. The number of my publications has increased or decreased now compared to:

<table>
<thead>
<tr>
<th>Increase a lot</th>
<th>Increase a little</th>
<th>Decrease a little</th>
<th>Decrease a lot</th>
<th>No difference or not relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   (a) 1986
   (b) 1991

4. The quality of my publications has increased or decreased now compared to:

<table>
<thead>
<tr>
<th>Increase a lot</th>
<th>Increase a little</th>
<th>Decrease a little</th>
<th>Decrease a lot</th>
<th>No difference or not relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   (a) 1986
   (b) 1991

5. My priorities in publications have changed now (e.g., concentrate more on refereed journals or book chapters than before) compared to:

<table>
<thead>
<tr>
<th>A lot</th>
<th>Quite a lot</th>
<th>A little</th>
<th>Not at all</th>
<th>Don't know or not relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   (a) 1986
   (b) 1991

If you think that your types of publications have changed, please elaborate.

---

B. External research grants

1. The pressure from the University to apply for external research grants has increased now compared to:

<table>
<thead>
<tr>
<th>A lot</th>
<th>Quite a lot</th>
<th>A little</th>
<th>Not at all</th>
<th>Don't know or not relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   (a) 1986
   (b) 1991
2. My time spent on external research grant applications has increased or decreased now compared to:

<table>
<thead>
<tr>
<th></th>
<th>Increase a lot</th>
<th>Increase a little</th>
<th>Decrease a little</th>
<th>Decrease a lot</th>
<th>No difference or not relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) 1986</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) 1991</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. The number of external research grants which I have applied for has increased or decreased now compared to:

<table>
<thead>
<tr>
<th></th>
<th>Increase a lot</th>
<th>Increase a little</th>
<th>Decrease a little</th>
<th>Decrease a lot</th>
<th>No difference or not relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) 1986</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) 1991</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. The types of external research grants for which I now apply have changed (e.g., more professional consultancies, industry funding, or national competitive grants) compared to:

<table>
<thead>
<tr>
<th></th>
<th>A lot</th>
<th>Quite a lot</th>
<th>A little</th>
<th>Not at all</th>
<th>Don't know or not relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) 1986</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) 1991</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If the types of external research grants for which you applied have changed, please elaborate.

5. My priority areas in research have changed now (e.g., concentrate more on applied research, or short-term research) compared to:

<table>
<thead>
<tr>
<th></th>
<th>A lot</th>
<th>Quite a lot</th>
<th>A little</th>
<th>Not at all</th>
<th>Don't know or not relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) 1986</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) 1991</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If your types of research have changed, please elaborate.

---

C. Supervision of postgraduate research students

1. The pressure from the University to ensure that the postgraduate research students whom I supervise pass in minimum time has increased now compared to:

<table>
<thead>
<tr>
<th></th>
<th>A lot</th>
<th>Quite a lot</th>
<th>A little</th>
<th>Not at all</th>
<th>Don't know or not relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) 1986</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) 1991</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
If you think that there is now more pressure to ensure that postgraduate research students pass within the minimum time, please go to statement 2. Otherwise, please go to Section 5.

2. This increased pressure affects the way I supervise my research students.

A lot | Quite a lot | A little | Not at all | Don't know or not relevant
--- | --- | --- | --- | ---
[ ] | [ ] | [ ] | [ ] | [ ]

If you think that your supervision has changed, please elaborate.

---

**Section 5 - Paper work**

Please indicate your judgement about your paper work by ticking the appropriate box.

1. I have to do more paper work now:
   (a) to account for my publications compared to:
   A lot | Quite a lot | A little | Not at all | Don't know or not relevant
--- | --- | --- | --- | ---
(a) 1986 | [ ] | [ ] | [ ] | [ ]
(b) 1991 | [ ] | [ ] | [ ] | [ ]
(b) in preparing proposals to apply for external research grants compared to:
A lot | Quite a lot | A little | Not at all | Don't know or not relevant
--- | --- | --- | --- | ---
(a) 1986 | [ ] | [ ] | [ ] | [ ]
(b) 1991 | [ ] | [ ] | [ ] | [ ]
(c) in supervising postgraduate research students compared to:
A lot | Quite a lot | A little | Not at all | Don't know or not relevant
--- | --- | --- | --- | ---
(a) 1986 | [ ] | [ ] | [ ] | [ ]
(b) 1991 | [ ] | [ ] | [ ] | [ ]

**Section 6 - Teaching**

Please indicate your judgement about your teaching by ticking the appropriate box.

