

University rankings

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Abstract

This paper describes and discusses the national and international rankings of universities that are most important for Australian universities: the Swiss Centre for Science and Technology Studies' *Champions league*, Shanghai Jiao Tong University's *World academic ranking of universities*, The Times Higher Education Supplement's *World university rankings* and Williams & Van Dyke's *International standing of Australian universities*. Even though they are based largely on research, these rankings influence international students' choice of institution, they affect the perceptions of governments and prospective staff and will become increasingly influential over prospective domestic students.

Introduction

National and international rankings of universities are becoming more common. They are also becoming more important. Even though as we shall see they are based largely on research, they influence international students' choice of institution. For example, in August 2004 the University of Melbourne was 15% below its target number of international students for 2005. By 21 February 2005, some 2 months after the publication of *The Times Higher Education Supplement's* 'World university rankings', the University of Melbourne met its target (Australian universities' directors of international forum, 2005). Ranks not only reflect observers' views of universities' standing but reinforce them, and disseminate them to a much wider audience. They will affect the perceptions of governments, prospective staff and will become increasingly influential over prospective domestic students. They will affect the capacity to form partnerships with other universities. Rankings will also affect industry funding since business will commission research from the top ranked research units or universities.

This gives some background to university rankings and describes briefly 4 rankings important to Australian universities:

Swiss Centre for Science and Technology Studies' 'Champions league';
Shanghai Jiao Tong University's 'World academic ranking of universities';
The Times Higher Education Supplement's 'World university rankings'; and
Williams & Van Dyke's 'International standing of Australian universities'.

Background

Various national rankings of universities have been published since the magazine *U.S. News* began its annual rankings of US colleges and universities in 1983. The Princeton Review, a company based in New York city known for its test preparation courses, education services and books first published its annual 'Best colleges' ranking of 'the best 357 colleges' in 1992. The weekly Canadian magazine *Maclean's* first published its rankings of Canadian universities in 1991. TheCenter, a US research body, started publishing its annual ranking of the top US research universities in 2000.

The Deutsche Akademische Austauschdienst (German academic exchange service) and the German weekly news magazine *Stern* has published the Centrum für Hochschulentwicklung (Centre for higher education development) ranking of Germany's 250 universities since 1998. The magazine *Asiaweek* published its report 'Asia's best universities' from 1997 to 2000. The magazine ceased publication in 2001. The UK's *Sunday Times* first published its rank of UK universities in 2001. Ross Williams and Nina Van Dyke of the University of Melbourne's institute of applied economic and social research published their 'International standing of Australian universities' in 2004.

The first important international ranking of universities was not published until 2002 when the Swiss Federal Government's Zentrum für Wissenschafts und Technologiestudien (Centre for Science and Technology Studies) published its 'Champions league' of research institutions which ranked universities and other research institutions by their number and impact of research journal publications during 1994-1999. The centre's current 'Champions league' is for publications in 1998-2002. Shanghai Jiao Tong University's institute of higher education first published its world academic ranking of universities in 2003. The *Times Higher Education Supplement* published its first 'World university rankings' in 2004.

Swiss Centre for Science and Technology Studies' 'Champions league'

The Swiss Federal Government's Zentrum für Wissenschafts und Technologiestudien (Centre for Science and Technology Studies) 'Champions league' ranks research institutions by their performance in research journal publications. The centre ranks the top 683 institutions by 4 measures:

- total research journal publications (an indicator of size);
- number of publications in subfields with a substantial number of publications (an indicator of influence);
- publications in qualified subfields as % of all publications (an indicator of concentration);
- citations per research publication (an indicator of research impact).

The centre got its data from 3 citations indices weighted thus:

- arts and humanities citation index 5%;
- social sciences citations index 11%; and
- science citation index 84%.

The centre counts research publications in journals only, and therefore does not count books and other research publications. This understates research publications in the arts, humanities and social sciences which publishes more books than the empirical fields. The centre also gives research journal publications in the arts, humanities and the social sciences less weight than their share of all research journal publications.

The centre publishes ranks by each of its 4 measures, but the ranking by publications citations is most commonly referred to. The Swiss centre ranks at the top by citations Copenhagen's Royal School Library and Information Science and Rockefeller University in New York. These are specialised research institutions that do a bit of teaching. Rockefeller University,

for example, is a biomedical research institute with 1,653 staff and postdoctoral investigators and 192 research students. US universities dominate the top of the centre's citations rank, occupying 25 of the top 27 places. The top ranked Australian university on this measure is ANU at 59, just below Bristol and above the University of Hawaii. ANU is much higher than the next Australian university, UNSW at 167, between the University of Connecticut and California State University at Monterey Bay. Interestingly, the Swiss centre ranks La Trobe and James Cook above 2 group of 8 universities – Monash and the University of Adelaide.

