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MELBOURNE

Rating Major Disciplines in Australian Universities: Perceptions and Reality

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November 2006



MELBOURNE INSTITUTE
of Applied Economic and Social Research

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ISBN 0 7340 3229 3

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Rating Major Disciplines in Australian Universities: Perceptions and Reality*

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Abstract

We evaluate the international academic standing of disciplines in Australian universities using both qualitative and quantitative measures. The disciplines included are Arts & Humanities, Business & Economics, Education, Engineering, Law, Medicine, and Science. We obtain qualitative rankings and ratings by surveying leading scholars in the fields, both within Australia and overseas. The quantitative measures of performance we use are publications and citations from Thomson Scientific, academy membership, success in national competitive grants, downloads of papers, doctoral completions, student entrance scores, student evaluations, and staff-student ratios.

We rank thirty-nine universities separately by the survey results and by an overall performance measure. We find very high correlation between the survey results and actual performance. The results indicate that in about 25 cases disciplines in Australian universities rate in the top 100 in the world; the standout performers are Science at ANU and Medicine at the University of Melbourne.

1. Introduction

While choice of university by undergraduates may be based heavily on the standing of an institution as a whole, for others, such as Ph.D. students and researchers, standing in the discipline is often more important. In previous work (Williams and Van Dyke (2005), (2007)), we rated Australian universities as single entities using as the criterion, 'international academic standing'. We used both a survey and data on a range of measures relating to research, research training, and teaching. We did differentiate, where data permitted, between laboratory-based and non-laboratory based disciplines. In this paper we extend our work and use a finer disaggregation to rate major disciplines.

The seven disciplines or groupings of disciplines that we evaluate are: Arts & Humanities, Business & Economics, Education, Engineering, Law, Medicine, and Science. In an age when organizational boundaries are fluid and structures differ across universities, we deliberately evaluate performance of disciplines rather than individual departments.¹ We evaluate academic standing using both qualitative and quantitative measures. We obtained qualitative rankings and ratings by surveying leading scholars in

* We owe thanks to Emayenesh Seyoum and Carol Smith for assistance with the data. We are greatly indebted to the Department of Education, Science and Training (DEST) and the Graduate Careers Council of Australia (GCCA) for providing data. The use to which we put the data is of course our responsibility.

¹ In particular, we include all components of ANU.

the fields, both within Australia and overseas. The quantitative data relate to research performance, research training and teaching.

We first provide a ranking of institutions by discipline based on responses to the surveys. We then compare the survey results with the direct measures of performance.

2. *The Surveys*

If the academic standing of an institution in a discipline is to be based on various performance measures, overall ranking requires that a set of weights be attached to the various measures used. The choice of weights by an investigator is arguably the most controversial aspect of ranking or rating institutions. The major advantage of a survey in which respondents are asked to provide rankings or ratings is that the choice of weights (including zero weights, which rule out certain performance measures) is implicitly left to the respondents². Overall rankings from surveys will be based on average implicit weights given by respondents.

A limitation of surveys is that respondents may be ill-informed (or well-informed about an institution as it was some time ago). Another limitation is that surveys on their own do not provide information about how an institution might improve its academic standing, although this deficiency may be overcome by linking the survey results with explicit performance measures.

It is not uncommon for academics to denounce the compilation of quantitative measures of performance as a waste of resources on the grounds that “everyone knows who is good”. Survey results show what is the average view; linking survey results to performance indicators answers the question of whether the two methods are alternative ways of achieving the same result.

Different groups of respondents may of course use quite different implicit weights, so the choice of respondents is important: the average implicit weights given by academics may differ from those given by, say, employers. The rankings developed by the *Times Higher Education Supplement (THES)*, for example, use surveys of both academics and employers in order to encompass different attributes of institutions. As we are aiming to measure international academic standing, we survey senior academics of international standing both overseas and within Australia.

We evaluate the performance of disciplines in 39 Australian universities: all those that are members of the Australian Vice-Chancellors Committee (AVCC) plus Notre Dame University, Australia. A full listing with abbreviations used is given in Appendix table A1.

² As part of our previous work we attempted to overcome investigator bias by asking survey respondents to provide weights on a set of attributes – see Williams and Van Dyke (2007). An alternative is for investigators to supply a set of performance measures and provide convenient means by which users can provide their own weights.

We sent questionnaires by mail to deans, departmental heads and full professors, in the seven discipline areas, in Australia and overseas. We used separate questionnaires for each of the disciplines and we asked each academic only about their own discipline.

We selected overseas scholars from universities which fall into at least one of the following groupings: universities in the top 100 in the 2005 rankings by Shanghai Jiao Tong University (SJTU), Canadian and UK universities in the SJTU top 202 or members of the UK Russell Group, representative Asian universities in the SJTU top 400, and eight New Zealand universities. This selection method resulted in a total of 131 overseas universities. Because a few first-rate schools are located in institutions which are not included using the criteria set out above, we added for each of Business, Engineering, Medicine and Law one or two U.S. institutions that are highly ranked in the *US News and World Report* discipline rankings but would otherwise not have entered our sample. Australian scholars were selected from the 39 universities we evaluate.

We chose academics so as to provide a balance among subdisciplines. In Science, for example, we included scholars who span the biological and physical sciences. We chose sample numbers for each discipline in proportion to the diversity of the discipline, with the largest samples for Science and the Humanities and the smallest samples for Economics, Law and Education.

Not all universities teach all disciplines. The number of universities we included on the questionnaire range from the full 39 for Arts & Humanities, Business & Economics, and Science, to 14 for Medicine. We discuss later the methods we used to decide which universities to include in each discipline.

We sent questionnaires to overseas academics in March 2006 and to Australian scholars in June 2006.

We asked only two questions of respondents. In the first, we asked respondents to *rate* the academic standing of the discipline in each Australian university in which it is taught. We asked respondents to place the academic standing of the discipline in each university in one of the following five categories:

- Comparable to top 100 in world
- Comparable to top 101-200 in world
- Comparable to top 201-500 in world
- Not comparable to top 500 in world
- Don't know well enough to rate

In the second question, we asked respondents to *rank* the top five Australian universities, from first to fifth, on the basis of the international academic standing of the discipline. In addition, we asked respondents to state whether they considered each of these universities to be ranked in the top 25 or top 50 in the world. Combining the results of question two with those from question one enabled us to construct a seven-point scale of perceived international standing for each discipline.

In order to combine the *ratings* into single measures we use a linear rating scale, allocating 6 points to a university discipline in the top 25, 5 to one in the top 50, and so on, with 1 if not in the top 500 and 0 if not known. In order to combine the *rankings* into a single measure we again use a linear scale, allocating 5 to the first-ranked university, 4 to the second-ranked university, and so on. The top five rankings should of course be consistent with the ratings; the rankings have the effect of separating out more precisely the top-rated universities, which may have the same ratings.

We calculate both the ratings and rankings measures separately for returns from overseas academics and from Australian academics, standardizing each of the four results by giving the highest ranked or rated university a score of 100 and expressing all other university scores as a percentage of the highest score. We then obtain an overall measure by weighting equally the four components and rescaling so that the top university is given a score of 100.

3. Survey Results

In this section we comment further on the methodology and discuss the results of the survey for each discipline. We chose large sample sizes (1620 for overseas scholars, 1029 for Australian) because previous work indicated that response rates would be low, especially for overseas scholars. Overall response rates were 31 per cent for Australian scholars and a very low 13 per cent for overseas academics. We know little about response bias but it seems reasonable to assume that the overseas respondents are those academics who are more familiar with Australian universities. We are comforted by the high correlations between the results from overseas and Australian academics.

We looked at Australian returns both with and without ‘own university’. While academics tended to over-rate their own university this was common across universities and made little difference to the overall results. We therefore include all returns.

3.1 Arts and Humanities (Table 3.1)

In choosing the sample for Arts & Humanities we selected scholars predominately from English, History/Classics, and Philosophy. Because all 39 universities teach some arts and humanities subjects, none was excluded from the questionnaire. The overall results show that three universities stand out as the strongest in terms of international academic standing in Arts & Humanities: ANU, Melbourne and Sydney. ANU is ranked first by overseas academics and Melbourne is ranked first by Australian academics. A non-Go8 university, La Trobe, is ranked sixth.

3.2 Business and Economics (Table 3.2)

We conducted separate surveys for Business and for Economics. We did so because in many overseas universities Economics is located separately from Business, although the business school may also employ economists. We included all 39 universities in the

Business questionnaire, which was sent to academics in the areas of management, marketing, accounting and finance. For Economics, we included 29 universities, based on the list used by Neri and Rogers (2006), chosen as having both PhD programs in economics and identifiable staff in the area.³

We combined the results for the surveys using a weight of $\frac{1}{4}$ for Economics and $\frac{3}{4}$ for Business, based roughly on staff and student numbers; for those universities where Economics was not surveyed we allocated the full weight to Business. The results are presented in table 3.2 for the two component groups and the combined group. We rank universities according to the combined score.

In the business school survey, Melbourne and UNSW are the most highly rated by both overseas and Australian academics.

In Economics, ANU and Melbourne are the top-rated universities but the overseas and domestic responses differ markedly, particularly when respondents are asked to rank the top five universities— ANU is clearly the first-ranked university by overseas economists but Australian economists rank Melbourne higher than ANU.

For Business and Economics combined, Melbourne and New South Wales are rated most highly. These universities contain both professional business schools and faculties of commerce, at least for the survey period.

3.3 Education (Table 3.3)

The size and nature of education schools vary across universities but we used a wide definition of a ‘school of education’: any university which had more than four academic staff in ‘Education’ as classified by the Department of Education, Science and Training (DEST). Under this definition, we included all but four of the 39 universities.⁴

The survey results indicate that the two top schools of education are Melbourne and Monash followed by Sydney. The rankings of these three are the same for both overseas and domestic respondents. Three non-Go8 universities appear among the top eight institutions: QUT, Deakin and Curtin. QUT is ranked third by Australian respondents. In the 1980s these three universities incorporated strong teacher-training institutions.

3.4 Engineering (Table 3.4)

We excluded institutions if no academic staff member was classified by DEST as “Engineering and Related Technologies”. This definition left 28 of the potential 39

³ Neri and Rodgers list 29 universities to which we add Bond and delete the Australian Defence Force Academy.

⁴ The universities which did not reach our threshold of a school of education were ANU, Bond University, Swinburne University of Technology, and the University of the Sunshine Coast. All included universities had more than 10 academic staff except Adelaide which had only 6 teaching staff in 2004.

universities.⁵ We sent the questionnaire to academics in each of the main branches of engineering.

The top three universities are Melbourne, New South Wales and Sydney. Sydney is ranked highest by overseas respondents; Melbourne and New South Wales are ranked highest by Australian academics. The highest ranked non-Go8 institution is Newcastle.

3.5 Law (Table 3.5)

The included universities are the 29 that are members of the Council of Australian Law Deans. Three universities stand out as being rated above the rest: Melbourne, Sydney and ANU. Melbourne was rated most highly by Australian law academics, ANU and Melbourne by overseas law academics. Go8 universities occupy the top eight places. Macquarie is rated the highest of the non-Go8 universities.

3.6 Medicine (Table 3.6)

The recent and proposed establishment of new schools of medicine make it less clear cut than in other disciplines as to which schools should be included. We have included all medical schools that are represented on the Committee of Deans of Australian Medical Schools except for the University of Notre Dame, Australia⁶ -- a total of 14. It is inevitable that the relatively new schools (ANU, Bond, James Cook and Griffith) will score lower in our survey.

We surveyed academics based in both clinical and nonclinical departments and in a range of specialist areas.

The survey results are clear-cut: Melbourne is first ranked by both overseas and Australian academics; Sydney and Monash are next ranked.

3.7 Science (Table 3.7)

We included all 39 universities in the questionnaire. The results are again clear-cut: ANU is ranked first by both overseas and Australian scientists. The next ranked universities are Melbourne and Sydney. The Go8 universities occupy the top 8 positions; Macquarie is the highest rated non-Go8 university by both overseas and Australian respondents.