1. The pressure from the University to teach better has increased now compared to:
A lot | Quite a lot | A little | Not at all | Don't know or not relevant
--- | --- | --- | --- | ---
(a) 1986 | [ ] | [ ] | [ ] | [ ]
(b) 1991 | [ ] | [ ] | [ ] | [ ]
2. The pressure from the University to ensure that I teach employable skills to my students has increased **now** compared to:

<table>
<thead>
<tr>
<th>A lot</th>
<th>Quite a lot</th>
<th>A little</th>
<th>Not at all</th>
<th>Don’t know or not relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) 1986</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) 1991</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. The pressure from the University to ensure that the coursework students whom I teach pass within the minimum time has increased **now** compared to:

<table>
<thead>
<tr>
<th>A lot</th>
<th>Quite a lot</th>
<th>A little</th>
<th>Not at all</th>
<th>Don’t know or not relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) 1986</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) 1991</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you think that there is now **more** pressure to either (1) teach better, or (2) teach employable skills to students, or (3) ensure coursework students pass within minimum time, please go to statement 4. Otherwise, please go to statement 5.

4. This increased pressure affects my approach to teaching.

<table>
<thead>
<tr>
<th>A lot</th>
<th>Quite a lot</th>
<th>A little</th>
<th>Not at all</th>
<th>Don’t know or not relevant</th>
</tr>
</thead>
</table>

If you think that your teaching has changed, please elaborate.

5. The number of student surveys carried out on my teaching (formal and otherwise) has increased or decreased **now** compared to:

<table>
<thead>
<tr>
<th>Increase a lot</th>
<th>Increase a little</th>
<th>Decrease a little</th>
<th>Decrease a lot</th>
<th>No difference or not relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) 1986</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) 1991</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. The results from these student surveys on my teaching have been used by me (please tick the appropriate box(es)):

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) as feedback on the quality of my teaching</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) to improve my teaching</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) to apply for promotion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) others (please elaborate)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 7 - Employment profile

Finally, it would be helpful if you would provide some details about yourself.

1. Main mode of employment in this/another university.
   - (a) research and teaching
   - (b) research
   - (c) teaching
   - (d) others (please elaborate)

2. Term of employment in this/another university.
   - (a) full-time permanent
   - (b) full-time contract
   - (c) fractional full-time contract
   - (e) others (please elaborate)

3. Level of appointment in this/another university.
   - (a) Associate Lecturer (Level A)
   - (b) Lecturer (Level B)
   - (c) Senior Lecturer (Level C)
   - (d) Associate Professor (Level D)
   - (e) Professor (Level E)
   - (f) others, e.g. Research Assistant (please elaborate)

4. Number of years employed in this university.
   - (a) less than 2
   - (b) 2-5
   - (c) 6-9
   - (d) 10 or over
Are you willing to be interviewed at a later date?

Please circle your response  .................................................................Yes / No

Thank you for your valued participation
Appendix 6

Sample cover letter sent to each participant
22th May 1997

Ms Jeannette Chong
c/o Politics Department
School of Social Sciences
Murdoch University
WA 6150

Mr David Byrne
School of Nursing
Edith Cowan University
Churchlands
WA 6018

Dear Mr Byrne,

Re: Survey on the impact of performance indicators in Australian universities

I would be most grateful if you would agree to participate in a survey I am conducting as a major part of my PhD degree (Supervisors - Prof David Andrich & Dr Irene Styles (Education); & Prof Ian Scott (Social Sciences)) in Murdoch University. My study is on the impact of the implementation of performance indicators on research and teaching (significance vs insignificance, & positive vs negative) in Australian universities. I am relying on information obtained from university academics who have been in an Australian university at least since 1991 (although not necessarily in the same university during this period) as they are in a good position to witness the change (if any) in the approach to research and teaching as a result of the introduction of performance indicators. I intend to obtain input not only from those academics who are supportive of or opposed to the application of performance indicators but also those who are indifferent to or unaware of their use. I am focusing on four different disciplines (Arts/Humanities, Social Sciences, Natural Sciences, and Physical Sciences) within the four Western Australian universities under the UNS.

In accordance to the guidelines set by the Murdoch University Human Research Ethics Committee, confidentiality of participants is assured. No individual participant will be identified by name in any report prepared from the data, as indicated in the enclosed consent form.
As the completion of my PhD degree is dependent upon this survey, I would very much appreciate it if you could complete the enclosed consent form and questionnaire as soon as possible, and return them to me in the reply-paid envelope provided. Any additional comments which you wish to make about performance indicators, including suggestions on how they should be improved (in terms of choice, process, etc.) would be most welcomed. Based on the responses which I will receive from the completed questionnaires, I may need to arrange for a personal interview with some university academics for an elaboration of the responses given. Please indicate on the last page of the questionnaire whether you are willing to be interviewed at a later date.

Thanking you in advance for your essential participation in my survey. Should you require further information about my study, please do not hesitate to contact me.

Yours sincerely

J. Chong

tel: (09) 478 2316
fax: (09) 479 7327
email: jchong@central.murdoch.edu.au
Appendix 7

Consent form
CONSENT FORM

My postgraduate research study is on the consequences of performance indicators on research and teaching in Australian universities. Since you, as an academic, are the key determinant of the quantity and quality of research and teaching in Australia, your participation is crucial in understanding and documenting the move to performance indicators in the Australian higher education system.

