



Australian Government
Australian Research Council

ERA

RESEARCH in the national interest - enabling the future

ERA Indicator Descriptors

19 December 2008

© Commonwealth of Australia 2008

ISBN 978-0-9581800-7-8 (Online)

This work is subject to the laws of copyright. You may download, display, print and reproduce this material in unaltered form only (retaining this notice) for your personal, non-commercial use or use within your organisation. All other rights are reserved. Requests and inquiries concerning reproduction and rights should be addressed to:

Commonwealth Copyright Administration, Copyright Law Branch, Attorney-General's Department, Robert Garran Offices, National Circuit, Barton ACT 2600, Fax: 02 6250 5989, or submitted via the copyright request form on the website <http://www.ag.gov.au/cca>. Requests and inquiries concerning reproduction and rights should be copied to: The General Manager, Research Excellence, Australian Research Council, GPO Box 2702, Canberra ACT 2601.

Contents

Introduction.....	1
Definition of Research	1
The Indicator Principles	1
Indicator categories	2
Reference period	3
Indicator profiles	4
Ranked Outlets.....	4
Journals	4
Refereed Conference Publications	5
Citation Analysis.....	6
Relative Citation impact (assessed against the world and Australian average for the field).....	7
Distribution of papers	7
Distribution of papers against relative citation rate bands.....	8
Volume and activity analysis	9
Total research outputs by type	9
FTE and headcount profile of eligible researchers by academic level	9
Higher Education Research Data Collection Research Income.....	10
Research funding income.....	10
Profiling Research Income.....	11
Esteem.....	12
Attribution.....	13
Editorial role (editor, associate editor, member of editorial board) of A* and A ranked journals.....	13
Contribution to a prestigious work of reference	14
Curatorial role (head curator, membership of curatorial board) of a prestigious event.....	14
Elected Fellowship of Learned Academies (national/international).....	15
Nationally competitive (Category 1) research fellowships.....	16
Prestigious Awards and Prizes (national/international).....	16
Applied.....	17
Intellectual property	17
Standard patents sealed	17
Plant Breeders' rights.....	18
Registered designs	18
Research commercialisation income.....	19
Appendix I	21
Appendix II	22
Appendix III.....	28

Introduction

ERA uses a range of discipline-specific indicators to evaluate research performance in Australian universities. The selection of indicators was undertaken in accordance with international best practice and was informed by analytical testing of data from the Australian higher education sector.

Definition of Research

For the purposes of ERA, research is defined¹ as:

the creation of new knowledge and/or the use of existing knowledge in a new and creative way so as to generate new concepts, methodologies and understandings. This could include synthesis and analysis of previous research to the extent that it is new and creative.

This definition of research is consistent with the broad notion of research and experimental development (R&D) as comprising creative work undertaken on a systematic basis in order to increase the stock of knowledge of humanity, culture and society, and the use of this stock of knowledge to devise applications.

Indicator Principles

This document should be read in conjunction with the ERA *Indicator Principles*.

Where an indicator cannot be demonstrated to be a valid and robust measure of research quality for a discipline, the ARC will not use the indicator. It is anticipated that future rounds of ERA will use a greater number of quantitative indicators once these have been developed further and tested.

In identifying and developing appropriate indicators for each discipline, the ARC considered that they must be:

1. **Quantitative**—objective measures that meet a defined methodology that will produce the same result, regardless of when and by whom the principles are applied.
2. **Internationally recognised**—while not all indicators will allow for direct international comparability, the indicators must be internationally-recognised measures of research quality. Indicators must be sensitive to a range of research types, including research relevant to different audiences (e.g. practitioner focused, internationally relevant, nationally- and regionally-focussed research). ERA will include research published in non-English language publications.
3. **Comparable to indicators used for other disciplines**—while ERA evaluation processes will not make direct comparisons across disciplines, indicators must be capable of identifying comparable levels of research quality across disciplines.
4. **Able to be used to identify excellence**—indicators must be capable of assessing the quality of research, and where necessary, focused to identify excellence.