⁵ The institutions with no academic staff classified as Engineering in 2004 were: Australian Catholic University, Bond, Charles Darwin, Charles Sturt, Flinders, Murdoch, Southern Cross, Canberra, New England, Notre Dame Australia and the University of the Sunshine Coast. The institutions included differ from the membership of the deans of engineering; that list does not include Macquarie University but does include Charles Darwin, Flinders, Murdoch and the University of Canberra. The difference between the lists seems to be due largely to the fact that we have not included staff in information technology.

⁶ Medicine was the first discipline surveyed and at that stage we had intended to include only universities that were members of the AVCC. We subsequently reversed that decision for other disciplines.

Table 3.1

ARTS AND HUMANITIES

University	Ratings Overseas	Ratings Australian	Rankings Overseas	Rankings Australian	Overall*
1 Australian National University	100.0	97.0	100.0	82.3	100.0
2 University of Melbourne	87.1	100.0	81.8	100.0	97.2
3 University of Sydney	85.3	90.5	97.7	86.6	95.0
4 Monash University	59.5	67.2	29.5	21.3	46.8
5 University of Queensland	43.5	71.6	11.4	32.3	41.9
6 La Trobe University	50.0	58.9	12.5	9.8	34.6
6 University of New South Wales	36.4	63.8	12.5	18.3	34.5
8 University of Western Australia	39.7	62.3	9.1	14.0	33.0
9 Macquarie University	42.2	53.1	6.8	4.9	28.2
9 University of Adelaide	42.6	57.5	4.5	1.8	28.1
11 Griffith University	18.1	54.0	3.4	6.1	21.5
12 University of Tasmania	21.6	47.7	1.1	0.6	18.7
12 Flinders University of South Australia	21.6	46.7	2.3	0.0	18.6
14 University of New England	22.4	44.3	0.0	2.4	18.2
15 University of Wollongong	13.8	43.8	1.1	1.8	16.0
15 University of Newcastle	19.8	40.4	0.0	0.0	15.9
17 Deakin University	10.3	44.3	0.0	1.8	14.9
18 University of Technology, Sydney	7.8	41.9	0.0	3.7	14.0
19 Murdoch University	10.3	37.5	0.0	1.2	12.9
19 Queensland University of Technology	9.5	37.5	0.0	1.8	12.9
21 Curtin University of Technology	6.0	34.6	0.0	0.0	10.7
21 University of Canberra	12.1	28.2	0.0	0.0	10.6
23 University of Western Sydney	6.0	33.1	0.0	0.0	10.3
23 RMIT University	6.0	31.2	0.0	1.8	10.3
23 James Cook University	6.9	29.7	0.0	0.0	9.6
23 University of South Australia	4.3	32.1	0.0	0.0	9.6
27 Edith Cowan University	6.9	27.3	0.0	0.0	9.0
28 Victoria University	6.9	23.4	0.0	0.0	8.0
29 Swinburne University of Technology	3.4	23.9	0.0	0.0	7.2
29 Charles Sturt University	6.0	20.5	0.0	0.0	7.0
29 University of Southern Queensland	5.2	20.9	0.0	0.0	6.9
32 Bond University	6.9	17.5	0.0	0.0	6.4
32 Charles Darwin University	5.2	19.0	0.0	0.0	6.4
32 University of Ballarat	3.4	20.0	0.0	0.0	6.2
32 Central Queensland University	4.3	19.0	0.0	0.0	6.1
32 Southern Cross University	3.4	18.0	0.0	0.0	5.7
32 University of the Sunshine Coast	2.6	18.5	0.0	0.0	5.6
38 Australian Catholic University	2.6	17.5	0.0	0.0	5.3
38 University of Notre Dame Australia	0.9	16.6	0.0	0.0	4.6
# responses	34	47			81

* Calculated with equal weight on each of the four components

Correlation between overseas and Australian ratings 0.943

Table 3.2

BUSINESS

ECONOMICS

University	Rating O/seas	Rating Aust	Ranking O/seas	Ranking Aust	Rating O/seas	Rating Aust	Ranking O/seas	Ranking Aust	Overall*
1 University of Melbourne	100.0	100.0	100.0	100.0	80.2	92.9	63.1	100.0	100.0
2 University of New South Wales	95.5	93.7	86.8	79.6	73.6	79.6	50.5	71.3	87.4
3 University of Sydney	82.1	75.7	79.2	33.8	63.7	68.1	35.9	20.4	65.1
4 Australian National University	62.7	65.3	28.3	21.8	100.0	100.0	100.0	90.7	60.2
5 Monash University	77.6	70.3	43.4	21.8	63.7	65.5	24.3	16.7	52.7
6 University of Queensland	52.2	82.9	32.1	49.5	31.9	68.1	1.0	25.9	50.6
7 University of Western Australia	50.7	61.3	18.9	11.6	36.3	61.9	7.8	16.7	35.8
8 Macquarie University	50.7	57.2	15.1	13.0	23.1	46.0	0.0	0.9	31.1
9 University of Adelaide	38.8	44.1	1.9	0.9	36.3	53.1	2.9	3.7	23.0
10 University of Technology, Syd	28.4	51.8	9.4	3.2	17.6	41.6	3.9	0.9	22.3
11 Queensland Univ of Technology	28.4	49.1	1.9	3.7	15.4	41.6	0.0	1.9	20.0
12 La Trobe University	25.4	34.7	11.3	0.0	25.3	52.2	4.9	1.9	19.4
13 Griffith University	34.3	36.9	3.8	0.0	14.3	32.7	0.0	0.0	17.7
14 Curtin University	32.8	35.1	0.0	1.4	15.4	38.1	0.0	0.0	17.0
15 University of South Australia	23.9	34.2	0.0	0.0					15.1
15 Deakin University	25.4	37.4	0.0	0.0	14.3	28.3	0.0	0.0	15.0
15 Bond University	26.9	35.6	0.0	0.5	13.2	22.1	0.0	0.0	14.6
15 University of Wollongong	22.4	37.8	0.0	0.5	11.0	30.1	0.0	0.0	14.5
19 RMIT University	20.9	37.4	0.0	0.0	15.4	29.2	1.0	0.0	14.3
20 University of Tasmania	13.4	34.7	0.0	0.0	14.3	44.2	0.0	0.9	13.3
20 Flinders University	22.4	28.8	0.0	0.0	17.6	30.1	0.0	0.0	13.1
20 University of Newcastle	16.4	32.9	1.9	0.0	17.6	30.1	0.0	0.0	13.1
23 Edith Cowan University	23.9	27.5	0.0	0.0	4.4	17.7	0.0	0.0	11.5
23 University of New England	17.9	23.4	0.0	0.0	15.4	35.4	0.0	0.0	11.4
23 Victoria University	20.9	24.3	0.0	0.0	13.2	21.2	1.9	0.0	11.2
23 Murdoch University	16.4	27.0	0.0	0.0	7.7	30.1	0.0	0.0	10.9
23 University of Sthn Queensland	16.4	22.5	7.5	0.0	5.5	17.7	0.0	0.0	10.6
28 University of Canberra	10.4	25.7	0.0	0.0	16.5	27.4	1.0	0.0	10.0
28 Charles Sturt University	14.9	22.1	0.0	0.0					9.6
30 University of Western Sydney	10.4	26.1	0.0	0.0	7.7	26.5	0.0	0.0	9.4
30 James Cook University	13.4	21.6	1.9	0.0	6.6	25.7	0.0	0.0	9.3
30 Swinburne University	7.5	25.7	0.0	0.0					8.6
33 Charles Darwin University	10.4	20.3	0.0	0.0					8.0
33 University of the S'shine Coast	10.4	19.8	0.0	0.0					7.9
35 Central Queensland University	7.5	21.2	0.0	0.0					7.5
35 Southern Cross University	7.5	20.7	0.0	0.0					7.3
35 University of Ballarat	7.5	19.8	0.0	0.0					7.1
35 University of Notre Dame	10.4	16.2	0.0	0.0					7.0
39 Australian Catholic University	4.5	18.5	0.0	0.0					6.0
# responses	24	51			23	27			125

* Weight of 0.75 for Business and 0.25 for Economics except weight of 1 on Business when no Economics

Correlation between overseas and domestic 0.952

Table 3.3

EDUCATION

University	Ratings Overseas	Ratings Australian	Rankings Overseas	Rankings Australian	Overall*
1 University of Melbourne	100.0	100.0	100.0	100.0	100.0
2 Monash University	91.0	93.8	73.8	89.5	87.0
3 University of Sydney	83.7	78.9	63.9	46.3	68.2
4 University of Queensland	55.8	74.6	32.8	48.4	52.9
5 Queensland University of Technology	44.9	84.1	9.8	66.3	51.3
6 Deakin University	63.2	71.7	19.7	33.7	47.1
7 Curtin University of Technology	36.5	54.3	4.9	25.3	30.3
7 University of Western Australia	53.4	45.7	11.5	10.5	30.3
9 Macquarie University	42.1	54.3	3.3	9.5	27.3
10 University of New South Wales	41.1	42.0	9.8	8.4	25.4
10 University of South Australia	30.9	55.8	0.0	13.7	25.1
10 Griffith University	36.5	48.4	3.3	10.5	24.7
10 University of Wollongong	30.9	53.6	0.0	13.7	24.6
10 University of Technology, Sydney	36.5	50.7	9.8	1.1	24.5
15 University of Western Sydney	25.3	52.9	0.0	14.7	23.2
15 University of Newcastle	30.9	54.3	0.0	7.4	23.1
17 University of New England	28.1	50.0	0.0	10.5	22.2
17 University of Tasmania	35.1	44.2	8.2	1.1	22.1
17 La Trobe University	33.7	45.7	3.3	4.2	21.7
20 Flinders University of South Australia	40.7	39.9	0.0	1.1	20.4
21 Edith Cowan University	28.1	45.7	0.0	1.1	18.7
21 University of Adelaide	38.2	36.2	0.0	0.0	18.6
23 Murdoch University	23.9	45.7	0.0	4.2	18.4
23 RMIT University	23.9	43.5	0.0	3.2	17.6
25 Charles Sturt University	22.5	38.4	0.0	2.1	15.7
26 University of Southern Queensland	15.5	34.1	4.9	4.2	14.7
26 James Cook University	18.3	39.9	0.0	0.0	14.5
28 University of Canberra	19.7	33.3	0.0	0.0	13.2
28 Australian Catholic University	15.5	31.9	0.0	3.2	12.6
30 Southern Cross University	12.6	28.3	0.0	0.0	10.2
30 Central Queensland University	14.0	26.1	0.0	0.0	10.0
30 University of Notre Dame Australia	11.2	26.8	0.0	0.0	9.5
33 Victoria University	14.0	23.2	0.0	0.0	9.3
33 University of Ballarat	15.5	21.7	0.0	0.0	9.3
35 Charles Darwin University	5.6	24.6	0.0	0.0	7.6

respondents

23

38

61

* Calculated with equal weight on each of the four components

Correlation between overseas and Australian ratings

0.893

Table 3.4

ENGINEERING

University	Ratings Overseas	Ratings Australian	Rankings Overseas	Rankings Australian	Overall*
1 University of Melbourne	97.9	100.0	83.8	100.0	100.0
2 University of New South Wales	97.8	98.2	92.6	88.2	98.7
3 University of Sydney	100.0	83.9	100.0	58.3	89.6
4 Monash University	79.2	85.3	48.5	56.7	70.7
5 University of Queensland	65.6	85.9	30.9	65.4	64.9
6 Australian National University	80.2	67.2	69.1	29.1	64.4
7 University of Western Australia	45.8	57.3	22.1	22.0	38.6
8 University of Newcastle	36.5	58.1	17.6	9.4	31.9
9 University of Adelaide	40.6	61.7	7.4	9.4	31.2
10 RMIT University	34.4	45.1	11.8	0.0	23.9
11 Queensland University of Technology	21.9	46.3	0.0	7.9	19.9
12 University of Wollongong	27.1	42.7	0.0	0.8	18.5
13 Curtin University of Technology	21.9	38.0	0.0	1.6	16.1
14 University of Technology, Sydney	13.5	41.5	0.0	3.1	15.3
15 University of Tasmania	12.5	38.0	0.0	0.8	13.4
15 University of South Australia	15.6	35.6	0.0	0.0	13.4
15 Swinburne University of Technology	14.6	33.8	0.0	0.0	12.7
18 James Cook University	11.5	32.0	0.0	3.1	12.2
18 University of Southern Queensland	12.5	24.9	4.4	3.9	12.0
20 Deakin University	13.5	28.5	0.0	1.6	11.4
20 La Trobe University	15.6	24.9	0.0	1.6	11.0
20 Macquarie University	12.5	27.9	0.0	0.0	10.6
23 Griffith University	8.3	28.5	0.0	0.0	9.6
24 Central Queensland University	9.4	25.5	0.0	0.0	9.1
24 Victoria University	12.5	21.4	0.0	0.0	8.9
26 University of Western Sydney	8.3	21.9	0.0	0.0	7.9
26 University of Ballarat	7.3	21.4	0.0	0.0	7.5
28 Edith Cowan University	6.3	20.8	0.0	0.0	7.1
# responses	32	42			74
* Calculated with equal weight on each of the four components					
Correlation between overseas and Australian ratings	0.957				