In recent years, performance indicators have been incorporated in the internal management of many Australian universities. They have been linked to specific internal funding. For instance, a significant portion of the amount of the research funds is determined by performance indicators under the Research Performance Index (RPI) scheme in Curtin University, the Research Activity Index (RAI) scheme in Edith Cowan University, the Research Index Fund (RIF) in Murdoch University, and the Faculty Funding Model (FFM) in the University of Western Australia. The shift to performance in your university may or may not have affected your approach to research and teaching. The purpose of this questionnaire is to obtain your essential feedback on any observed changes to research and teaching as a result of the shift to performance indicators.

All your comments obtained from the questionnaire and interview will be held in the strictest confidence. Only myself and two supervisors will have access to the material. Under no circumstances will you be identified by name in any report prepared from these data. Interviews will only be taped upon your approval. Research numbers appear on the questionnaire to enable me to trace the institution, discipline, and level of appointment of respondents. The list of research numbers and names will be kept in a secure place separate from the questionnaire. Although no individual will be identified, it is intended to make a summary of findings from this survey available to your University and School/Unit. This should be of great help in understanding the impact of performance indicators on the Australian universities.

Thank you very much for your valued co-operation.

Yours sincerely,

[Signature]

Jeannette Chong
Tel: (09) 478 2316 (H)

I, the participant have read the information above and any questions I have asked have been answered to my satisfaction. I agree to participate in this study, realising that I may withdraw at any time without prejudice.

Name of participant

[Signature]

Jeannette Chong (Investigator)
Appendix 8

RUMM analysis of *Perceptions of university reward system* scale

(a) The expected value as a function the location estimate (items 5(a), 5(b), and 6)

Item 5(a) : \( \text{Locn} = 1.432 \quad \text{Resid} = 4.561 \quad \text{ChiSqProb} = 0.000 \)

![Graph for Item 5(a)]

Item 5(b) : \( \text{Locn} = 2.038 \quad \text{Resid} = 5.107 \quad \text{ChiSqProb} = 0.000 \)

![Graph for Item 5(b)]
Item 6: Locn = 1.947  Resid = 3.544  ChiSqProb = 0.000
(b) Indices of the tests of fit between the data and the model in fit order of standardised residuals

<table>
<thead>
<tr>
<th>Items</th>
<th>Discrimination standardised Z</th>
<th>Item-trait interaction χ²: 3 df</th>
</tr>
</thead>
<tbody>
<tr>
<td>3(a) Academics who receive more external research have a better chance of getting promoted.</td>
<td>-3.394</td>
<td>12.656***</td>
</tr>
<tr>
<td>2(a) Academics who have more publications have a better chance of getting promoted.</td>
<td>-2.804</td>
<td>7.044*</td>
</tr>
<tr>
<td>2(b) Academics who have more publications have a better chance of getting internal funds.</td>
<td>-2.490</td>
<td>2.705</td>
</tr>
<tr>
<td>1(b) High performers in research have a better chance than high performers in teaching of getting internal funds.</td>
<td>-1.567</td>
<td>5.420</td>
</tr>
<tr>
<td>3(b) Academics who receive more external research have a better chance of getting internal funding.</td>
<td>-1.237</td>
<td>3.237</td>
</tr>
<tr>
<td>1(a) High performers in research have a better chance than high performers in teaching of getting internal funds.</td>
<td>0.213</td>
<td>4.309</td>
</tr>
<tr>
<td>4(a) Academics who have a high proportion of supervised students who passed their postgraduate research degrees have a better chance of getting promoted.</td>
<td>2.334</td>
<td>35.047***</td>
</tr>
<tr>
<td>4(b) Academics who have a high proportion of supervised students who passed their postgraduate research degrees have a better chance of getting internal funding.</td>
<td>3.034</td>
<td>40.953***</td>
</tr>
</tbody>
</table>

Total 111.371
21 df, p < 0.0001

* p < 0.05, ** p < 0.01, *** p < 0.0001
Appendix 9

RUMM analysis of *General research and teaching activities* scale

(a) Indices of the tests of fit between the data and the model in fit order of standardised residuals