¹ Based on the Frascati definition of research as per the *Frascati Manual: Proposed Standard Practice for Surveys on Research and Experimental Development*, OECD: Paris. (2002).

5. **Research relevant**—indicators must be relevant to the research component of any discipline.
6. **Repeatable and verifiable**—indicators must be repeatable and based on transparent and publicly available methodologies. This will allow the sector to reproduce the methodology in-house. All data submitted to ERA must be auditable and reconcilable.
7. **Time-bound**—indicators must be specific to a particular period of time as defined by the reference period. Research activity outside of the reference period will not be assessed under ERA other than to the extent it results in the triggering of an indicator during the reference period.
8. **Behavioural impact**—indicators should drive responses in a desirable direction and not result in perverse unintended consequences. They should also limit the scope for special interest groups or individuals to manipulate the system to their advantage.

Indicator categories

ERA uses a range of indicators to evaluate research quality.

Below is list of the standard ERA indicator categories with specific measures identified in each category:

- **Ranked outlets**
 - Journals
 - Refereed conference publications
- **Citation analysis**
 - Relative citation impact (assessed against world and Australian average for the field)
 - Distribution of publications based on:
 - Comparison to world centile thresholds
 - Comparison to the field
 - Distribution of papers against relative citation rate bands
- **Volume and activity analysis**
 - Total research publication outputs (by type)
 - FTE of eligible researchers by academic level and overall headcount profile

- **HERDC Research Income**
ERA will profile all HERDC categories of research income (where relevant), including:
 - Number of grants (Category 1 only)
 - Research income per grant (Category 1 only)
 - Total research income
 - Total research income per FTE
 - Ratio of total research income per FTE against discipline benchmark
- **Esteem**
 - Editorial roles at A* and A ranked journals
 - Contribution to a prestigious work of reference
 - Curatorial role (head curator, membership of curatorial board) of a prestigious event
 - Elected Fellowship of Learned Academies (national/international)
 - Nationally competitive research fellowships (Category 1 only)
 - Prestigious awards and prizes (national/international)
- **Applied**
 - Standard patents sealed
 - Plant breeders' rights
 - Registered designs
 - Research commercialisation income

Reference period

Indicator type	Reference period	Years
Ranked outlets	1 January 2002–31 December 2007	6
Citation analysis	1 January 2002–31 December 2007	6
Volume and activity analysis	1 January 2002–31 December 2007	6
HERDC Research Income	1 January 2005–31 December 2007	3
Esteem	1 January 2005–31 December 2007	3
Applied	1 January 2005–31 December 2007	3

For all research outputs, the date for inclusion in ERA is the published date of the first definitive version of a publication. This may be the publisher-generated (print) version, but could also refer to the on-line version with a digital object identifier (DOI).

Indicator profiles

Each ERA indicator definition is supported by an indicator specification which includes the minimum volume thresholds. Below these thresholds, data will not be presented to the Research Evaluation Committees (RECs) as a profile.

Where an institution does not have a sufficient volume of research outputs in a four- or two-digit FoR code, the research activity is deemed to be of insufficient volume to assess. In these instances, the ARC will report the FoR code as 'not assessed due to low volume'. However, all research outputs are included in the national analysis of the discipline, where low volume should not be an issue.

More detailed information on how ERA will respond to low volume thresholds is contained in the ERA *Indicator Principles*.

Ranked Outlets

The indicator category of ranked outlets profiles a group of output types (where relevant) across a number of defined quality bands. For the first round of ERA, only ranked lists for journals and refereed conference publications are being developed. Further ranked lists may be developed in subsequent rounds of ERA.

Journals

This measure relates to articles published in electronic or paper journals.

The ranked journal list consists of more than 19,500 unique peer reviewed journals. For inclusion in the list, a journal must be peer reviewed, and have an ISSN.

Each journal is assigned a single quality rating and assigned to one or more disciplines at the four-digit FoR level. While it is recognised that journals do contain articles of variable quality, the quality band reflects the overall quality of articles published in the journal. The quality rating is defined in terms of how it compares with other journals and should not be confused with its relevance or importance to a particular FoR.