Table 3.5

LAW

University	Ratings Overseas	Ratings Australian	Rankings Overseas	Rankings Australian	Overall*
1 University of Melbourne	89.2	100.0	100.0	100.0	100.0
2 University of Sydney	86.7	88.5	86.8	81.5	88.2
2 Australian National University	100.0	82.4	100.0	59.3	87.8
4 University of New South Wales	50.5	78.4	41.2	53.3	57.4
5 Monash University	63.4	67.6	44.1	36.3	54.3
6 University of Queensland	36.6	54.7	13.2	11.1	29.7
7 University of Western Australia	33.3	47.3	7.4	2.2	23.2
8 University of Adelaide	32.3	42.6	0.0	0.0	19.2
9 Macquarie University	19.4	42.6	5.9	2.2	18.0
10 Griffith University	16.1	42.6	4.4	1.5	16.6
11 Queensland University of Technology	15.1	43.2	0.0	5.9	16.5
12 University of Tasmania	12.9	41.2	0.0	0.7	14.1
12 Bond University	8.6	39.9	0.0	5.2	13.8
14 La Trobe University	17.2	29.7	2.9	1.5	13.2
15 Flinders University of South Australia	15.1	31.8	0.0	1.5	12.4
15 University of Technology, Sydney	12.9	35.1	0.0	0.0	12.3
17 Murdoch University	10.8	31.8	0.0	0.0	10.9
17 University of Wollongong	9.7	31.8	0.0	0.7	10.8
19 University of Canberra	15.1	23.0	0.0	0.0	9.8
20 Deakin University	7.5	29.1	0.0	0.0	9.4
20 Victoria University	10.8	21.6	2.9	0.0	9.1
20 University of Newcastle	6.5	28.4	0.0	0.0	8.9
23 University of Notre Dame Australia	6.5	20.9	0.0	0.0	7.0
23 University of New England	4.3	23.0	0.0	0.0	7.0
23 Charles Darwin University	5.4	18.9	0.0	2.2	6.8
23 James Cook University	5.4	20.9	0.0	0.0	6.8
23 Southern Cross University	4.3	21.6	0.0	0.0	6.7
23 Edith Cowan University	5.4	20.3	0.0	0.0	6.6
29 University of Western Sydney	3.2	20.9	0.0	0.0	6.2
# responses	24	32			56
* Calculated with equal weight on each of the four components					
Correlation between overseas and Australian ratings					
	0.943				

Table 3.6

MEDICINE

University	Ratings Overseas	Ratings Australian	Rankings Overseas	Rankings Australian	Overall*
1 University of Melbourne	100.0	100.0	100.0	100.0	100.0
2 University of Sydney	70.1	89.4	52.6	74.5	71.7
3 Monash University	72.4	72.7	73.7	37.6	64.1
4 University of New South Wales	59.8	70.8	35.5	25.5	47.9
5 University of Adelaide	55.2	65.2	21.1	16.3	39.4
6 University of Queensland	41.4	67.7	6.6	29.8	36.4
7 Australian National University**	41.4	48.4	23.7	20.6	33.5
8 University of Western Australia	36.8	64.0	6.6	16.3	30.9
8 Flinders University of South Australia	41.4	54.7	11.8	15.6	30.9
10 University of Newcastle	41.4	49.7	1.3	6.4	24.7
11 University of Tasmania	26.4	38.5	0.0	0.0	16.2
12 James Cook University**	18.4	33.5	5.3	4.3	15.4
13 Bond University**	13.8	21.7	3.9	1.4	10.2
14 Griffith University**	11.5	26.1	0.0	0.0	9.4

responses

24

36

60

* Calculated with equal weight on each of the four components

** First student intakes were: James Cook (2002), ANU (2002), Griffith (2005) and Bond (2005). The University of Notre Dame was not included in our survey.

Correlation between overseas and Australian ratings

0.946

Table 3.7

SCIENCE

University	Ratings Overseas	Ratings Australian	Rankings Overseas	Rankings Australian	Overall*
1 Australian National University	100.0	100.0	100.0	100.0	100.0
2 University of Melbourne	93.0	83.5	71.5	73.4	80.3
3 University of Sydney	79.6	83.0	56.9	68.6	72.0
4 University of Queensland	49.3	67.0	26.2	37.2	44.9
5 University of New South Wales	54.9	61.8	26.2	20.7	40.9
6 Monash University	59.9	59.9	25.4	16.0	40.3
7 University of Adelaide	53.5	55.3	13.1	5.9	31.9
8 University of Western Australia	31.7	53.3	6.2	4.3	23.9
9 Macquarie University	28.2	46.6	6.2	1.6	20.6
10 James Cook University	23.9	41.9	3.1	2.1	17.8
11 La Trobe University	27.5	39.6	2.3	0.0	17.4
11 University of Tasmania	23.2	41.9	2.3	0.0	16.9
13 University of Wollongong	23.2	39.6	0.0	0.0	15.7
14 Griffith University	23.2	36.4	0.0	1.1	15.2
14 Flinders University of South Australia	24.6	33.7	2.3	0.0	15.2
16 University of Newcastle	15.5	37.8	0.0	0.0	13.3
17 Curtin University of Technology	16.9	31.8	0.0	0.0	12.2
17 Murdoch University	14.8	30.4	0.0	1.1	11.6
19 Queensland University of Technology	12.0	33.2	0.0	0.0	11.3
19 University of Canberra	23.2	18.0	3.8	0.0	11.3
19 Swinburne University of Technology	11.3	27.7	3.1	2.1	11.0
19 University of South Australia	17.6	26.3	0.0	0.0	11.0
19 RMIT University	12.7	29.5	0.0	0.5	10.7
24 University of Technology, Sydney	8.5	32.7	0.0	0.0	10.3
24 University of New England	12.7	27.2	0.0	0.0	10.0
24 Deakin University	13.4	26.3	0.0	0.0	9.9
27 Charles Darwin University	9.2	21.2	0.0	0.0	7.6
28 Charles Sturt University	7.7	21.7	0.0	0.0	7.4
28 Central Queensland University	8.5	20.7	0.0	0.0	7.3
28 University of Western Sydney	7.7	20.3	0.0	0.5	7.1
28 Edith Cowan University	8.5	19.4	0.0	0.0	7.0
32 Victoria University	10.6	15.2	0.0	0.0	6.4
32 Southern Cross University	4.9	18.4	0.0	0.0	5.8
32 University of Ballarat	5.6	16.6	0.0	0.0	5.6
32 University of Southern Queensland	5.6	16.6	0.0	0.0	5.6
36 Bond University	6.3	15.2	0.0	0.0	5.4
36 University of the Sunshine Coast	4.2	13.8	0.0	0.0	4.5
38 University of Notre Dame Australia	3.5	13.8	0.0	0.0	4.3
38 Australian Catholic University	2.1	13.4	0.0	0.0	3.9
# responses	42	44			86

* Calculated with equal weight on each of the four components

Correlation between overseas and Australian ratings 0.959

3.8 Summary of Survey Findings

Although the Go8 universities tend to dominate, there exist marked differences across disciplines. In Education, for example, non-Go8 institutions score highly. Overall, though, ANU and the University of Melbourne tend to be the most highly-ranked institutions, a result which is consistent with our earlier work on institutions as a whole and the rankings of SJTU and the Times Higher Education Supplement.

Some systematic differences exist between the views of overseas and Australian scholars across disciplines. Ratings by Australian academics exhibit a smaller range than do those by overseas scholars. This result occurs mainly because a larger percentage of overseas respondents classify newer universities as “don’t know well enough to rate”. Another noticeable difference is that overseas respondents consistently rate ANU higher and Queensland lower than do Australian respondents.

We have of course omitted from our study several discipline areas, such as information technology, creative arts, social sciences other than economics, and the wider health area. By definition we have ignored cross-disciplinary studies. Putting it another way, we have concentrated on disciplines that are strongest in the well-established Go8 universities. It is therefore not unexpected that Go8 universities dominate the rankings – with the exception of Education.

In converting the ratings to scores out of 100, we have ignored the question of how Australian disciplines rank internationally. While we have more confidence in relative ratings than in absolute, it is of some interest to ask: in how many Australian universities are disciplines considered in the top 50 or top 100 in the world? The findings are shown in table 4, where we pool the survey responses from overseas and Australian scholars. We list those disciplines where at least 40 per cent of respondents state that the university in that discipline is in the top 50 or top 100 in the world.⁷

The results presented in table 4 indicate that Australia universities are strongest in Engineering, with six universities in the top 100 in the world, and Medicine is the next strongest; in all other fields there are at most three Australian universities in the top 100 in the world. Our survey results imply that Education has only one university in the top 100 using the criterion of international academic standing. Later on in section 6, however, we find that Queensland is ranked ahead of Melbourne on performance measures in Education and we have modified table 4 to include Queensland. The standout performers overall are Medicine at Melbourne (28 per cent of respondents put it in the top 25 per cent in the world) and Science at ANU (64 per cent of respondents put it in the top 50 in the world and 19 per cent in the top 25 per cent).

⁷ We take 40 per cent rather than 50 per cent because of the ambiguity in interpreting the category, “don’t know well enough to rate”, which is included as one of the possible responses.

Table 4: World Class Performers

World Rank	Humanities	Business	Economics	Education	Engineering	Law	Medicine	Science
Top 50	ANU Melbourne	Melbourne			Melbourne Sydney** UNSW	ANU Melbourne Sydney	Melbourne	ANU
Top 51-100	Sydney	UNSW	ANU Melbourne	Melbourne Queensland*	ANU Monash Queensland		Monash Sydney Queensland*	Melbourne Sydney
# responses	81	75	50	61	74	56	60	86

University included if at least 40 per cent of respondents classify in range. Exceptions are those marked with one asterisk, which have been added on the basis of performance data, and that marked with two asterisks, which has moved up a category on the basis of performance data. Universities are listed alphabetically in each range.

4. Performance Measures: Methodology

Quantitative measures of the international academic standing of an institution can be divided into three categories:

- Quality or international standing of staff as judged by publications and citations, peer recognition as evidenced for example by election to learned bodies, and competitive research grants obtained
- Quality of graduate and undergraduate programs as evidenced by attributes such as demand for places, placement of students, completion rates, and student satisfaction
- Resource levels

These three categories are of course inter-related: a first-rate graduate program depends on first-rate staff; a good undergraduate program needs to be well resourced, and so on.

Conceptualising what measures should be used is relatively easy; the hard part is implementation using reliable data that is publicly available. Data at the discipline level are harder to obtain than at the institutional level. A particular problem at the discipline level is defining the boundaries of the discipline.