<table>
<thead>
<tr>
<th>Items</th>
<th>Discrimination standardised Z</th>
<th>Item-trait interaction $\chi^2$; 3 df</th>
</tr>
</thead>
<tbody>
<tr>
<td>5(b) My approach to research has changed now compared to 1991.</td>
<td>-3.174</td>
<td>1.019</td>
</tr>
<tr>
<td>5(a) My approach to research has changed now compared to 1986.</td>
<td>-2.510</td>
<td>0.629</td>
</tr>
<tr>
<td>6(b) My priorities between research and teaching have changed now compared to 1991.</td>
<td>-1.709</td>
<td>13.512***</td>
</tr>
<tr>
<td>4(a) The pressure from the University to do more research has increased or decreased now compared to 1986.</td>
<td>-1.272</td>
<td>5.244</td>
</tr>
<tr>
<td>2(b) The pressure from the University to teach more has increased or decreased now compared to 1991.</td>
<td>-1.010</td>
<td>2.557</td>
</tr>
<tr>
<td>4(b) The pressure from the University to do more research has increased or decreased now compared to 1991.</td>
<td>-0.975</td>
<td>1.936</td>
</tr>
<tr>
<td>6(a) My priorities between research and teaching have changed now compared to 1986.</td>
<td>-0.921</td>
<td>4.523</td>
</tr>
<tr>
<td>2(a) The pressure from the University to teach more has increased or decreased now compared to 1986.</td>
<td>-0.520</td>
<td>8.713**</td>
</tr>
<tr>
<td>1(b) My teaching has increased or decreased now compared to 1991.</td>
<td>1.285</td>
<td>0.616</td>
</tr>
<tr>
<td>3(a) My research has increased or decreased now compared to 1986.</td>
<td>1.826</td>
<td>0.319</td>
</tr>
<tr>
<td>3(b) My research has increased or decreased now compared to 1991.</td>
<td>1.984</td>
<td>4.677</td>
</tr>
<tr>
<td>1(a) My teaching has increased or decreased now compared to 1986.</td>
<td>2.596</td>
<td>5.528</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>49.274</td>
<td>33 df, p &lt; 0.05</td>
</tr>
</tbody>
</table>

* p < 0.05, ** p < 0.01, *** p < 0.0001
(b) The expected value as a function the location estimate
(items 5(a) and 6(b))

Item 6(b) : Locn = 0.559   Resid = -1.709   ChiSqProb = 0.000

Expected Score

-3  -2  -1  0   1   2   3

Person Location

Item 5(a) : Locn = 0.326   Resid = -2.510   ChiSqProb = 0.886

Expected Score

-3  -2  -1  0   1   2   3

Person Location
Appendix 10

RUMM analysis of Specific research activities scale

(a) The expected value as a function the location estimate (section 4A - items 1(a))

Item 1(a) : Loci = -0.465  Resid = 0.926  ChiSqProb = 0.551

(b) The expected value as a function the location estimate (section 4C - items 1(a), 1(b) and 2)

Item 1(a) : Loci = 0.181  Resid = 2.801  ChiSqProb = 0.000
Item 1(b):  Locn = 0.265  Resid = 2.805  ChiSqProb = 0.000

Item 2:  Locn = 0.885  Resid = 0.930  ChiSqProb = 0.000
(c) Indices of the tests of fit between the data and the model in fit order of standardised residuals

<table>
<thead>
<tr>
<th>Items (x)</th>
<th>Discrimination standardised Z</th>
<th>Item-trait interaction $\chi^2$; 3 df</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:4(b) The quality of my publications has increased or decreased now compared to 1991.</td>
<td>-3.342</td>
<td>5.766</td>
</tr>
<tr>
<td>B:3(b) The number of external research grants which I have applied for has increased or decreased now compared to 1991.</td>
<td>-3.111</td>
<td>5.347</td>
</tr>
<tr>
<td>B:3(a) The number of external research grants which I have applied for has increased or decreased now compared to 1986.</td>
<td>-1.236</td>
<td>6.522</td>
</tr>
<tr>
<td>A:1(b) The pressure from the University to publish has increased now compared to 1991.</td>
<td>-1.062</td>
<td>0.708</td>
</tr>
<tr>
<td>A:3(b) The number of my publications has increased or decreased now compared to 1991.</td>
<td>-1.054</td>
<td>4.128</td>
</tr>
<tr>
<td>A:4(a) The quality of my publications has increased or decreased now compared to 1986.</td>
<td>-0.916</td>
<td>4.762</td>
</tr>
<tr>
<td>B:1(b) The pressure from the University to apply for external research grants has increased now compared to 1991.</td>
<td>-0.791</td>
<td>1.171</td>
</tr>
<tr>
<td>A:2(a) My time spent on publications has increased or decreased now compared to 1986.</td>
<td>-0.375</td>
<td>1.995</td>
</tr>
<tr>
<td>B:2(b) My time spent on external research grant applications has increased or decreased now compared to 1991.</td>
<td>0.288</td>
<td>11.062***</td>
</tr>
<tr>
<td>B:1(a) The pressure from the University to apply for external research grants has increased now compared to 1986.</td>
<td>0.317</td>
<td>0.873</td>
</tr>
<tr>
<td>B:2(a) My time spent on external research grant applications has increased or decreased now compared to 1986.</td>
<td>0.497</td>
<td>8.615**</td>
</tr>
<tr>
<td>A:2(b) My time spent on publications has increased or decreased now compared to 1991.</td>
<td>0.588</td>
<td>1.471</td>
</tr>
<tr>
<td>A:5(b) My priorities in publications have changed now compared to 1991.</td>
<td>0.685</td>
<td>2.252</td>
</tr>
</tbody>
</table>