TABLE 1: SWISS CENTRE'S 2004 CHAMPIONS LEAGUE RANKED BY CITATIONS, TOP 5, TOP 2 UK UNIVERSITIES, ALL AUSTRALIAN UNIVERSITIES AND SELECTED OTHER UNIVERSITIES

University	Country	Rank
Royal School Library and Information Science, Copenhagen	Denmark	1
Rockefeller University, New York	USA	2
Harvard University, Cambridge	USA	3
Massachusetts Institute of Technology (MIT), Cambridge	USA	4
Princeton University, New Jersey	USA	5
University of Oxford	UK	28
University of Cambridge	UK	29
University of Bristol	UK	57
Australian National University	Australia	59
University of Hawaii, Honolulu	USA	63
Florida State University, Tallahassee	USA	64
University of Connecticut, Storrs	USA	165
UNSW	Australia	167
California State University at Monterey Bay	USA	168
University of Exeter	UK	169
University of Melbourne	Australia	197
University of Sydney	Australia	218
University of Western Australia	Australia	233
University of Queensland	Australia	285
La Trobe University	Australia	296
James Cook University	Australia	302
Monash University	Australia	344
University of Adelaide	Australia	349
University of Newcastle	Australia	359
Macquarie	Australia	363
UNE	Australia	375
University of Tasmania	Australia	410
Flinders University	Australia	443
Murdoch University	Australia	535
QUT	Australia	633

Source: Zentrum für Wissenschafts und Technologiestudien (Centre for Science and Technology Studies) (2004) *CEST scientometrics rankings. Universities and colleges participating in the champions league: rankings by four performance indicators, 1998-2002*. Champions league: period 1998-2002, all subfields, 683 universities and colleges, four performance indicators, ranked by impact, pp 1-14.

Shanghai Jiao Tong University's 'World academic ranking of universities'

Shanghai Jiao Tong University's institute of higher education's world academic ranking of universities ranks universities by their share of 6 factors weighted thus:

alumni who won a Nobel prize or a Field medal for mathematics	10%
staff who won a Nobel prize or a Field medal for mathematics	20%
Highly cited researchers in 21 broad subject categories	20%
articles published in <i>Nature</i> and <i>Science</i>	20%
Articles in Science Citation Index-expanded and Social Science Citation Index	20%
correction for institutional size	10%
Total	100%

The Nobel prizes, Field medals, *Nature* and *Science* articles and Science Citation Index-expanded and Social Science Citation Index are all heavily weighted towards the sciences, and as the *Times* (2004: 2) points out, 2 research publications measures overlap.

Jiao Tong ranks Harvard at number 1 but at number 2 Stanford which the Swiss centre ranked at 8. Jiao Tong ranks Berkeley at number 4, up from its 9th ranking by the Swiss centre. The ANU is again by some margin Australia's highest university on Jiao Tong's rank at 53, clearly above the next ranked Australian university, which on this rank is the University of Melbourne at 82. Jiao Tong ranks all the go8 universities above all other Australian universities.

TABLE 2: JIAO TONG UNIVERSITY'S 2004 'WORLD ACADEMIC RANKING OF UNIVERSITIES', TOP 8, ALL AUSTRALIAN UNIVERSITIES AND SELECTED OTHER UNIVERSITIES

University	Country	Rank
Harvard	USA	1
Stanford	USA	2
Cambridge	UK	3
University of California – Berkeley	USA	4
Massachusetts Inst Tech (MIT)	USA	5
California Institute of Technology	USA	6
Princeton	USA	7
Oxford	UK	8
ANU	Australia	53
University of California – Irvine	USA	55
University of Bristol	UK	60
University of Nottingham	UK	80
Brown University	USA	82
University of Melbourne	Australia	82
University of Queensland	Australia	101-152
University of Sydney	Australia	101-152
University of Hawaii	USA	101-152
UNSW	Australia	153-201
University of Western Australia	Australia	153-201
Florida State University	USA	153-201
Monash University	Australia	202-301
University of Adelaide	Australia	202-301
Macquarie University	Australia	302-403
University of Newcastle	Australia	302-403
University of Tasmania	Australia	302-403
Flinders University	Australia	404-502
La Trobe University	Australia	404-502
Murdoch University	Australia	404-502
University of Exeter	UK	404-502

Source: Shanghai Jiao Tong University's institute of higher education's 2004 *World academic ranking of universities*.