The variables we use are listed below. They meet the two criteria of conceptual relevance and data availability for more than one discipline.

4.1 Quality/International Standing of Academic Staff

The variables we use to measure the quality of academic staff are publications and citations of journal articles using the Thomson Scientific (TS) Data bases; highly-cited authors as defined by TS; membership in Australian academic academies; success in national competitive grants; and downloads of papers.

For Engineering, Medicine and Science we use the TS Essential Science Index (ESI) data for the period 1 January 1996 to 30 April 2006. The ESI data are available for 22 fields of scholarship which we group into our disciplines as described below. For Arts & Humanities, Business & Economics, and Education we use the TS University Statistical Indicators (USI) for the period 1996-2005⁸. A feature of the ESI data is that universities enter only if a threshold is reached; namely, an institution must be in the top one per cent in the world in a field. The USI data bank does not have this constraint, although only journals in the TS data bank are included.⁹ The data base is therefore biased towards journals of international standard, but this bias matches our aim of measuring international standing. For all disciplines we also present publication counts for the

⁸ We are indebted to Thomson Scientific for permission to use this data.

⁹ The USI data base does not include the University of Ballarat, the University of Southern Queensland, and the University of Notre Dame, Australia.

period 2001-2005. The citations data in both ESI and USI relate to citations to articles published within the period. We deem that for many disciplines a five-year window is too small and so we confine the presentation of citations to ESI data for 1996-2006, which uses a 10-year window. No suitable data base for books exists and so this form of output is excluded. The time period for ISI highly-cited authors is 1981 to 1999.

The suitability of the data bases varies markedly across disciplines which we discuss below.

Membership of the four academies (Science, Humanities, Social Sciences and Technological Sciences and Engineering) were extracted from the relevant web pages in March 2006.¹⁰ We included all academics who provided a university affiliation other than those listed as 'visiting'.

Downloads of papers from the Social Sciences Research Network (SSRN) relate to Law and Business for the 12 months ending 1st October 2006 and were obtained from www.ssrn.com.

Our final measure of research standing is success in national competitive grants. For Medicine we use the total value of funding from the National Health and Medical Research Council in the 2005 and 2006 rounds. For other disciplines we use the number of ARC discovery projects and linkage projects funded in the last two rounds.¹¹ We map the RFCDC codes into our disciplines in a way that is broadly consistent with the sample we used in the surveys:

Arts & Humanities = Language and Culture + History and Archaeology + Philosophy and Religion
Business & Economics = Economics + Commerce, Management, Tourism and Services
Education = Education
Engineering = Engineering and Technology
Law = Law, Justice and Law Enforcement
Science = Physical Sciences + Chemical Sciences + Earth Sciences + Biological Sciences

We are interested in evaluating the international academic standing of disciplines. In our previous work we concluded that such standing was related primarily to total research performance rather than research performance per academic staff member. Of course size is relevant for other measures, such as research productivity. Because of our earlier findings, we do not deflate research measures by size, although we do provide an indicator of size in the form of an index of full-time and fractional full-time academic

¹⁰ Details are as follows: the Australian Academy of the Humanities (www.humanities.org.au), the Australian Academy of Science (www.science.org.au), the Academy of Social Sciences in Australia (www.assa.edu.au), and the Australian Academy of Technological Sciences and Engineering (www.atse.org.au).

¹¹ These are Discovery Projects with funding to commence in 2006 and 2007 and Linkage Projects to commence in 2007 and July 2006. Sources for the data on grants are www.nhmrc.edu.au and www.arc.edu.au/grant_programs. We ignore the fact that some NHMRC grants are allocated to disciplines other than Medicine and some ARC grants are allocated to Medicine.

staff in 2004, excluding casuals and those holding teaching-only positions. There is a particular difficulty in measuring the input of auxiliary staff, especially in professional faculties. To match output against staff numbers would require time series on the number of staff, however defined, who were capable of contributing to that output.

4.2 Quality of Programs

The variables we use to measure quality of programs are quality of undergraduate student intake, undergraduate student evaluation of programs, doctorates by research¹², and the staff-student ratio. The staff-student ratio acts in part as a measure of resources (for which we do not have direct data). Completions of research doctorates are taken over the three years 2002-2004.

We measure the quality of undergraduates by the average Tertiary Entry Score (TES) for students entering bachelors degrees (including those with graduate entry) and undergraduate diplomas in 2004.

We use results from the Course Experience Questionnaire (CEQ) to measure student evaluation of courses. We use responses to the question, “Overall, I was satisfied with the quality of the course”, for each of our discipline groups. The results are coded on a five-point scale ranging from ‘strongly agree’ to ‘strongly disagree’ and are converted to a single number with a maximum of 100 using the weights -100, -50, 0, 50, 100. We use two-year averages of those who graduated with a bachelor’s degree in 2003 and 2004.

Staff-student ratios relate to 2004; we measure student and academic staff numbers in equivalent full-time units; we exclude research-only staff and off-shore students. Our staff-student ratios are valid in those cases where there are no off-shore courses or where off-shore students are taught by offshore staff (who are not included in our data); where off-shore students are taught by local staff the staff-student ratios we use are over-estimates. In practice of course universities may teach off-shore students using a combination of local and off-shore staff. We note in the tables those instances in which offshore students represent a significant part of the total student load.

In calculating staff-student ratios from DEST data we map the 12 broad Academic Organisational Unit (AOU) groups into our categories as follows:

Arts & Humanities = Society and Culture – Law – Economics and Commerce –
Behavioural Science

Business & Economics = Management and Commerce + Economics and Econometrics

Education = Education

Engineering = Engineering and Related Technologies

Law = Law

Medicine = Medical Studies

Science = Natural and Physical Sciences

¹² In most disciplines the data relate to Ph.D. completions but other research doctorates are numerically important in areas such as Business and Education.

These are also the groupings we use for doctoral completions, CEQ results and entrance scores (TES)¹³.

5. Performance Measures: Results

The total set of performance measures we use are: publications and citations in Thomson Scientific, academy membership, ARC and NHMRC grants, doctoral completions, entrance scores, student evaluations on graduation (CEQ), and staff-student ratios. Data availability varies across disciplines so that it is convenient to discuss details by discipline. Where data on a performance measure are not available for only a few institutions we include the attribute but do not rank those institutions where data are missing. Many of our quantitative measures are not available for the University of Notre Dame Australia, so we exclude this university for all disciplines.

We scale the relevant measures so that the best-performing institution on each is given a score of 100. We obtain an overall performance measure (except for Law where data are limited) by a simple unweighted average of the indicators we have available for each discipline, except that we give a half weight to staff-student ratios owing to the limitations of these data noted above. Note, however, that we are deliberately giving an implicit double weight to publications in the period 2001-2005 (these data enter twice). In the tables, we rank universities according to the overall performance score (again except for Law).

The data for each performance measure and the overall measure are correlated against the survey results given in section 3. We also correlate publications with the other measures.

5.1 Arts and Humanities (Table 5.1)

In Arts & Humanities, DEST returns for the Go8 universities show that between 50 and 60 per cent of (weighted) publications in the humanities is in the form of books and book chapters, which we do not measure. Notwithstanding the limits of our data, which relate only to journal articles, ANU, Melbourne and Sydney dominate in the number of publications and this matches the survey findings (the correlation coefficients between the survey results and the publications results are 0.93). For the period 1996 -2005, the publication rankings are Sydney, ANU, Melbourne; for the period 2001-2005 the rankings are Sydney, Melbourne and ANU.

ANU has a clear ascendancy in membership in the academies, leads in ARC project funding, and is a close second to Melbourne in completions of research doctorates. Melbourne and UWA have the highest undergraduate entrance standards; UNE students are the most satisfied with their course.

¹³ Except that for the CEQ data Behavioural Science remains in Arts & Humanities.

Overall, on performance measures, ANU is ranked first, Melbourne second, and Sydney third.

5.2 Business and Economics (Table 5.2)

In Business & Economics, Melbourne is ranked first on publications for both time periods and in SSRN downloads. ANU and UNSW are ranked second for publications over the long period but UNSW is second over the more recent five years. The research output data are highly correlated with the survey rankings ($r = 0.94$). ANU's rank in publications is closer to the survey results for Economics than it is to the combined rank for Business and Economics.¹⁴

Membership in the academies is dominated by economists; business academics are not well represented. ANU is a clear first on this measure. No Australian academic from these disciplines appears in the Thomson list of highly-cited authors. UNSW is a clear first on ARC projects funded.

Southern Cross University had the highest number of doctoral completions (principally DBAs) in Business and Economics over the period 2002-2004; Monash is ranked second and UNSW third.

Melbourne, UNE and UWA have the highest entrance scores; Bond students are the most satisfied.

Overall on performance measures, Melbourne is ranked first and UNSW second. ANU and Monash are roughly equal in third place.

5.3 Education (Table 5.3)

The data on Education for the Go8 universities imply that only about half the (DEST-weighted) output of education schools is in the form of articles. The correlation between the TS USI article count and the article count for DEST points is also lower than for other disciplines, although it is an open question as to which set of publications is the better indicator of international academic standing. It is not surprising that for this discipline the correlation between the survey results and articles published is less than that for other disciplines at 0.7.

The University of Queensland is ranked first on the criteria of articles published and ARC projects. The three non-Go8 universities that ranked highly in the survey (QUT, Curtin and Deakin) are again ranked highly when we use publications data: QUT is ranked second and the other two non-Go8 universities are in the top seven for the period 2001-2005. Curtin is ranked first for doctoral completions and, with UNE, has the highest

¹⁴ Only three universities, Melbourne, ANU and UNSW, make the threshold cut-off in the ESI category Economics & Business over the period 1996-2006. The rankings for publications are the same as those reported for USI over this period. The rankings for citations are UNSW (100), Melbourne (92.5), ANU (84.6).

level of student satisfaction as measured by the CEQ. Staff-student ratios are best at UNSW and Sydney.

Academy membership is small, with Monash and Melbourne having the largest numbers.

Because of data limitations with the CEQ and staff-student ratios (which arise from the structures for degrees in education) we exclude these measures from our overall measure of performance. Using our performance measures, Queensland is ranked first, Melbourne second, and Monash third.

5.4 Engineering (Table 5.4)

In Engineering, Sydney and UNSW are clearly first ranked on ESI publications and citations, followed by Melbourne. Nine of the 28 universities that we include do not reach the ESI publication threshold. The correlation between ESI articles and the survey results is high at 0.93, despite the fact that in some areas of engineering refereed conference papers, which we do not count, are an important form of research output.

Melbourne has the largest number of elected fellows of academies, with ANU second ranked. UNSW is ranked first on ARC success; Sydney is second.

UNSW has about double the number of doctoral completions of the next ranked universities, Melbourne and Queensland. Melbourne, Queensland and UWA are ranked equal first on quality of undergraduates as measured by entrance scores. Ballarat, ANU and USQ are ranked highest for satisfaction by graduating students.

The staff-student ratio is highest at Macquarie, but student numbers are small and course offerings are specialized. If Macquarie is excluded, Victoria has the most favourable staff-student ratio.

Overall, UNSW is ranked first followed by Sydney and Melbourne.

5.5 Law (Table 5.5)

Unfortunately, data limitations severely constrain our attempts to rate Law schools on the basis of performance data and we do not calculate an overall measure of performance. The publicly available data on publications are not appropriate for use in ranking. The TS journals are heavily dominated by US Law School journals and we estimate that the USI article counts for Australian universities represent less than 5 per cent of total refereed journal articles in Law.¹⁵

Nevertheless, the limited data we have is broadly consistent with the survey results. In SSRN downloads and ARC success, Melbourne is ranked first and Sydney second. ANU

¹⁵ For Go8 universities, the total USI article count for Law over the period 2001-2005 was 74; this compares with a total article count, as recorded in DEST submissions, of 482 in 2004 alone. The USI counts are also very low for U.K. universities.

has the highest academy membership but numbers are small. Sydney dominates completions of research doctorates, with 21 per cent of the national total; Melbourne is next ranked with 12 per cent. Sydney has the best staff-student ratio.