cont/-
cont/-

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Statement</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:3(a)</td>
<td>The number of my publications has increased or decreased now compared to 1986.</td>
<td>0.741</td>
<td>4.465</td>
</tr>
<tr>
<td>B:4(b)</td>
<td>The types of external research grants for which I now apply have changed compared to 1991.</td>
<td>0.858</td>
<td>4.426</td>
</tr>
<tr>
<td>A:1(a)</td>
<td>The pressure from the University to publish has increased now compared to 1986.</td>
<td>1.309</td>
<td>3.277</td>
</tr>
<tr>
<td>B:4(a)</td>
<td>The types of external research grants for which I now apply have changed compared to 1986.</td>
<td>1.593</td>
<td>5.369</td>
</tr>
<tr>
<td>A:5(a)</td>
<td>My priorities in publications have changed now compared to 1986.</td>
<td>1.900</td>
<td>0.712</td>
</tr>
<tr>
<td>B:5(b)</td>
<td>My priority areas in research have changed now compared to 1991.</td>
<td>2.038</td>
<td>2.665</td>
</tr>
<tr>
<td>B:5(a)</td>
<td>My priority areas in research have changed now compared to 1986.</td>
<td>2.401</td>
<td>3.716</td>
</tr>
</tbody>
</table>

Total                                                   79.304
57 df, p < 0.05

(x) Items are identified by subsection followed by statement number.
* p < 0.05, ** p < 0.01, *** p < 0.0001
Appendix 11

RUMM analysis of *Paperwork* scale

(a) Indices of the tests of fit between the data and the model in fit order of standardised residuals

<table>
<thead>
<tr>
<th>Items</th>
<th>Discrimination standardised Z</th>
<th>Item-trait interaction $\chi^2$, 3 df</th>
</tr>
</thead>
<tbody>
<tr>
<td>1(a)(a) I have to do more paper work now to account for my publications compared to 1986.</td>
<td>-0.592</td>
<td>1.534</td>
</tr>
<tr>
<td>1(a)(b) I have to do more paper work now to account for my publications compared to 1991.</td>
<td>-0.550</td>
<td>5.411</td>
</tr>
<tr>
<td>1(b)(b) I have to do more paper work now in preparing proposals to apply for external research grants compared to 1991.</td>
<td>0.103</td>
<td>0.478</td>
</tr>
<tr>
<td>1(b)(a) I have to do more paper work now in preparing proposals to apply for external research grants compared to 1986.</td>
<td>0.204</td>
<td>0.202</td>
</tr>
<tr>
<td>1(c)(b) I have to do more paper work now in supervising postgraduate research students compared to 1991.</td>
<td>0.480</td>
<td>1.562</td>
</tr>
<tr>
<td>1(c)(a) I have to do more paper work now in supervising postgraduate research students compared to 1986.</td>
<td>0.546</td>
<td>2.474</td>
</tr>
</tbody>
</table>

**Total** 11.661

15 df, $p = 0.705$

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.0001$
(b) The expected value as a function the location estimate
(item 1(b)(a))

Item 1(b)(a) : Locn = .0.100  Resid = 0.204  ChiSqProb = 0.977
Appendix 12

RUMM analysis of *Specific teaching activities* scale

(a) Indices of the tests of fit between the data and the model in fit order of standardised residuals

<table>
<thead>
<tr>
<th>Items</th>
<th>Discrimination standardised Z</th>
<th>Item-trait interaction $\chi^2$: 3 df</th>
</tr>
</thead>
<tbody>
<tr>
<td>2(a) The pressure from the University to ensure that I teach employable</td>
<td>-1.966</td>
<td>7.175*</td>
</tr>
<tr>
<td>2(b) The pressure from the University to ensure that I teach employable</td>
<td>-1.178</td>
<td>8.581**</td>
</tr>
<tr>
<td>3(a) The pressure from the University to ensure that the coursework</td>
<td>-0.753</td>
<td>6.730</td>
</tr>
<tr>
<td>3(b) The pressure from the University to ensure that the coursework</td>
<td>-0.405</td>
<td>7.227*</td>
</tr>
<tr>
<td>5(b) The number of student surveys carried out on my teaching</td>
<td>-0.346</td>
<td>16.555***</td>
</tr>
<tr>
<td>4 This increased pressure affects my approach to teaching.</td>
<td>0.466</td>
<td>4.202</td>
</tr>
<tr>
<td>1(a) The pressure from the University to teach better has increased</td>
<td>0.535</td>
<td>4.056</td>
</tr>
<tr>
<td>5(a) The number of student surveys carried out on my teaching</td>
<td>1.121</td>
<td>12.582****</td>
</tr>
</tbody>
</table>