Journals relevant to a particular four-digit FoR have been sorted into four tiers according to the following distribution:

- Tier A*
- Tier A
- Tier B
- Tier C

See **Appendix I** for the tier descriptors used to guide the journal ranking exercise.

Figure 1: Example of total ranked research outputs profiled across the four tiers

Ranked Outlets: A01 Journals Institution: University X Discipline Cluster: PCE FoR Level: Group (4-digit) Group Number: 0403 Group Name: Geology		
Journal Tier	No. of Papers	% of Papers
A*	55	15.8%
A	61	17.5%
B	91	26.1%
C	138	39.7%
Not Ranked	3	0.9%
Total	348	100.0%
Indicator Coverage		99.1%

Figure 2: Example of ranked journal outlet analysis by year of publication

Ranked Outlets: A01 Journals Institution: University X Discipline Cluster: PCE FoR Level: Group (4-digit) Group Number: 0405 Group Name: Oceanography						
Journal Tier	No. of Papers					
	2002	2003	2004	2005	2006	2007
A*	5	6	8	10	11	15
A	8	12	11	6	9	15
B	10	11	17	18	21	14
C	15	20	18	26	31	28
Not ranked	2	0	0	1	0	0
Total	40	49	54	61	72	72
Indicator Coverage	95.2%	100.0%	100.0%	98.4%	100.0%	100.0%

Refereed Conference Publications

This measure relates specifically to refereed conference publications other than refereed conference papers published in journals, any form of address (keynote, plenary, member of a panel discussion etc.), poster presentations and/or the facilitation of a workshop.

Conferences are an important venue for releasing and communicating research; however, they only represent the predominant output for publishing research for a small number of disciplines. In conjunction with the relevant disciplines, the ARC has undertaken preliminary work to develop tier descriptors for the ranking of refereed conference publications and will continue to work with these disciplines to develop ranked lists.

Figure 3: Example of total ranked refereed conference publications

Ranked Outlets: A02 Conferences		
Institution: University X		
Discipline Cluster: MICS		
FoR Level: Group (4-digit)		
Group Number: 0801		
Group Name: Artificial intelligence and image processing		
Conference Publications Tier	No. of Publications	% of Publications
A	37	23.0%
B	46	28.6%
C	69	42.9%
Not Ranked	9	5.6%
Total	161	100.0%
Indicator Coverage		94.4%

Figure 4: Example of ranked refereed conference publications analysis

Ranked Research outputs: Indicator A_002 Conferences						
Institution: University X						
Discipline Cluster: MICS						
FoR Level: Group (4-digit)						
Group Number: 0801						
Group Name: Artificial intelligence and image processing						
Conference Publications Tier	No. of Publications					
	2002	2003	2004	2005	2006	2007
A	3	3	15	12	2	2
B	5	5	2	2	20	12
C	3	2	5	12	12	35
Not ranked	3	1	0	2	2	1
Total	14	11	22	28	36	50
Indicator Coverage	78.6%	90.9%	100.0%	92.9%	94.4%	98.0%

Citation Analysis

Citation analysis involves the scrutiny of the references contained in journal articles, including analysis of frequency and patterns. It is one of the most widely used bibliometric tools.

ERA uses two types of citation analysis—relative citation impact and the distribution of publications based on comparisons to field benchmarks. The former is presented as an average, while the latter profiles the distribution of citations across the set of publications being assessed.

For the first round of ERA, citation analysis relates to publications in indexed journals. Review articles are included in citation analysis, as are conference publications published in indexed journals.

Relative Citation impact (assessed against the world and Australian average for the field)

ERA uses field-normalised citation analysis using discipline-specific journal sets. This approach attempts to overcome discipline-specific citing behaviours and differences in expected citation rate. ERA is undertaking citation analysis at both the two- and four-digit FoR level.

ERA is not using journal impact factors, but is using discipline-specific citation benchmarks derived using discipline-specific journal sets. The journal sets are defined by the FoR code assignment for each journal, and will be published by the ARC. The ARC will make annual benchmarks available to institutions.