Bond students are the most satisfied. Entrance standards are high across all universities, with Melbourne, UWA and Queensland the highest (we do not have average data for Sydney but the published cut-off levels imply similarly high levels to the listed three).

5.6 Medicine (Table 5.6)

In using the ESI data for Medicine there is necessarily some arbitrariness in allocating the fields between Medicine and Science. We allocate publications (and citations) in the fields of Biology & Biochemistry and Molecular Biology & Genetics equally between Medicine and Science. We allocate all output in the following fields to Medicine: Clinical Medicine, Immunology, Microbiology, Neuroscience & Behaviour, Pharmacology & Toxicology, and Psychiatry/Psychology. We rank universities for clinical and non-clinical medicine separately.

In rating medical schools it must be borne in mind that the new schools at ANU, Bond, Griffith and James Cook are at a distinct disadvantage; with no graduates during the time period considered we have no CEQ ratings for these universities.

Sydney is first and Melbourne second on ESI publications and citations in clinical medicine, but the positions are reversed for non-clinical research output. Melbourne is first on highly-cited authors and Academy membership. There is strong correlation between research performance and the survey results – the coefficients are all above 0.85. Citations in non-clinical medicine have the highest correlation with the survey results ($r = 0.90$), suggesting that it is the impact of research findings in this area that contributes most to international academic standing.

Melbourne clearly leads in funding from the NHMRC. Monash has the largest number of completions of research doctorates, and the most satisfied students as measured by the CEQ.

Data limitations and conceptual issues mean that our overall measure for Medicine excludes entrance scores, CEQ and the staff-student ratio. On the basis of the performance measures we include, Melbourne is ranked first, Sydney second, and Queensland third.

5.7 Science (Table 5.7)

ESI publications (and citations) in Science are the sum of publications (and citations) in Chemistry, Geosciences, Physics, Plant & Animal Science and Space Science, plus 50 per cent of the publications (and citations) in the two categories divided between Medicine and Science, namely, Biology & Biochemistry and Molecular Biology & Genetics. Only a little over half the universities meet the ESI cut-off.

ANU is ranked first on all measures of research; Sydney is ranked second on ESI articles and citations; Melbourne is ranked second on academy membership. Melbourne and Queensland have the largest number of completions of research doctorates.

The correlations between research performance and survey ratings are very high (and there are only small decreases if the universities that do not make the ESI cut-off are excluded). Citations are the most highly correlated with the survey results ($r = 0.97$), which implies that it is scholarly impact which matters most amongst peers.

ANU leads in ARC projects, Sydney is second, and Queensland is third.

Queensland has the highest average student entrance score, followed by Sydney and UWA. Students from Ballarat and ANU are the most satisfied.

Overall, in Science ANU is a very clear first; Sydney is second, and Melbourne is third.

5.7 Research and/or Teaching?

A noticeable feature of our performance measures is the very low correlation between research performance and student satisfaction with their undergraduate course as measured by the CEQ scores. The correlations between publications and the CEQ scores are actually negative for Business & Economics and Engineering. The highest correlations between research and teaching occur in Science and Medicine.

Note that in order to keep our number of measures manageable we have used only a single measure of student satisfaction, namely, overall levels of satisfaction of recent graduates. A range of measures conditional on the attributes of each institution were used by DEST in allocating the Teaching and Learning Fund.

Competition for places as measured by entrance scores is much more highly correlated with publications than with the CEQ scores.

Table 5.1: ARTS AND HUMANITIES

University	Overall Performance		Articles USI (10 yrs)	Articles USI (5 yrs)	Academy M'bership	ARC Projects	Research Doctorate Completions	Entrance Score	CEQ	Staff-Student Ratios	# Staff
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1 Australian National University	100.0	100.0	94.7	85.6	100.0	100.0	96.5	92.1	90.7	68.4	100.0
2 University of Melbourne	91.0	97.2	82.7	97.3	65.4	71.9	100.0	100.0	79.3	69.6	72.3
3 University of Sydney	87.6	95.0	100.0	100.0	51.9	62.5	80.6	95.2	80.1	74.6	81.0
4 Monash University	76.6	46.8	76.8	84.0	39.5	50.0	72.1	92.4	77.7	78.1	69.8
5 University of Queensland	76.1	41.9	80.2	75.4	25.9	65.6	65.1	95.9	82.5	74.2	70.9
6 University of New South Wales	63.0	34.5	62.0	56.1	16.0	56.3	36.0	95.5	77.7	74.9	65.1
7 La Trobe University	55.1	34.6	43.0	38.5	42.0	18.8	40.7	79.0	89.6	61.9	65.1
8 University of Western Australia	53.5	33.0	40.8	29.4	21.0	28.1	25.2	99.4	84.3	86.6	36.0
9 Macquarie University	52.4	28.2	30.4	34.8	12.3	31.3	36.4	95.5	82.7	80.5	50.0
10 Flinders University of South Australia	43.2	18.6	24.0	22.5	13.6	6.3	39.1	78.7	80.3	70.8	34.6
11 University of Adelaide	42.2	28.1	26.0	25.1	14.2	12.5	30.2	87.4	72.2	50.7	34.6
11 University of New England	41.7	18.2	23.7	19.8	12.3	12.5	15.1	71.0	100.0	70.1	28.6
13 University of Tasmania	41.2	18.7	30.4	31.6	7.4	15.6	13.2	79.3	74.1	68.2	29.9
14 University of Newcastle	39.9	15.9	29.9	31.0	2.5	6.3	20.5	84.5	74.0	56.3	29.4
15 Murdoch University	38.6	12.9	10.3	8.0	6.2	6.3	20.5	92.3	92.0	64.8	12.9
16 Griffith University	38.1	21.5	19.8	21.4	6.2	3.1	17.4	88.6	75.8	64.0	59.3
17 Deakin University	36.9	14.9	21.8	23.0	2.5	0.0	25.6	83.2	69.5	60.4	22.0
17 University of Wollongong	36.8	16.0	15.4	12.8	1.2	6.3	5.8	88.9	89.9	70.0	21.7
19 Curtin University of Technology	35.7	10.7	6.1	8.0	1.2	9.4	29.8	90.7	68.1	*	62.1
20 James Cook University	34.2	9.6	7.8	5.9	0.0	3.1	8.1	81.8	95.4	69.5	15.4
21 Swinburne University of Technology	33.0	7.2	3.4	2.7	0.0	6.3	5.0	77.1	84.6	100.0	14.8
21 University of Western Sydney	33.0	10.3	11.2	10.7	3.7	12.5	19.4	79.6	63.1	57.2	29.4
23 University of Technology, Sydney	32.2	14.0	7.0	8.6	4.9	6.3	8.9	93.3	74.5	40.2	13.7
24 Victoria University	31.3	8.0	6.1	4.3	0.0	3.1	14.3	65.7	88.6	<u>69.9</u>	33.2
24 University of Canberra	30.7	10.6	4.5	4.3	0.0	0.0	1.2	86.3	79.5	74.3	16.2
26 Edith Cowan University	30.4	9.0	12.0	10.7	1.2	0.0	8.5	77.8	69.1	<u>63.3</u>	19.5
26 Australian Catholic University	30.2	5.3	5.0	4.8	0.0	9.4	0.8	77.9	77.1	69.0	22.5
28 Queensland University of Technology	29.8	12.9	10.1	11.8	2.5	0.0	4.3	84.8	69.0	48.4	22.0
29 Central Queensland University	28.8	6.1	1.1	1.1	0.0	0.0	0.0	80.1	83.9	67.7	18.1
30 Charles Sturt University	28.7	7.0	7.0	7.0	1.2	3.1	7.0	71.2	82.5	40.2	23.4
31 RMIT University	28.2	10.3	2.8	2.7	1.2	9.4	8.9	75.9	68.4	<u>52.5</u>	27.7
31 Southern Cross University	28.0	5.7	0.6	0.6	1.2	3.1	2.3	73.8	78.8	67.4	15.9
31 University of South Australia	27.7	9.6	5.9	2.7	1.2	3.1	8.5	75.9	62.2	<u>65.5</u>	28.3
34 Charles Darwin University	27.1	6.4	4.2	1.6	0.0	0.0	6.2	69.0	66.3	81.2	12.4
35 University of the Sunshine Coast	26.1	5.6	0.8	0.5	0.0	0.0	0.4	81.3	82.7	30.9	0.0
<u>Unranked</u>											
Bond University		6.4	1.4	1.6	3.7	3.1	1.6	n.a	77.5	n.a.	n.a.
University of Ballarat		6.2	n.a.	n.a.	1.2	0.0	3.9	69.8	66.3	79.1	6.0
University of Southern Queensland		6.9	n.a.	n.a.	0.0	0.0	1.2	80.7	87.1	57.3	9.3

Correlation with survey 0.956
 Correlation with publications 1996-2006 0.928

n.a. indicates data not available; * numbers unstable across years and student-staff score put equal to national average (69) in calculating overall performance; underlining of staff-student scores is done when offshore student load is more than 10 per cent of total load and estimated ratio may be an overstatement; column (1) is calculated as the sum of columns (3) to (9) plus one-half of column (10) divided by the score for the best performing university and converted to a percentage.