Total 68.107
24 df, $p < 0.0001$

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.0001$
(b) The expected value as a function the location estimate (item 7)

Item 7 : Locn = 0.740  Resid = 0.466  ChisqProb = 0.217
Appendix 13

*Attitude to PIs* scale: Chi-square test results

(a) With four response categories

<table>
<thead>
<tr>
<th>Survey items</th>
<th>Category of responses</th>
<th>( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>(with numbering as in questionnaire)</td>
<td>SA</td>
<td>A</td>
</tr>
<tr>
<td>1. I am not happy with:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) the choice of the current performance indicators used in this University.</td>
<td>12 43</td>
<td>32</td>
</tr>
<tr>
<td>(b) the process in which the current performance indicators are used in this University.</td>
<td>13 37</td>
<td>32</td>
</tr>
<tr>
<td>2. The use of performance indicators brings more advantages than disadvantages to academics in this University. (R)</td>
<td>9 40</td>
<td>28</td>
</tr>
<tr>
<td>3. Academics in this University do not need performance indicators to know that we have done a good job.</td>
<td>7 35</td>
<td>43</td>
</tr>
<tr>
<td>4 (a) Performance indicators help the Australian Commonwealth Government to increase its control over this University.</td>
<td>24 45</td>
<td>14</td>
</tr>
<tr>
<td>5 (a) Performance indicators help this University to increase its control over academics' work.</td>
<td>17 51</td>
<td>18</td>
</tr>
<tr>
<td>6. Performance indicators help academics in this University:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) to be accountable for our work. (R)</td>
<td>5 52</td>
<td>30</td>
</tr>
<tr>
<td>(b) to have a better knowledge of the goals of this University. (R)</td>
<td>5 41</td>
<td>36</td>
</tr>
<tr>
<td>(c) by providing feedback on our work performance. (R)</td>
<td>5 41</td>
<td>37</td>
</tr>
<tr>
<td>(d) to improve the quality of our research. (R)</td>
<td>3 20</td>
<td>49</td>
</tr>
<tr>
<td>(e) to improve the quality of our teaching. (R)</td>
<td>3 28</td>
<td>36</td>
</tr>
<tr>
<td>(f) to improve the work performance of specific academics (e.g., new academics). (R)</td>
<td>2 36</td>
<td>40</td>
</tr>
<tr>
<td>7. The literature on performance indicators suggests that performance indicators can encourage dysfunctional work behaviour in some academics.</td>
<td>28 44</td>
<td>8</td>
</tr>
<tr>
<td>8. I am happy with the move towards the use of performance indicators in this University. (R)</td>
<td>3 45</td>
<td>27</td>
</tr>
</tbody>
</table>
Notes to previous table: SA=strongly agree, A=agree, D=disagree, SD=strongly disagree. Degrees of freedom, df = 3. Level of significance, p: * p < 0.05, ** p < 0.01, *** p < 0.001. Number of participants, N=152.

<table>
<thead>
<tr>
<th>Survey items</th>
<th>Category of responses</th>
<th>( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>(with numbering as in questionnaire)</td>
<td>SD+A</td>
<td>SD+D</td>
</tr>
<tr>
<td>1. I am not happy with:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) the choice of the current performance indicators used in this University.</td>
<td>55</td>
<td>37</td>
</tr>
<tr>
<td>(b) the process in which the current performance indicators are used in this University.</td>
<td>49</td>
<td>40</td>
</tr>
<tr>
<td>2. The use of performance indicators brings more advantages than disadvantages to academics in this University. (R)</td>
<td>49</td>
<td>33</td>
</tr>
<tr>
<td>3. Academics in this University do not need performance indicators to know that we have done a good job.</td>
<td>42</td>
<td>55</td>
</tr>
<tr>
<td>4 (a) Performance indicators help the Australian Commonwealth Government to increase its control over this University.</td>
<td>69</td>
<td>15</td>
</tr>
<tr>
<td>5 (a) Performance indicators help this University to increase its control over academics' work.</td>
<td>68</td>
<td>22</td>
</tr>
<tr>
<td>6. Performance indicators help academics in this University:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) to be accountable for our work. (R)</td>
<td>57</td>
<td>36</td>
</tr>
<tr>
<td>(b) to have a better knowledge of the goals of this University. (R)</td>
<td>46</td>
<td>43</td>
</tr>
<tr>
<td>(c) by providing feedback on our work performance. (R)</td>
<td>46</td>
<td>45</td>
</tr>
<tr>
<td>(d) to improve the quality of our research. (R)</td>
<td>23</td>
<td>67</td>
</tr>
<tr>
<td>(e) to improve the quality of our teaching. (R)</td>
<td>31</td>
<td>59</td>
</tr>
<tr>
<td>(f) to improve the work performance of specific academics (e.g., new academics). (R)</td>
<td>38</td>
<td>47</td>
</tr>
<tr>
<td>7. The literature on performance indicators suggests that performance indicators can encourage dysfunctional work behaviour in some academics.</td>
<td>72</td>
<td>11</td>
</tr>
<tr>
<td>8. I am happy with the move towards the use of performance indicators in this University. (R)</td>
<td>48</td>
<td>40</td>
</tr>
</tbody>
</table>
Appendix 14