ERA calculates average citations per publication and compares them to world and Australian benchmarks to arrive at their relative citation impact.

The citation data is being normalised to take account of the year of publication, as well as the discipline of the journal in which the article appears.

Figure 5: Example of relative citation impact analysis

Citation Analysis: B01 Institution relative citation impact against world and Australian cpp					
Institution: University X					
Discipline Cluster: PCE					
FoR Level: Group (4-digit)					
Group Number: 0301					
Group Name: Analytical Chemistry					
Total Publications	Sum of Cites	Average Cpp			% Journals Indexed
		Inst.	World	Aust.	
57	927	16.26			96%
Institution Relative Citation Impact			1.83	3.59	

Distribution of papers

ERA is undertaking a centile analysis showing the spread of papers across centile bands. The distribution profile also shows the number of uncited papers (*Figure 6* provides an example of this centile analysis). The distribution profile is compared to that for Australia as a whole in the field. The median can be derived as the number of papers contained within the 50th percentile.

Figure 6: Cumulative number and percentage of papers at centile bands against expected citation rate (ecr)

Citation Analysis: B02 Distribution of papers based on world centile threshold and field average				
Institution: University X				
Discipline Cluster: PCE				
FoR level: Group (4-digit)				
Group Number: 0301				
Group Name: Analytical Chemistry				
World centile	Institution		Aust. Group Average % of papers (cumulative)	% Paper Indexed
	No. of papers (cumulative)	% of papers (cumulative)		
1	3	5.5%	1.2%	96%
5	9	16.4%	6.2%	
10	13	23.6%	8.9%	
25	26	47.3%	25.5%	
50	42	76.4%	41.1%	
Total	55	100.0%	100.0%	
Uncited	2			

Distribution of papers against relative citation rate bands

ERA includes analysis to compare the citations received by each paper, calculate the relative citation impact for the paper by comparing this to the world average for the discipline, and profile the distribution across relative citation bands (*Figure 7 below* provides an example).

Figure 7: Number of papers on a ReBased Index (RBI) scale, where RBI is the relative institution cpp average against world cpp average

Citations Analysis: B03 Citation Impact								
Institution: University X								
Discipline Cluster: PCE								
FoR Level 4-digit (Group)								
Group Number: 0301								
Group Name: Analytical Chemistry								
No. of papers	RBI Intervals							
	0.0	>0 - ≤0.125	>0.125 - ≤0.5	>0.5 - ≤1.0	>1.0 - ≤2.0	>2.0 - ≤4	>4.0 - ≤8.0	>8.0+
	10	12	35	26	85	8	4	1

I.e. this means that four papers in this analysis had a citation rate of between 4 and 8 times the world average.

Volume and activity analysis

ERA report on a range of volume and activity measures in order to provide the RECs with an indicator of the level of activity relating to the FoR code.

Volume and activity profiled as frequency tables for each indicator type. The three key profiles are:

- Total research outputs (by type);
- FTE profile of eligible researchers by academic level; and
- Headcount profile of eligible researchers by academic level.

Total research outputs by type

This indicator provides an overview of the volume of publications, including the contribution of the institution to the total output of Australian research within the discipline.

Figure 8: Example of research outputs by type and proportion of total publication activity for the FoR code.

The following format is being used for all disciplines with the exception of Division 19, which will use an expanded list of output types (currently under development).

Volume and Activity Analysis: C01 Research outputs			
Institution: University X			
Discipline Cluster: PCE			
FoR Level: Group (4-digit)			
Division Number: 0302			
Division Name: Inorganic Chemistry			
Outlet Type	No. of outputs	% of outputs	% of outputs for Group
Journal Articles	52	57.8%	3.5%
Book Chapters	31	34.4%	14.8%
Books	5	5.6%	5.6%
Conference Publications	2	2.2%	5.6%
Total	90	100.0%	29.4%

FTE and headcount profile of eligible researchers by academic level

For each unit of evaluation, ERA will profile the number of researchers by academic level (level A–E, and other). This information provides context to the RECs regarding the size and academic profile for each four-digit FoR. Institutions will be asked to assign academic level information to each eligible researcher as well as their relevant four-digit FoR(s). A researcher may be fractionated across up to three four-digit FoRs. An ‘other’ category is provided where an eligible researcher is not employed on the academic scale (such as HDR students).