The *Times Higher Education Supplement's* 'World university rankings'

The *Times Higher Education Supplement's* 'World university rankings' is based on 5 factors with these weights:

survey of 1,300 academics in 88 countries	50%
% overseas staff	5%
% overseas students	5%
staff:student ratio	20%
citations per staff	20%
Total	100%

The *Times Higher Education Supplement* says that it asked academics to name the top institutions in the areas and subjects on which they felt able to make an informed judgment. The *Times* doesn't say what 'top' might be, but traditional research performance was probably the most important factor. The *Times* says it 'balanced' its survey by academic discipline and location. The *Times* gave 5% for the proportion of academic staff recruited from overseas. Since this isn't systematically reported for Australian universities they were all allocated a score of 49 out of 100. The *Times* gave 5% of its score for proportion of international students. While this may be a good indicator of the quality of universities in other countries, it is not a good indicator of the quality of Australian universities.

The *Times's* top 5 universities are familiar, and again ANU is ranked clearly above all other Australian universities. However, the *Times's* rank is inconsistent with the ranks of the Swiss centre and Jiao Tong. The *Times* ranks Monash the third highest Australian university, RMIT above 208 universities, and it ranks several UK universities lower than the other rankings or not at all.

TABLE 3: *TIMES* 'WORLD UNIVERSITY RANKINGS', TOP 9, ALL AUSTRALIAN UNIVERSITIES AND SELECTED OTHER UNIVERSITIES

University	Country	Rank
Harvard University	USA	1
University of California – Berkeley	USA	2
Massachusetts Institute of Technology	USA	3
California Institute of Technology	USA	4
Oxford University	UK	5
Cambridge University	UK	6
Stanford University	USA	7
Yale University	USA	8
Princeton University	USA	9
ANU	Australia	16
University of Melbourne	Australia	22
Monash University	Australia	33
UNSW	Australia	36
University of Sydney	Australia	40
University of Queensland	Australia	49
RMIT	Australia	55
University of Adelaide	Australia	56
Macquarie	Australia	68
Curtin University	Australia	76
University of Bristol	UK	91
University of Western Australia	Australia	96
University of Technology, Sydney	Australia	113
La Trobe University	Australia	142
University of Tasmania	Australia	161

Source: The *Times Higher Education Supplement* (2004) 'World university rankings'.

Williams & Van Dyke's 'International standing of Australian universities'

Williams & Van Dyke's 'International standing of Australian universities' is based on 19 factors weighted thus.

TABLE 4: WILLIAMS & VAN DYKE'S RANKING FACTORS AND WEIGHTINGS

Factor	weight
Views of vice chancellors of overseas highly ranked universities & Australian deans	8%
Revenue per student	11%
<i>Undergraduate students (25%)</i>	
Median tertiary entrance score	11%
Retention rate	3.5%
Staff:student ratio	3.5%
Overall satisfaction in course experience questionnaire	3.5%
% of bachelor graduates proceeding to a higher degree	3.5%
<i>Postgraduate students (16%)</i>	
PhD completions	5.6%
All postgraduate progression rate	4.8%
Overall satisfaction in postgraduate experience questionnaire	5.6%
<i>Research (40%)</i>	
All research publications	4%
Publications in the Essential Science Indicators (ESI) for laboratory disciplines	4%
ESI publications for economics & business and social sciences disciplines	2%
ESI citations for laboratory disciplines	6.8%
ESI citations for non laboratory disciplines	3.2%
Membership of an Australian academy	8%
Number of staff who were included in the ISI-ESI list of highly cited authors	2%
National competitive research grant income	6%
Other research income	4%
Total	100%

Source: Williams, Ross & Van Dyke, Nina (2004) *The international standing of Australian universities*.

Williams & Van Dyk asked vice chancellors of 172 overseas highly ranked universities to compare the international standing of each Australian university with the standing of universities in their continent and they asked Australian and Aotearoa New Zealand deans to compare the international standing of each Australian university with US universities. Williams & Van Dyk's respondents placed most emphasis on the 'quality/international standing of staff', which is based on research performance.