Plot of *Attitude to PIs* scale by rank

1 = Associate Lecturer
2 = Lecturer
3 = Senior Lecturer
4 = Associate Professor
5 = Professor

$R^2 = 0.052$  Level of significance, $p = 0.0046$
Appendix 15

Perceptions of link between PIs and university reward system: Chi-square test results

(a) With four response categories

<table>
<thead>
<tr>
<th>Survey items (with numbering as in questionnaire)</th>
<th>Category of responses</th>
<th>( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SA</td>
<td>A</td>
</tr>
<tr>
<td>Perceptions of the university reward system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. High performers in research have a better chance than high performers in teaching of getting:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) promoted</td>
<td>53</td>
<td>34</td>
</tr>
<tr>
<td>(b) internal funds</td>
<td>52</td>
<td>34</td>
</tr>
<tr>
<td>2. Academics who have more publications have a better chance of getting:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) promoted</td>
<td>57</td>
<td>35</td>
</tr>
<tr>
<td>(b) internal funds</td>
<td>49</td>
<td>37</td>
</tr>
<tr>
<td>3. Academics who receive more external research grants have a better chance of getting:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) promoted</td>
<td>59</td>
<td>33</td>
</tr>
<tr>
<td>(b) internal funds</td>
<td>53</td>
<td>31</td>
</tr>
<tr>
<td>4. Academics who have a high proportion of supervised students who passed their postgraduate research degrees have a better chance of getting:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) promoted</td>
<td>24</td>
<td>39</td>
</tr>
<tr>
<td>(b) internal funds</td>
<td>21</td>
<td>30</td>
</tr>
<tr>
<td>Other rewards by the university</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Academics who receive favourable student surveys on teaching have a better chance of getting:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) promoted</td>
<td>6</td>
<td>35</td>
</tr>
<tr>
<td>(b) other benefits</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>6. Schools/departments with a high graduate employment rate have a better chance of getting benefits than schools/departments with a low graduate employment rate.</td>
<td>3</td>
<td>16</td>
</tr>
</tbody>
</table>

Notes: SA=strongly agree, A=agree, D=disagree, SD=strongly disagree. Degrees of freedom, df = 3. Level of significance, p: * p < 0.05, ** p < .01, *** p < 0.001 Number of participants, N=152.
(b) With two response categories

<table>
<thead>
<tr>
<th>Survey items</th>
<th>Category of responses</th>
<th>( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>(with numbering as in questionnaire)</td>
<td>SA+A</td>
<td>D+SD</td>
</tr>
<tr>
<td><strong>Perceptions of the university reward system</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. High performers in research have a better chance than high performers in teaching of getting:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) promoted</td>
<td>88</td>
<td>9</td>
</tr>
<tr>
<td>(b) internal funds</td>
<td>86</td>
<td>8</td>
</tr>
<tr>
<td>2. Academics who have more publications have a better chance of getting:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) promoted</td>
<td>93</td>
<td>4</td>
</tr>
<tr>
<td>(b) internal funds</td>
<td>86</td>
<td>7</td>
</tr>
<tr>
<td>3. Academics who receive more external research grants have a better chance of getting:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) promoted</td>
<td>93</td>
<td>4</td>
</tr>
<tr>
<td>(b) internal funds</td>
<td>84</td>
<td>8</td>
</tr>
<tr>
<td>4. Academics who have a high proportion of supervised students who passed their postgraduate research degrees have a better chance of getting:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) promoted</td>
<td>63</td>
<td>22</td>
</tr>
<tr>
<td>(b) internal funds</td>
<td>52</td>
<td>28</td>
</tr>
<tr>
<td><strong>Other rewards by the university</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Academics who receive favourable student surveys on teaching have a better chance of getting:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) promoted</td>
<td>41</td>
<td>47</td>
</tr>
<tr>
<td>(b) other benefits</td>
<td>17</td>
<td>44</td>
</tr>
<tr>
<td>6. Schools/departments with a high graduate employment rate have a better chance of getting benefits than schools/departments with a low graduate employment rate.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>45</td>
</tr>
</tbody>
</table>

Notes: SA=strongly agree, A=agree, D=disagree, SD=strongly disagree. Degrees of freedom, df =1. Level of significance, p: * p < 0.05, ** p < .01, *** p < 0.001. Number of participants, N=152.
Appendix 16

Change/Increase versus no change/increase: Chi-square results for publications, external research grants, higher degree research supervision, paperwork, and teaching