Both headcount and FTE are being used in ERA. As non-salaried staff (e.g. Emeritus and Adjunct Professors) may have an FTE of 0.00, headcount is required to provide a more complete picture of an institution’s researchers.

Figure 9: Example of eligible researchers' FTE profiled by academic level

Volume and Activity Analysis: C03 FTE Profile by academic level		
Institution: University X		
Discipline Cluster: PCE		
FoR Level: Group (4-digit)		
Group Number: 0305		
Group Name: Organic Chemistry		
HESDC Level	No. of FTE	% of FTEs
Level A	3.1	23.8%
Level B	3.9	30.0%
Level C	2.5	19.2%
Level D	1.0	7.7%
Level E	1.5	11.5%
Other	1.0	7.7%
Total	13.0	100.0%

Figure 10: Example of headcount profiled by academic level

Volume and Activity Analysis: C03 Headcount by academic level		
Institution: University X		
Discipline Cluster: PCE		
FoR Level: Group (4-digit)		
Group Number: 0305		
Group Name: Organic Chemistry		
HESDC Level	Headcount	% of Headcount
Level A	8	22.9%
Level B	5	14.3%
Level C	6	17.1%
Level D	2	5.7%
Level E	4	11.4%
Other	10	28.6%
Total	35	100.0%

Higher Education Research Data Collection Research Income

ERA includes research income as defined by Higher Education Research Data Collection (HERDC) specifications, benchmarked at the relevant two- or four-digit FoR level.

Research commercialisation income—income generated by research previously conducted—is included in ERA under the indicator category of Applied in those instances where a clear link between the commercialisation income and the original research is evident.

Research funding income

The research income categories are based on the HERDC definitions for Categories 1–4, see **Appendix II**.

For the purposes of ERA, *income* reported across all Categories is interpreted as per the HERDC specifications.

Profiling Research Income

The following tables are examples of research income profiling based on HERDC Categories 1–4 for a specific discipline cluster.

Category 1 research income also includes the total number of grants received (as well as total research income dollars). The total number of grants received is apportioned in accordance with the total research income for each grant, with the total number for a single grant not exceeding 1.0.

Figure 11: Example of total research income by HERDC income category

Research Income: D01-D04 Profiling Research income					
Institution: University X					
Discipline Cluster: PCE					
FoR Level: Group (4-digit)					
Group Number: 0305					
Group Name: Organic Chemistry					
HERDC Category	Research Income Type	2005	2006	2007	Total for period
1	Nationally competitive grants	\$683,400	\$3,400,000	\$1,000,000	\$5,083,400
2	Other public sector research income	\$46,000	\$910,667	\$388,889	\$1,345,556
3	Industry and other research income	\$119,043	\$257,416	\$247,356	\$623,815
4	CRC research income	\$476,000	\$926,667	\$192,533	\$1,595,200
Total Income - All types		\$1,324,443	\$5,494,750	\$1,828,778	\$8,647,970

Figure 12: Example of a breakdown of Category 3 funding

Research Income: D03 Profiling Research income (Category 3 breakdown)				
Institution: University X				
Discipline Cluster: PCE				
FoR Level: Group (4-digit)				
Group Number: 0305				
Group Name: Organic Chemistry				
Research Income Type	2005	2006	2007	Total for period
3(i) Australian	\$24,043	\$59,000	\$59,000	\$142,043
3(ii) International A (peer reviewed)	\$53,200	\$100,100	\$96,700	\$250,000
3(iii) International B (non-peer reviewed)	\$41,800	\$98,316	\$91,656	\$231,772
Total Income - Category 3	\$119,043	\$257,416	\$247,356	\$623,815