Table 5.2: BUSINESS AND ECONOMICS

University	Overall	Articles	Articles	Academy	ARC	SSRN	Doctorate	Entrance		Staff-		
	Performance	Survey	USI (10 yrs)	USI (5 yrs)	M'bership	Projects	D'nloads	Completi ns	Score	CEQ	Student ratio	# Staff
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1 University of Melbourne	100.0	100.0	100.0	100.0	83.3	72.7	100.0	54.7	100.0	58.5	68.2	62.4
2 University of New South Wales	89.8	87.4	92.9	90.7	44.4	100.0	28.0	76.4	99.3	61.4	76.5	65.9
3 Australian National University	80.6	60.2	93.1	84.5	100.0	63.6	10.8	21.7	90.7	62.0	81.5	49.7
4 Monash University	79.6	52.7	73.8	78.6	33.3	50.0	49.0	84.9	92.1	62.2	<u>71.2</u>	100.0
5 University of Queensland	69.0	50.6	60.6	61.6	33.3	36.4	32.3	65.1	89.7	72.7	67.3	57.9
6 University of Sydney	61.6	65.1	47.4	42.7	27.8	72.7	14.7	50.9	92.9	51.1	65.9	69.3
7 University of Western Australia	60.6	35.8	47.0	45.2	38.9	18.2	13.6	65.1	97.6	60.2	<u>81.1</u>	39.3
8 University of Technology,Sydney	49.7	22.3	27.5	32.8	11.1	27.3	42.1	23.6	87.3	63.7	67.8	50.3
9 Queensland University of Technology	46.9	20.0	37.4	35.0	0.0	45.5	13.1	21.7	91.1	58.1	55.6	37.2
10 Griffith University	44.7	17.7	22.5	28.2	11.1	22.7	0.9	43.4	86.8	63.2	70.9	55.5
11 Macquarie University	42.7	31.1	13.9	13.3	11.1	4.5	45.2	36.8	96.0	53.2	52.1	55.2
12 Curtin University of Technology	42.3	17.0	20.1	20.7	0.0	4.5	25.6	38.7	89.8	63.8	<u>68.6</u>	46.2
12 University of South Australia	41.9	15.1	16.7	18.6	11.1	4.5	2.9	58.5	77.3	54.9	<u>100.0</u>	55.9
14 Southern Cross University	40.3	7.3	1.5	1.2	0.0	0.0	0.0	100.0	71.0	68.8	<u>81.5</u>	18.3
15 University of Wollongong	37.4	14.5	11.9	11.1	0.0	13.6	0.0	31.1	87.5	75.6	<u>64.1</u>	35.2
15 La Trobe University	37.0	19.4	24.5	17.6	11.1	4.5	6.1	21.7	75.1	70.1	58.8	27.6
15 University of New England	36.8	11.4	18.4	14.9	11.1	0.0	0.1	27.4	72.4	80.7	67.7	16.9
18 RMIT University	35.7	14.3	11.0	9.9	0.0	13.6	3.0	41.5	80.8	48.9	<u>85.0</u>	37.9
19 University of Adelaide	35.1	23.0	23.2	22.9	19.4	4.5	0.0	13.2	91.1	43.3	<u>58.4</u>	14.8
19 Murdoch University	35.1	10.9	5.4	4.6	0.0	0.0	0.0	29.2	88.0	82.3	<u>74.4</u>	13.8
21 Victoria University	33.8	11.2	6.1	3.7	0.0	0.0	0.2	39.6	69.4	78.9	<u>79.0</u>	29.3
22 Swinburne University of Technology	33.0	8.6	1.3	1.9	0.0	0.0	0.0	33.0	73.1	85.7	73.8	34.5
22 University of Western Sydney	32.9	9.4	20.4	13.6	0.0	0.0	0.0	31.1	80.9	50.5	<u>69.1</u>	47.9
24 Deakin University	32.0	15.0	12.5	10.5	0.0	0.0	5.5	15.1	81.1	68.5	63.7	45.2
24 Edith Cowan University	31.7	11.5	8.2	6.8	0.0	0.0	8.9	20.8	74.2	67.7	73.0	22.8
26 University of Newcastle	31.2	13.1	11.3	10.8	0.0	0.0	1.0	17.9	83.7	54.3	80.4	25.5
27 University of Tasmania	29.6	13.3	11.3	8.0	0.0	4.5	0.0	7.5	80.7	66.0	<u>60.6</u>	10.7
28 Flinders University of South Australia	29.4	13.1	8.2	5.9	25.0	0.0	0.0	0.0	77.3	50.1	80.4	13.8
28 University of the Sunshine Coast	28.8	7.9	0.9	1.5	0.0	0.0	0.0	2.8	77.9	78.4	81.9	13.8
30 University of Canberra	28.4	10.0	2.8	4.0	11.1	0.0	0.2	7.5	84.7	60.8	<u>57.7</u>	17.6
30 Australian Catholic University	27.9	6.0	0.7	0.0	0.0	0.0	0.0	0.0	81.2	76.1	76.5	14.8
32 James Cook University	27.3	9.3	6.1	2.8	0.0	0.0	0.0	6.6	80.4	66.9	58.1	11.7
33 Charles Sturt University	26.2	9.6	5.2	4.3	0.0	0.0	0.1	5.7	67.8	70.8	<u>61.3</u>	21.0
34 Central Queensland University	24.4	7.5	3.0	3.1	0.0	0.0	0.0	1.9	79.5	50.9	*	17.9
<u>Unranked</u>												
Bond University		14.6	5.9	6.8	0.0	0.0	6.4	1.9	n.a.	100.0	n.a.	n.a.
Charles Darwin University		8.0	0.7	0.3	0.0	0.0	0.2	1.9	76.2	36.8	**	**
University of Ballarat		7.1	n.a.	n.a.	0.0	0.0	0.0	2.8	69.9	64.0	<u>46.3</u>	9.7
University of Southern Queensland		10.6	n.a.	n.a.	0.0	0.0	4.4	6.6	82.5	76.3	48.2	19.3
Correlation with survey	0.951		0.941	0.939	0.846	0.923	0.767	0.535	0.729	-0.194	0.069	
Correlation with publications 1996-2006				0.994	0.886	0.910	0.698	0.524	0.707	-0.178	0.112	

n.a. indicates data not available; * staff numbers under-recorded and staff-student score put equal to national average of 67 when calculating overall performance;
 ** only one staff member; underlining of staff-student scores is done when offshore student load is over 10 per cent of total load and estimated ratio may be an overstatement; column (1) is calculated as the sum of columns (3) to (10) plus one-half of column (11) divided by the score for the best performing university and converted to a percentage

Table 5.3: EDUCATION

University	Overall Performance	Survey	Articles USI (10 yrs)	Articles USI (5 yrs)	Academy M'bership	ARC Projects	Research Doctorate Cmpltns	Entrance Score	CEQ	Staff-Student ratio	# Staff
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1 University of Queensland	100.0	52.9	100.0	100.0	33.3	100.0	50.0	93.7	76.2	50.0	25.4
2 University of Melbourne	96.1	100.0	53.4	58.0	100.0	75.0	82.1	90.2	71.1	48.1	99.2
3 Monash University	93.7	87.0	63.2	66.7	100.0	62.5	61.3	93.5	74.9	54.5	74.6
4 Curtin University of Technology	82.8	30.3	62.0	66.7	33.3	37.5	100.0	95.4	99.1	54.0	*
5 University of Sydney	78.8	68.2	57.7	70.4	66.7	37.5	47.2	96.4	32.3	94.7	60.7
6 Queensland University of Technology	78.0	51.3	84.0	77.8	33.3	37.5	46.2	93.4	42.5	45.5	94.3
7 La Trobe University	57.6	21.7	33.7	29.6	66.7	25.0	37.7	82.1	85.3	45.6	34.4
8 Deakin University	55.8	47.1	39.3	51.9	0.0	50.0	36.8	88.4	50.7	53.8	61.5
9 University of Western Sydney	54.2	23.2	50.9	44.4	0.0	50.0	23.6	89.6	35.2	98.6	59.8
10 Griffith University	49.9	24.7	28.8	37.0	0.0	37.5	38.7	95.9	56.3	45.7	80.3
11 Edith Cowan University	44.0	18.7	32.5	38.3	33.3	0.0	23.6	82.2	61.0	50.1	100.0
12 University of South Australia	41.8	25.1	31.9	39.5	0.0	12.5	34.9	80.4	60.3	50.1	71.3
12 University of Adelaide	41.5	18.6	11.7	14.8	66.7	0.0	5.7	99.2	n.a.	54.8	4.9
12 Murdoch University	41.5	18.4	20.2	22.2	33.3	12.5	17.9	91.6	56.1	66.8	25.4
14 University of New South Wales	40.8	25.4	22.1	23.5	33.3	0.0	20.8	94.8	87.5	100.0	12.3
16 University of Technology,Sydney	38.5	24.5	27.0	19.8	0.0	12.5	37.7	86.7	92.3	90.6	67.2
17 University of Newcastle	38.2	23.1	21.5	29.6	0.0	25.0	17.9	88.0	52.5	47.8	65.6
17 University of New England	38.1	22.2	19.0	23.5	0.0	25.0	38.7	75.5	100.0	<u>49.6</u>	70.5
17 University of Western Australia	37.7	30.3	23.3	22.2	0.0	12.5	21.7	100.0	n.a.	<u>59.5</u>	14.8
20 Flinders University of South Australia	35.3	20.4	17.2	19.8	33.3	12.5	0.0	85.5	44.9	58.3	31.1
21 University of Wollongong	34.5	24.6	9.8	13.6	0.0	25.0	26.4	89.7	98.5	78.3	38.5
22 James Cook University	32.5	14.5	22.1	17.3	0.0	12.5	12.3	90.8	53.9	42.3	35.2
22 Macquarie University	31.6	27.3	20.9	22.2	0.0	0.0	11.3	96.4	82.1	49.7	44.3
24 University of Tasmania	30.9	22.1	13.5	16.0	0.0	25.0	13.2	79.6	29.6	39.0	36.9
25 Australian Catholic University	30.4	12.6	16.6	17.3	0.0	0.0	23.6	87.6	56.3	55.4	99.2
26 RMIT University	29.2	17.6	6.1	4.9	0.0	12.5	37.7	78.0	46.1	<u>42.7</u>	29.5
27 Charles Sturt University	28.1	15.7	16.0	22.2	0.0	12.5	9.4	74.1	74.1	38.6	50.0
28 Central Queensland University	27.2	10.0	16.0	14.8	0.0	0.0	10.4	88.8	51.3	*	*
29 University of Canberra	24.6	13.2	8.6	8.6	0.0	0.0	10.4	89.8	56.5	52.8	34.4
30 Victoria University	21.8	9.3	3.7	4.9	0.0	12.1	8.5	74.6	76.4	58.8	18.9
31 Southern Cross University	20.8	10.2	6.7	9.9	0.0	0.0	5.7	76.8	77.9	53.1	17.2
32 Charles Darwin University	18.7	7.6	2.5	2.5	0.0	0.0	2.8	81.3	38.1	43.4	12.3

Unranked

University of Ballarat		9.3	n.a.	n.a.	0.0	12.5	0.9	81.8	84.3	45.0	13.9
University of Southern Queensland		14.7	n.a.	n.a.	0.0	0.0	11.3	86.9	58.9	73.7	32.0

Correlation with survey	0.864		0.714	0.753	0.741	0.770	0.714	0.411	-0.004	0.086	
Correlation with publications: 1966-2006				0.979	0.504	0.813	0.706	0.437	0.010	0.093	

n.a. indicates data not available; * indicates recorded staff numbers too low and staff-student score put equal to national average of 54 in calculating overall performance; underlining of student-staff scores is done when offshore student load is more than 10 per cent of total load and estimated ratio may be an overstatement; column (1) is calculated as the sum of columns (3) to (8) divided by the score for the best performing university and converted to a percentage.

Table 5.4: ENGINEERING

University	Overall Performance	Citations			Articles		Academy M'bership	ARC Projects	Research Doctorate Cmpltns	Entrance Score	CEQ	Staff-Student ratio	# Staff
		Survey	ESI (10 yrs)	ESI (10 yrs)	ESI (5 yrs)	ESI (5 yrs)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
1 University of New South Wales	100.0	98.7	90.8	100.0	100.0	40.9	100.0	100.0	92.3	65.7	54.4	100.0	
2 University of Sydney	91.0	89.6	100.0	98.1	94.4	63.6	88.5	34.4	96.0	55.8	43.6	44.3	
3 University of Melbourne	83.8	100.0	75.2	74.2	79.5	100.0	26.9	53.1	100.0	67.5	48.4	59.1	
4 University of Queensland	71.9	64.9	49.1	60.5	60.8	36.4	55.8	49.7	99.9	77.6	51.7	69.4	
5 Monash University	69.8	70.7	41.1	66.1	76.2	45.5	61.5	38.5	94.7	48.8	<u>56.3</u>	79.4	
6 Australian National University	66.4	64.4	44.7	55.2	51.2	81.8	25.0	12.2	94.3	91.4	40.7	26.1	
7 University of Newcastle	64.5	31.9	47.6	51.7	56.7	45.5	50.0	21.5	90.3	64.4	<u>69.3</u>	39.9	
8 University of Western Australia	61.5	38.6	42.7	55.0	55.3	45.5	34.6	20.5	100.0	62.8	49.8	37.8	
9 University of Wollongong	49.7	18.5	25.7	31.9	29.4	13.6	30.8	23.6	87.6	82.5	62.1	35.4	
10 Queensland University of Technology	44.6	19.9	29.9	38.6	42.9	0.0	15.4	25.0	92.7	54.9	40.5	19.2	
10 University of Adelaide	44.5	31.2	24.1	33.2	35.9	13.6	15.4	19.8	96.0	55.7	50.8	30.9	
11 Curtin University of Technology	36.4	16.1	16.9	29.3	29.0	4.5	11.5	10.4	91.0	46.5	<u>43.1</u>	43.0	
11 University of Technology, Sydney	36.0	15.3	11.0	21.2	25.8	4.5	25.0	9.0	83.8	55.0	<u>45.7</u>	31.6	
11 Griffith University	35.7	9.6	13.5	23.0	26.7	4.5	3.8	9.4	86.5	61.2	54.1	18.6	
15 University of South Australia	33.2	13.4	13.8	20.9	21.4	4.5	5.8	27.8	76.2	45.0	<u>44.9</u>	45.7	
15 RMIT University	33.1	23.9	10.1	12.4	8.9	4.5	7.7	30.6	84.2	56.0	44.9	50.9	
17 Macquarie University	32.4	10.6	8.8	11.9	13.0	4.5	7.7	0.7	83.6	51.9	100.0	3.8	
18 Swinburne University of Technology	30.4	12.7	0.0	0.0	0.0	9.1	7.7	17.4	85.8	70.3	55.2	48.1	
18 Deakin University	29.6	11.4	0.0	0.0	0.0	4.5	9.6	10.1	76.8	83.8	<u>54.6</u>	15.8	
20 University of Southern Queensland	29.0	12.0	0.0	0.0	0.0	0.0	5.8	4.2	85.7	89.7	44.7	21.0	
21 University of Tasmania	28.2	13.4	16.6	14.1	9.8	13.6	5.8	4.5	89.6	28.9	38.8	6.9	
21 La Trobe University	28.2	11.0	8.9	10.5	11.0	0.0	0.0	3.8	78.5	62.5	54.0	11.7	
21 Victoria University	27.6	8.9	0.0	0.0	0.0	4.5	3.8	6.6	71.9	76.2	69.4	17.9	
24 University of Ballarat	27.0	7.5	0.0	0.0	0.0	0.0	0.0	0.0	74.2	100.0	38.7	2.1	
25 James Cook University	26.0	12.2	0.0	0.0	0.0	0.0	0.0	3.5	93.1	64.8	50.6	10.7	
26 Edith Cowan University	24.1	7.1	0.0	0.0	0.0	0.0	0.0	2.1	82.9	61.8	51.5	7.6	
26 Central Queensland University	23.6	9.1	0.0	0.0	0.0	0.0	0.0	0.7	90.3	52.2	*	*	
28 University of Western Sydney	21.3	7.9	0.0	0.0	0.0	0.0	1.9	3.5	72.7	48.9	50.8	12.4	
Correlation with Survey	0.956		0.934	0.928	0.921	0.880	0.839	0.822	0.661	0.061	-0.124		
Correlation with publications 1996-2006					0.995	0.811	0.909	0.805	0.698	-0.058	-0.092		