<table>
<thead>
<tr>
<th>Survey items</th>
<th>Category of responses</th>
<th>( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Change/Increase</td>
<td>No change/No increase</td>
</tr>
<tr>
<td><strong>Publications</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. My priorities in publications have changed now compared to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) 1986 (N = 91)</td>
<td>36</td>
<td>64</td>
</tr>
<tr>
<td>(b) 1991 (N = 122)</td>
<td>32</td>
<td>68</td>
</tr>
<tr>
<td><strong>External research grants</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. The types of external research grants for which I now apply have changed compared to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) 1986 (N = 79)</td>
<td>34</td>
<td>66</td>
</tr>
<tr>
<td>(b) 1991 (N = 109)</td>
<td>31</td>
<td>69</td>
</tr>
<tr>
<td><strong>Higher degree research supervision</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. The pressure from the University to ensure that the postgraduate research students whom I supervise pass in minimum time has increased now compared to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) 1986 (N = 92)</td>
<td>50</td>
<td>48</td>
</tr>
<tr>
<td>(b) 1991 (N = 122)</td>
<td>44</td>
<td>54</td>
</tr>
<tr>
<td>2. This increased pressure affects the way I supervise my research students. (N = 88)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Paperwork</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1(c). I have to do more paperwork now in supervising postgraduate research students compared to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) 1986 (N = 90)</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>(b) 1991 (N = 122)</td>
<td>47</td>
<td>53</td>
</tr>
<tr>
<td><strong>Teaching</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. The pressure from the University to teach better has increased now compared to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) 1986 (N = 114)</td>
<td>39</td>
<td>60</td>
</tr>
<tr>
<td>(b) 1991 (N = 146)</td>
<td>34</td>
<td>65</td>
</tr>
<tr>
<td>2. The pressure from the University to ensure that I teach employable skills to my students has increased now compared to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) 1986 (N = 107)</td>
<td>23</td>
<td>70</td>
</tr>
<tr>
<td>(b) 1991 (N = 139)</td>
<td>22</td>
<td>72</td>
</tr>
</tbody>
</table>

cont/-...
### Survey items

<table>
<thead>
<tr>
<th>Category of responses</th>
<th>( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change/Increase</td>
<td>No change/</td>
</tr>
<tr>
<td>No increase</td>
<td></td>
</tr>
</tbody>
</table>

3. The pressure from the University to ensure that the coursework students whom I teach pass within minimum time has increased now compared to:

(a) 1986 (N = 113)

- Change/Increase: 21
- No change/No increase: 72
- Don't know: 7
- \( \chi^2 = 32.35^{***} \)

(b) 1991 (N = 142)

- Change/Increase: 20
- No change/No increase: 75
- Don't know: 5
- \( \chi^2 = 46.09^{***} \)

4. This increased pressure affects my approach to teaching. (N = 105)

- Change/Increase: 24
- No change/No increase: 76
- Don't know: 0
- \( \chi^2 = 28.81^{***} \)

Degrees of freedom, df = 1.

Level of significance, \( p \): * \( p < 0.05 \), ** \( p < .01 \), *** \( p < 0.001 \)
Appendix 17

Determination of the limits of confidence level for changes in work activities

In order to calculate the limits of confidence level under which a percentage of respondents was significantly different from zero, the following formula (Minium, 1978) was used.

\[
pp \pm \frac{1}{2n} \left[ 1.96 \sqrt{\frac{pp(1-pp)}{n}} \right]
\]

where \( n \) is sample size, and \( pp \) is proportion value. For efficiency and to save repeating the confidence interval, the confidence interval for the smallest sample size and smallest proportion that appeared in the data were calculated. This gave a conservative interval because for the opposite case (large sample size and large proportion value), the range in the confidence levels would be smaller and therefore less likely to contain zero. It was found that the smallest number of respondents (79) answered the statement in the questionnaire on types of external grants (Appendix 16). This number was accordingly taken as ‘\( n \)’ in the above formula. Similarly, 18 per cent of the respondents was the smallest percentage and pertained to supervising postgraduate students (Appendix 16). This value was therefore taken as ‘\( pp \)’ in the above formula. Therefore, the 95% confidence interval is given by
\[
= 0.18 \pm \left[ \frac{1}{2(79)} + 1.96 \sqrt{0.18\ (0.82)} \right] \\
= 0.18 \pm 0.09 \\
= 0.09 \text{ to } 0.27
\]

Therefore, if pp is greater than approximately 10%, it would be significantly different from zero.

Taking paperwork associated with higher degree research supervision as an example of a specific work activity, with pp = 0.47 and n = 90

\[
\text{Levels of confidence} = 0.47 \pm \left[ \frac{1}{2(90)} + 1.96 \sqrt{0.47\ (0.53)} \right] \\
= 0.47 \pm 0.11 \\
= 0.36 \text{ to } 0.58
\]

Such a percentage for the sample size is even more significantly different from a percentage of zero.