Figure 13: Example of a research income profile for Category 1 funding

Research Income: C01 Profiling Research income Institution: University X Discipline Cluster: PCE FoR Level : Group Division number: 0301 Division Name: Analytical Chemistry							
HERDC Category	Research Income Type	No. of grants	Total Amount	\$ per grant	\$ per FTE	Discipline Benchmark per FTE	Ratio
1	Nationally competitive grants	4	\$690,614	\$172,654	\$14,181	\$15,200	0.93
2	Other public sector research income		\$1,292,400		\$26,538	\$18,000	1.47
3	Industry and other research income		\$1,197,888		\$24,597	\$16,500	1.49
4	CRC research income		\$1,148,800		\$23,589	\$31,201	0.76
Total FTEs		48.7					

Esteem

ERA includes a number of measures of esteem, which embody peer review or some form of peer acceptance, and are proxy measures of research quality.

Some esteem measures are not relevant for all disciplines.

The list of esteem measures includes:

- editorial role (editor, member of editorial board) of A* and A ranked journals (defined list of journals)
- contribution to a prestigious work of reference
- curatorial role (head curator, membership of curatorial board) of a prestigious event
- elected Fellowship of a learned academy (national/international);
- nationally competitive (Category 1) research fellowships, and
- prizes and awards (national/international).

Attribution

Each eligible esteem measure results in one esteem count. With the exception of editorial role (editor, member of editorial board), each esteem count is fractionated pro-rata by the institution according to the four-digit FoR code(s) assignment of the relevant researcher, with the total count not exceeding 1.0.

The esteem attached to an eligible editorial role is attributed based on the four-digit FoR code(s) of the journal (and may be ‘double counted’ for journals allocated to more than one four-digit FoR but will only be single counted at the two-digit FoR level).

In the case where the recipient of an award or prize is a department or institution (rather than an individual researcher), the esteem count will be allocated by the institutions to the relevant four-digit FoR code (and may be fractionated across up to three four-digit FoRs).

Figure 14: Example of an Esteem Profile at the 4-digit level for a single institution.

Esteem Profile		
Institution: University X		
Discipline Cluster: PCE		
FoR Level: Group		
Group number: 0302		
Group Name: Inorganic Chemistry		
	Esteem Type	Esteem Counts
Number of	E01 Editors at A & A* ranked journals	3.0
	E02 Prestigious awards and prizes (national)	1.2
	E03 Prestigious awards and prizes (international)	0.8
	E04 Contributions to works of reference	5.2
	E05 Curatorial roles	0.0
	E06 Elected fellowships of learned academies (national)	0.8
	E07 Elected fellowships of learned academies (international)	2.0
	E08 Category 1 Fellowships	5.0
Total Esteem Counts		18.0

Editorial role (editor, associate editor, member of editorial board) of A* and A ranked journals

An editorial role of an A* and A ranked journal (ranking is as defined through consultation with the sector) is recognised by ERA as a measure of esteem. For the purposes of this measure, editorial role includes the roles of editor, associate editor and/or member of an editorial board. Guest editors are excluded from this measure.

One esteem count is attributed for each editorial role regardless of the length of appointment. For inclusion, a researcher must be publicly acknowledged in the journal (e.g. on the list of editors on the inside front cover of a printed journal or on the journal’s website) as having fulfilled an editorial role for that journal. Editing an article that is subsequently published in an A* or A ranked journal is not equivalent to fulfilling an editorial role for that journal and is not counted under this indicator.

For example:

- Professor Smythe edited the Australian Journal of XYZ (ranked A*) from January 2005-December 2007.
- Professor Yang edited the Australian Journal of ABC (ranked A) from April 2006-March 2007.
- Professor Schmidt edited the Australian Journal of MNO (ranked A) from January 2005-April 2005 and then again from March 2006-August 2006.

In each case, the esteem count is 1.

- Professor Heindrikkson edited a paper which was subsequently published in the European Journal of LMN (ranked A*) in June 2006. Professor Heindrikkson was acknowledged by the paper's author at the end of the paper, but was not an editor of the Journal of LMN.

In this case, there is no esteem count.