Williams & Van Dyk's calculations of revenue per student are wrong. They include the dual sector universities' funding for vocational education and training and divide that by higher education students only, thus ranking these institutions misleadingly high on this measure. When this and other corrections are made this factor will be mainly another measure of research revenue. The scale for undergraduate students is too compressed for about the top 60% of institutions on this measure and so does not discriminate much between most institutions. Williams & Van Dyk's measure of all research publications overlaps with their measures of publications in the Essential Science Indicators (ESI), and Williams & Van Dyk's ESI publications and citations measures weight laboratory disciplines at twice that of the other disciplines.

Williams & Van Dyk's does not include equity or diversity to their measure of undergraduate intake. Extensive quantitative data are readily available on institutional student equity (<http://www.detya.gov.au/highered/equity/default.htm> and see James et al for a discussion of earlier data http://www.detya.gov.au/highered/equity/documents/equity_report.pdf) which, incidentally, are of far better quality than the institutional data on student entry scores and discriminate well between institutions. While these ranks are meant to be descriptive rather than normative, they nonetheless have a normative aspect and in any case diversity of student body is at least rhetorically important as an indicator of the quality of the undergraduate experience in the US and is increasingly important in the UK. Equity of undergraduate intake should be a separate factor and not submerged within other factors, however small a weight it may be given.

TABLE 5: WILLIAMS & VAN DYK'S 2004 RANKING OF AUSTRALIAN UNIVERSITIES

University	Score	Rank
Australian National University	100	1
University of Melbourne	100	1
University of Sydney	95	3
University of Queensland	87	4
University of New South Wales	85	5
Monash University	76	6
University of Western Australia	76	6
University of Adelaide	70	8
Flinders University of South Australia	56	9
La Trobe University	55	10
Macquarie University	54	11
University of Tasmania	53	12
University of Newcastle	52	13
Murdoch University	51	14
University of Wollongong	50	15
Curtin University of Technology	49	16
Griffith University	49	16
Queensland University of Technology	49	16
Deakin University	47	19
University of New England	47	19
University of Technology, Sydney	47	19
James Cook University	46	22
Swinburne University of Technology	46	22
University of South Australia	44	24
RMIT	43	25
University of Canberra	42	26
Charles Darwin University	41	27
Edith Cowan University	41	27
Victoria University of Technology	41	27
Charles Sturt University	39	30
Southern Cross University	39	30
University of Western Sydney	39	30
University of Ballarat	38	33
Australian Catholic University	37	34
Central Queensland University	37	34
University of Southern Queensland	36	36
University of Notre Dame, Australia	32	37
University of the Sunshine Coast	32	37

Source: Williams, Ross & Van Dyke, Nina (2004) *The international standing of Australian universities*, table 8: Melbourne Institute index of the international standing of Australian universities.

Some rankings don't rely so heavily on research

It will be seen from the foregoing quick review that most national and international rankings of universities are based mostly on research, and mostly only on investigator-initiated and discipline-based or mode 1 research (Gibbons *et al*, 1994) in the empirical sciences. However, not all national rankings are based so heavily on research. *US News*' rank is based heavily on selectivity of undergraduate student admissions and its related attributes retention and graduation rates, and on various measures of financial resources including class size and student:teacher ratio. *Macleans* produces 3 ranks, of undergraduate, medical/doctoral and comprehensive universities.

The *Good Universities Guide* does not rank institutions, but it uses a 5 point scale to rate institutions on 17 characteristics: prestige, non government earnings, student demand, research grants, research intensity, undergraduate sex balance, Indigenous participation, proportion given credit for tafe studies, proportion of school leavers, ceq (selected scales – overall satisfaction, teaching quality, general skills), student:staff ratio, academic staff qualifications, student cultural diversity, graduates' starting salary, graduate employment and positive graduate outcomes (employed or further study). It would be possible to turn these ratings into a rank by allocating 1 point for each star rating and then summing the points for all characteristics.

Conclusion

However, it seems most likely that the national and international rankings based on research will become increasingly important. It also seems likely that they will reinforce and be reinforced by national governments' research funding decisions informed by exercises such as the UK's research assessment exercise, Aotearoa New Zealand's performance-based research fund and Australia's research quality framework. Most institutions will therefore seek to maximise their performance on the ranks and in the national research assessment exercises. The criteria are clear and the techniques are well known and already widely mimicked within the sector. They involve, basically, transferring resources from teaching to research intensity. I expect this will intensify over the next 2 years, producing more conformity and generating greater homogeneity amongst the universities that compete for research-quality positioning.

8 March 2005

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