n.a. indicates data not available; * indicates under-recording of staff numbers and staff-student score put at national average (52) when calculating overall performance; underlining of staff-student ratios is done when offshore student load is over 10 per cent and staff-student score may be an overstatement; column (1) is calculated as the sum of columns (3) to (10) plus one-half of column (11) divided by the score for the best performing university and converted to a percentage.

Table 5.5: LAW

University	Survey	SSRN Downloads	Academy M'bership	ARC Projects	Research Doctorate Completions	Entrance Score	CEQ	Staff - Student ratio	# Staff
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1 University of Melbourne	100.0	100.0	75.0	100.0	55.3	100.0	62.8	61.1	69.2
2 University of Sydney	88.2	63.8	75.0	75.0	100.0	n.a.	61.4	100.0	54.2
3 Australian National University	87.8	11.4	100.0	50.0	15.8	94.2	59.8	85.8	74.8
4 University of New South Wales	57.4	11.8	50.0	16.7	34.2	98.2	70.5	89.7	50.5
5 Monash University	54.3	2.2	75.0	33.3	42.1	97.8	57.6	64.3	100.0
6 University of Queensland	29.7	3.7	0.0	0.0	39.5	99.1	38.9	67.0	48.6
7 University of Western Australia	23.2	0.0	0.0	0.0	7.9	99.8	57.1	62.9	38.3
8 University of Adelaide	19.2	0.3	12.5	0.0	5.3	88.6	20.6	67.6	24.3
9 Macquarie University	18.0	0.0	0.0	0.0	10.5	96.5	45.5	59.6	26.2
10 Griffith University	16.6	4.6	0.0	25.0	13.2	92.6	67.3	94.1	44.9
11 Queensland University of Technology	16.5	0.0	0.0	33.3	21.1	95.4	49.2	64.5	43.0
12 University of Tasmania	14.1	0.0	0.0	0.0	10.5	n.a.	60.8	55.4	15.9
13 Bond University	13.8	3.9	0.0	0.0	21.1	n.a.	100.0	n.a.	n.a.
14 La Trobe University	13.2	0.4	25.0	8.3	0.0	92.4	61.4	n.a.	n.a.
15 Flinders University of South Australia	12.4	0.0	0.0	25.0	0.0	90.3	72.1	80.9	29.9
16 University of Technology, Sydney	12.3	0.0	0.0	8.3	26.3	95.6	66.8	38.0	40.2
17 Murdoch University	10.9	0.0	0.0	0.0	7.9	95.7	59.9	57.5	18.7
18 University of Wollongong	10.8	0.0	0.0	8.3	18.4	93.8	50.0	85.9	29.9
19 University of Canberra	9.8	0.0	0.0	8.3	2.6	93.1	49.0	<u>47.4</u>	13.1
20 Deakin University	9.4	1.3	0.0	8.3	15.8	94.9	62.0	81.6	45.8
21 Victoria University	9.1	0.0	0.0	0.0	0.0	82.3	59.0	n.a.	n.a.
22 University of Newcastle	8.9	0.0	0.0	8.3	2.6	95.3	56.2	n.a.	18.7
23 University of New England	7.0	0.0	0.0	0.0	0.0	77.3	66.3	51.8	21.5
24 Charles Darwin University	6.8	0.0	0.0	16.7	0.0	80.4	49.3	n.a.	n.a.
25 James Cook University	6.8	0.0	0.0	0.0	2.6	85.9	47.2	73.9	17.8
26 Southern Cross University	6.7	0.0	0.0	0.0	5.3	84.2	83.3	n.a.	n.a.
27 Edith Cowan University	6.6	0.0	0.0	0.0	0.0	n.a.	79.5	n.a.	n.a.
28 University of Western Sydney	6.2	0.0	0.0	0.0	5.3	93.3	52.9	62.7	27.1

Correlation with survey 0.799 0.937 0.864 0.772 0.474 0.010 0.377

n.a. indicates data not available; underlining of staff-student ratios is done when offshore student load is more than 10 per cent of total load and estimated ratio may be an overstatement.

Table 5.6: MEDICINE

University**	Overall		Clinical Medicine			NonClinical Medicine			Academy M'bship	ISI Highly Cited	Research Doctorate Cmpltns	NHMRC Income	Entrance Score	Staff-Student		
	Perf	Survey	Citations ESI (10 yrs)	Articles ESI (10 yrs)	Articles ESI (5 yrs)	Citations ESI (10 yrs)	Articles ESI (10 yrs)	Articles ESI (5 yrs)						CEQ	ratio	# staff
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1 University of Melbourne	100.0	100.0	77.3	85.4	86.4	100.0	100.0	100.0	100.0	100.0	79.3	100.0	100.0	86.2	100.0	100.0
2 University of Sydney	85.0	71.7	100.0	100.0	100.0	71.0	80.2	75.9	88.9	20.0	82.2	70.8	n.a.	91.1	35.4	97.4
3 University of Queensland	64.8	36.4	56.9	63.1	62.4	65.1	88.4	87.3	94.4	0.0	31.5	52.4	98.3	51.3	43.2	69.4
4 Monash University	56.5	64.1	59.8	58.9	58.5	54.7	59.5	56.6	16.7	0.0	100.0	59.7	97.4	100.0	12.4	20.4
5 University of New South Wales	50.0	47.9	47.8	48.9	48.6	47.4	55.0	54.9	50.0	20.0	48.1	43.7	98.9	62.0	61.8	69.7
6 University of Western Australia	37.7	30.9	46.4	50.8	52.5	28.8	32.6	33.8	27.8	0.0	31.1	45.8	99.7	70.5	65.1	54.3
7 University of Adelaide	28.3	39.4	29.9	38.4	38.3	16.9	19.5	19.0	11.1	0.0	47.8	41.7	97.3	81.5	33.3	47.4
8 Australian National University	27.3	33.5	15.6	13.5	11.8	38.6	33.4	28.4	72.2	20.0	0.0	20.1	89.0	n.a.	57.6	n.a.
9 Flinders University	13.2	30.9	13.1	17.9	17.5	0.0	0.0	5.2	16.7	20.0	21.5	10.3	95.8	n.a.	n.a.	n.a.
10 University of Newcastle	12.0	24.7	23.5	23.6	23.0	3.2	6.1	6.7	11.1	0.0	1.9	12.5	96.5	95.1	n.a.	n.a.
11 Griffith University	3.7	9.4	3.4	5.2	6.0	3.1	6.6	7.7	0.0	0.0	0.0	2.3	n.a.	n.a.	n.a.	n.a.
12 University of Tasmania	3.1	16.2	5.4	6.8	6.3	0.0	0.0	0.0	0.0	0.0	7.8	2.1	97.9	53.7	28.1	15.8
13 James Cook University	2.4	15.4	3.0	6.1	7.2	0.0	0.0	0.0	0.0	0.0	2.6	3.3	90.3	92.3	33.6	13.5
Correlation with survey	0.925		0.861	0.867	0.865	0.895	0.837	0.840	0.697	0.768	0.874	0.939	0.446	0.329	0.452	
Correlation with pubs 1996-2006			0.897	0.900	0.896	0.985	1.000	0.998	0.884	0.562	0.740	0.919	0.449	-0.049	0.433	

n.a. indicates data not available; column (1) is calculated as the sum of columns (3) to (12) divided by the score for the best performing university and converted to a percentage.