Contribution to a prestigious work of reference

Typically, a prestigious work of reference is one of the best in its field or subfield and would be characterised by a refereeing process and high scholarly standards, equivalent to an A*/A ranked journal. Most contributions would be of a very high quality. Collectively, the work would be recognised as one of the best sources of references for the field or subfield, and would have authoritative status.

To be included in ERA, a contribution to a prestigious work of reference must be:

- specifically commissioned for inclusion in that work of reference
- considered in advance (i.e. not included retrospectively), and
- in excess of 700 words (or non-text equivalent).

Examples of suitably prestigious works of reference include (but are not limited to) the *Oxford Companions* and the *Blackwell Companions*. Reference works lacking in a rigorous academic reviewing process are not included.

Institutions are required to identify contributions to prestigious works of reference consistent with these definitions. It is possible that in subsequent rounds a defined list of prestigious works of references will be developed and institutions will be required to select from this list.

Curatorial role (head curator, membership of curatorial board) of a prestigious event

A curatorial role (head curator, membership of a curatorial board) at a prestigious event is recognised by ERA as a measure of esteem. A curatorial role at a prestigious event is viewed by ERA as an indicator equivalent in prestige to the fulfillment of an editorial role at an A*/A ranked journal and should be considered in the context of this comparison.

Typically, the output of A-ranked curated events will be characterised by a highly competitive international curatorial/judging/selection process and the highest professional standards. An example of such an event is a prestigious international biennale.

These events sometimes have a designated series in which senior curators/judges/selectors solicit and appraise projects. In almost all cases, those researchers fulfilling curatorial roles will have disciplinary expertise and be internationally recognised in their fields.

Prestigious curated events focus upon distinguished practitioners as participants. These events and works have a highly significant impact on practice in the field, as evidenced through professional and/or scholarly publications, performances, recordings, broadcasts, forums and settings.

To be included under this indicator, a researcher must fulfill the role of either head curator of an event, or be a recognised, active, member of the curatorial board. Institutions will be required to identify curatorships consistent with this definition (both in terms of the prestige of the event, and the extent of the curatorial role). It is possible that in subsequent rounds a defined list of prestigious events will be developed and institutions will be required to select from this list.

One esteem Count may be claimed for each curatorial role.

E.g. Professor Ylve was head curator of the Venice Biennale in 2006.

This would result in one esteem count.

Professor Bvgliron was a member of the curatorial board of the 2007 International Film Festival.

This would result in an esteem count.

Elected Fellowship of Learned Academies (national/international)

Elected Fellowship of a learned academy (or society of equivalent prestige) is considered to be a measure of esteem. The indicator is defined as elected Fellowship, whether new or existing within the reference period.

This esteem indicator differentiates national and international Fellowships.

A list of eligible academies will be made available to the sector prior to submission. Institutions are required to select the relevant academy from this list.

One esteem Count may be claimed for each membership; not one count per year of membership.

E.g. Professor Sally Cameron was elected as a Fellow of the Academy of Arts and Letters in January 2005. This would result in one esteem count.

Professor Bonitni Pavorto was elected as a Fellow of the Brazilian Academy of Science in September 2007. This would result in one esteem count as Professor Pavorto was a member during the reference period.

Nationally competitive (Category 1) research fellowships

Nationally competitive (Category 1 HERDC funding), named research fellowships, which have a highly competitive selection process incorporating a strong element of peer review are recognised by ERA as a measure of esteem. To be eligible, the fellowship must be open to applicants from any state or territory, have a minimum tenure of two years full time (or the equivalent part time) and be awarded to an individual.

Direct appointments to postdoctoral fellowships in the absence of an open application process are not included in ERA. A list of eligible schemes will be made available to the sector prior to submission. Institutions are required to select the relevant fellowship scheme from this list.

Only one count may be claimed per person for the entire reference period for each fellowship awarded during the reference period. However, one person may claim more than one fellowship.

Prestigious Awards and Prizes (national/international)

Typically, a prestigious award or prize would be one of the best in its field or subfield and would be characterised by a refereeing process and high scholarly standards.