**First student intakes were: James Cook (2002), ANU (2002), Griffith (2005) and Bond (2005).

Table 5.7: SCIENCE

University	Overall	Citations		Articles	Articles	Academy	ISI	Research	ARC	Entrance	CEQ	Staff-	# staff
	Performance	Survey	ESI	ESI	ESI		Highly	Doctorate		Score		Student	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1 Australian National University	100.0	100.0	100.0	100.0	100.0	100.0	100.0	82.5	100.0	93.8	96.9	41.7	88.5
2 University of Sydney	69.7	72.0	60.3	83.9	93.0	30.9	9.5	76.6	77.1	97.7	68.9	51.2	73.0
3 University of Melbourne	67.7	80.3	54.4	64.1	76.2	35.3	14.3	100.0	60.0	97.8	76.1	53.8	86.2
4 University of Queensland	61.2	44.9	32.1	67.3	77.1	5.9	0.0	98.1	71.4	100.0	75.4	40.4	96.8
5 University of New South Wales	55.5	40.9	46.3	62.1	62.5	19.1	19.0	54.3	44.8	95.2	62.5	60.3	57.8
6 University of Western Australia	50.6	23.9	29.7	47.6	50.6	11.8	33.3	53.5	27.6	98.4	68.8	62.7	56.7
7 University of Adelaide	47.4	31.9	26.1	43.3	50.0	20.6	4.8	50.8	43.8	92.0	60.8	62.8	47.7
8 Monash University	45.7	40.3	34.2	39.0	45.0	11.8	4.8	35.5	45.7	91.9	73.8	54.9	100.0
9 University of Tasmania	37.2	16.9	16.6	24.4	30.2	10.3	4.8	34.1	23.8	86.9	77.5	47.8	15.7
10 James Cook University	32.2	17.8	9.1	15.1	17.6	4.4	0.0	29.6	7.6	88.8	86.1	58.2	21.4
11 Macquarie University	30.7	20.6	10.7	12.1	13.8	10.3	9.5	17.7	18.1	95.3	61.4	51.9	21.8
12 Murdoch University	29.0	11.6	3.0	8.2	10.0	5.9	4.8	17.2	5.7	93.5	80.2	61.8	16.4
13 University of New England	27.6	10.0	2.8	5.9	5.9	2.9	4.8	15.6	2.9	74.3	96.6	71.0	9.2
14 University of Wollongong	27.0	15.7	2.8	4.1	4.5	0.0	0.0	18.3	17.1	90.5	78.7	51.3	18.0
14 University of Newcastle	26.5	13.3	5.3	8.8	10.7	0.0	4.8	18.0	8.6	87.9	65.3	55.8	27.3
16 La Trobe University	25.8	17.4	7.5	9.2	6.4	4.4	0.0	27.4	5.7	77.5	62.8	60.0	25.9
17 Curtin University of Technology	25.1	12.2	5.0	5.4	7.0	1.5	0.0	17.7	6.7	91.8	62.3	53.3	16.6
17 Queensland University of Technology	24.8	11.3	2.7	4.7	5.7	0.0	0.0	18.5	4.8	93.9	69.0	45.4	23.3
17 RMIT University	24.7	10.7	0.0	0.0	0.0	1.5	0.0	28.5	7.6	78.3	74.5	61.3	28.1
20 University of Canberra	24.4	11.3	0.0	0.0	0.0	0.0	0.0	3.8	1.9	86.4	84.6	82.3	3.1
20 Griffith University	24.3	15.2	4.3	8.0	10.3	2.9	0.0	10.8	7.6	88.9	61.8	44.6	34.7
22 Central Queensland University	23.2	7.3	0.0	0.0	0.0	0.0	0.0	7.3	0.0	86.0	64.7	100.0	7.1
22 University of Technology,Sydney	22.9	10.3	0.0	0.0	0.0	0.0	0.0	17.5	2.9	88.3	66.8	58.6	20.5
22 University of Ballarat	22.7	5.6	0.0	0.0	0.0	0.0	0.0	1.9	0.0	61.8	100.0	77.7	2.2
25 Swinburne University of Technology	22.5	11.0	0.0	0.0	0.0	1.5	0.0	8.9	10.5	84.6	67.1	56.9	2.6
25 Flinders University of South Australia	22.3	15.2	2.0	3.1	3.5	0.0	0.0	15.9	11.4	85.5	54.7	47.2	9.4
27 Deakin University	21.4	9.9	0.0	0.0	0.0	0.0	0.0	13.7	2.9	81.4	66.9	53.4	12.8
27 Charles Darwin University	20.9	7.6	0.0	0.0	0.0	0.0	0.0	4.0	3.8	73.5	73.1	64.7	3.6
29 University of South Australia	20.3	11.0	0.0	0.0	0.0	1.5	0.0	6.5	5.7	81.2	66.8	39.5	12.6
29 Edith Cowan University	20.2	7.0	0.0	0.0	0.0	0.0	0.0	1.6	1.0	80.3	65.2	65.3	4.1
31 Victoria University	19.4	6.4	0.0	0.0	0.0	0.0	0.0	9.7	0.0	69.3	57.5	73.7	6.1
31 University of the Sunshine Coast	19.2	4.5	0.0	0.0	0.0	0.0	0.0	0.3	0.0	82.4	71.0	36.8	3.9
31 University of Western Sydney	18.8	7.1	0.0	0.0	0.0	0.0	0.0	14.2	1.0	76.1	54.6	44.3	12.8
31 Charles Sturt University	18.5	7.4	0.0	0.0	0.0	0.0	0.0	0.0	1.9	74.1	70.1	38.9	5.8
<u>Unranked</u>													
Australian Catholic University		3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	n.a.	30.8	n.a.	3.5
Bond University		5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	n.a.	38.5	n.a.	n.a.
Southern Cross University		5.8	1.2	2.2	2.6	0.0	0.0	6.2	2.9	n.a.	n.a.	65.5	4.9
University of Southern Queensland		5.6	0.0	0.0	0.0	0.0	0.0	2.7	0.0	89.3	67.1	*	7.7
Correlation with Survey	0.963		0.971	0.942	0.938	0.891	0.722	0.892	0.956	0.567	0.301	-0.265	
Correlation with Publications 1996-2006			0.969		0.997	0.820	0.694	0.928	0.974	0.623	0.256	-0.243	

n.a indicates data not available; * indicates data difficulties with staff numbers; column (1) is calculated as the sum of columns (3) to (11) plus one-half of column (12) divided by the score for the best performing university and converted to a percentage.

6. Perceptions versus Performance

There are two ways to view the relationship between our two types of data. The first way is to assume that since we have surveyed experts, the survey results can be taken as providing an appropriate ranking of academic standing. We can then select appropriate performance measures by choosing those that correlate best with the survey ratings. The second approach turns this first way on its head and uses the quantitative performance data to test the validity of the survey results.

A possible criticism of survey results is that they are a lagging measure of actual performance. As a practical matter, even performance data will be a few years old and blips can occur in short-period data that do not reflect longer term trends. Lagged perceptions should show up in our results as a lower correlation between the survey scores and publications in the most recent five years as opposed to publications in the most recent ten years. In our results, the correlation is little affected by the time period; the biggest difference is in Education where the correlation between the survey score and publications is actually *higher* for the more recent period.

Because we have surveyed experts in the area, we expect a close correlation between the survey results and the performance measures most valued by academics in the discipline. In most disciplines, international academic standing is achieved by publishing articles in leading international journals and by those articles having high international impact. The TS data bases that we use are designed to measure this. We expect and achieve high correlations between the survey and performance measures in Business & Economics, Engineering, Medicine and Science. Somewhat unexpectedly (because the data do not include books) we also find strong congruence in Arts & Humanities. Correlation between the survey and performance results is lowest in Education, which may reflect in part the selection of journals in the data base and in part the weight placed on other performance measures by scholars in the discipline.

Correlations between the ratings by academics and student evaluations as measured by the CEQ are low. On the surface this implies that student satisfaction is not an important determinant of international academic standing. However, the low correlation between peer opinion and student perceptions does not in itself imply that academics undervalue undergraduate teaching. It may reflect, for example, differing beliefs between staff and students as to what constitutes good teaching or resource constraints may limit the quality of programs. In addition, overseas respondents to our survey are unlikely to be well informed about relative teaching standards in Australian universities.

Aggregating the performance measures raises the correlation coefficients between performance and peer opinion, implying that academics use a range of criteria in evaluating performance. The correlation between the overall results for performance and the survey ratings is 0.86 for Education, 0.93 for Medicine, and 0.95-0.96 for the other disciplines. In only two cases do the correlations between the survey results and individual performance measures exceed the correlation between the two overall measures: NHMRC income in Medicine and citations in Science.

In table 6 we compare the rankings for the top universities in each discipline using the survey results and aggregate performance measures. We have already seen from the correlation coefficients that there is broad consistency between the two sets of measures. We note, however, that Queensland is rated more highly using the performance measures than using the survey scores. Combined with the finding that Australian academics rate Queensland higher than do their overseas colleagues this suggests that Queensland's reputation lags its performance. On the other hand, Melbourne, Monash and Sydney tend to be rated a little higher on the surveys than on the performance measures.

Returning to the list of world class performers in table 4 in section 3, there are only three instances where the performance data are inconsistent with the survey data: in the performance data Queensland is above Melbourne in Education, Sydney is above Melbourne in Engineering, and Queensland is above Monash in Medicine.

7. Concluding Remarks

Under the existing Australian system of higher education, high international academic standing among peers is achieved through research performance which in turn translates into high demand for places by students who are then not always pleased with what they get, at least immediately after graduation. Under any system of education, high academic standing in research is the main driver for postgraduate students and scholars seeking positions. A weakness of the current Australian system is that good teaching is not a major driver of student preferences at the undergraduate level. To overcome this deficiency would require appropriate funding measures, and incentives and encouragement for students to change institutions as they progress through their studies and research training.

Our study shows that there is high correlation between peer opinion and a range of research measures. If correlations are high then the simplest and cheapest methods for measuring research performance are preferred. There are lessons in this for governments trying to develop research measures for the purpose of allocating funds.

Discipline ratings can be aggregated up to university ratings that reflect the relative importance of each discipline in each university. Such aggregation overcomes the difficulties that more aggregate approaches to university ranking suffer when attempting to compare institutions with quite different profiles—for example, the London School of Economics and the California Institute of Technology. The main constraint on the aggregating up approach is the availability of data. Also, the appropriate performance measures are not the same across disciplines: the performance measures for, say, music, nursing, law and science are all quite different. Representative professional groups and societies have an important role to play in improving performance measurement.

Table 6: Top Rankings in Surveys and Performance Measures

Humanities		Business & Economics		Education		Law
Survey	Performance	Survey	Performance	Survey	Performance	Survey
1 ANU	1 ANU	1 Melbourne	1 Melbourne	1 Melbourne	1 Queensland	1 Melbourne
2 Melbourne	2 Melbourne	2 UNSW	2 UNSW	2 Monash	2 Melbourne	2 ANU
3 Sydney	3 Sydney	3 Sydney	3 ANU	3 Sydney	3 Monash	2 Sydney
4 Monash	4 Monash	4 ANU	4 Monash	4 Queensland	4 Curtin	4 UNSW
5 Queensland	5 Queensland	5 Monash	5 Queensland	5 QUT	5 Sydney	5 Monash
6 LaTrobe	6 UNSW	6 Queensland	6 Sydney	6 Deakin	6 QUT	6 Queensland
6 UNSW	7 La Trobe	7 UWA	7 UWA	7 Curtin	7 La Trobe	7 UWA
8 UWA	8 UWA	8 Macquarie	8 UTS	7 UWA	8 Deakin	8 Adelaide
9 Adelaide	9 Macquarie	9 Adelaide	9 QUT	9 Macquarie	9 UWS	9 Macquarie
9 Macquarie	10 Flinders	9 UTS	10 Griffith	10 Griffith	10 Griffith	10 Griffith
11 Griffith	11 Adelaide	11 QUT	11 Macquarie	10 UNSW	11 ECU	10 QUT
12 Flinders	11 UNE	12 La Trobe	12 Curtin	10 UniSA	12 Adelaide	12 Tasmania
12 Tasmania				10 UTS	12 UniSA	12 Bond
				10 Wollongong	12 Murdoch	

Engineering		Medicine		Science	
Survey	Performance	Survey	Performance	Survey	Performance
1 Melbourne	1 UNSW	1 Melbourne	1 Melbourne	1 ANU	1 ANU
2 UNSW	2 Sydney	2 Sydney	2 Sydney	2 Melbourne	2 Sydney
3 Sydney	3 Melbourne	3 Monash	3 Queensland	3 Sydney	3 Melbourne
4 Monash	4 Queensland	4 UNSW	4 Monash	4 Queensland	4 Queensland
5 Queensland	5 Monash	5 Adelaide	5 UNSW	5 UNSW	5 UNSW
6 ANU	6 ANU	6 Queensland	6 UWA	6 Monash	6 UWA
7 UWA	7 Newcastle	7 ANU	7 Adelaide	7 Adelaide	7 Adelaide
8 Newcastle	8 UWA	8 Flinders	8 ANU	8 UWA	8 Monash
9 Adelaide	9 Wollongong	8 UWA	9 Flinders	9 Macquarie	9 Tasmania
10 RMIT	10 Adelaide	10 Newcastle	10 Newcastle	10 JCU	10 JCU
11 QUT	10 QUT			11 La Trobe	11 Macquarie
12 Wollongong	12 Curtin			11 Tasmania	12 Murdoch
	12 Griffith				
	12 UTS				

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Appendix Table A1: List of Included Universities

	Abbreviation
Australian Catholic University	ACU
Australian National University	ANU
Bond University	Bond
Central Queensland University	CQU
Charles Darwin University	CDU
Charles Sturt University	CSU
Curtin University of Technology	Curtin
Deakin University	Deakin
Edith Cowan University	ECU
Flinders University of South Australia	Flinders
Griffith University	Griffith
James Cook University	JCU
La Trobe University	La Trobe
Macquarie University	Macquarie
Monash University	Monash
Murdoch University	Murdoch
Queensland University of Technology	QUT
RMIT University	RMIT
Southern Cross University	SCU
Swinburne University of Technology	Swinburne
University of Adelaide	Adelaide
University of Ballarat	Ballarat
University of Canberra	Canberra
University of Melbourne	Melbourne
University of New England	UNE
University of New South Wales	UNSW
University of Newcastle	Newcastle
University of Notre Dame Australia	Notre Dame
University of Queensland	Queensland
University of South Australia	UniSA
University of Southern Queensland	USQ
University of Sydney	Sydney
University of Tasmania	Tasmania
University of Technology, Sydney	UTS
University of the Sunshine Coast	USC
University of Western Australia	UWA
University of Western Sydney	UWS
University of Wollongong	Wollongong
Victoria University	Victoria