These awards and prizes are highly sought after by researchers and recognised nationally and internationally as representing excellence. They also have authoritative status. A competitive selection process involving rigorous peer review would typically occur as a precursor to the receipt of one such award or prize.

Institutions are required to identify awards and prizes consistent with this definition, separated into national and international. It is possible that in subsequent rounds a defined list of awards and prizes will be developed and institutions will be required to select from this list. This is subject to further work by the ARC and consultation.

Applied

The applied indicator category consists of intellectual property and research commercialisation income measures.

Where relevant, ERA is considering the following types of applied measures:

- Standard patents sealed and provisional applications
- Plant breeders' rights (for new plant varieties)
- Registered designs, and
- Research commercialisation income.

Intellectual property

This measure refers to the group of legal measures to protect ideas and concepts, and is most often applied around research commercialisation.

Intellectual property rights granted in Australia are not necessarily applicable internationally, and conversely, an intellectual property right granted overseas does not necessarily apply in Australia. While there are some international agreements covering intellectual property rights between signatory nations, in most cases an applicant is required to apply for rights in each relevant country.

All intellectual property measures included in this indicator category must be directly related to research.

Standard patents sealed

According to the definition provided by IP Australia, a patent is:

a right granted for any device, substance, method or process which is new, inventive and useful. A patent is legally enforceable and gives the owner the exclusive right to commercially exploit the invention for the life of the patent².

Patents provide suitable protection for the development of a new technology that will lead to a product, composition or process with significant potential for long-term commercial gain. The process for obtaining patents differs between countries, both in terms of the ease and cost of obtaining patents, and the time taken for a patent to be granted.

In those instances where the research behind the intellectual property that has resulted in the patent being granted is clearly identifiable as meeting the ERA definition of research, one count per standard patent sealed per country will be attributed.

² From http://www.ipaustralia.gov.au/patents/what_index.shtml. Accessed on 13th November 2008 at 10.12am.

Figure 15: Example profile of standard patents sealed.

Applied: F01 Patents	
Institution: University X	
Discipline Cluster: PCE	
FoR Level: Group	
Group Number: 0303	
Group Name: Macromolecular and Materials Chemistry	
Country	No. of patent sealed
Australia	3
Japan	0
United States	2
Europe	1
Other international	2
Total Patents in reference period	8

Plant Breeders' rights

A plant breeders' right, or plant variety right, gives the owner exclusive commercial rights over the new variety of plant. This right is granted for the development of a new variety of plant where it can be demonstrated that the new variety is:

- distinct, uniform and stable, and
- identifiably different from any other variety.

Under ERA, one count will be attributed for each plant breeders' right granted in Australia (or an international equivalent) during the reference period.

Figure 16: Example profile of plant breeders' rights granted.

Applied: F02 Plant breeders' rights (PBRs)		
Institution: University X		
Discipline Cluster: BSB		
FoR Level: Group		
Group Number: 0703		
Group Name: Crop and Pasture Production		
FoR Code	Group Name	No. of PBRs Granted
0703	Crop and Pasture Production	12

Registered designs

A registered design right is granted for new and distinctive designs (see **Appendix III**). Once a registered design has been examined and certified, the owner has an exclusive right to use, license and/or sell the design. In this context, design refers to features which, when applied to a product, render it unique in appearance. This may include shape, pattern or ornamentation.

Registered designs are not automatically included in ERA. However, in those cases where there is a clear link between the registered design and the related research (based on the definition of research on page 3), an institution can submit the design

for inclusion. Institutions are required to justify this inclusion as a part of their submission using no more than 150 words.

One count is attributed for each registered design granted in Australia during the reference period.

Income generated from registered designs, either via licensing or otherwise, is included in ERA under research commercialisation income, providing the additional requirements pertaining to this measure are met (see next section).

Figure 17: Example profile of registered designs.

Applied: F02 Registered designs		
Institution: University X		
Discipline Cluster: HCA		
FoR Level: Group		
Group Number: 1905		
Group Name: Visual Arts and Crafts		
FoR Code	Group Name	No. of registered designs
1905	Visual Arts and Crafts	5

Research commercialisation income

Where relevant, ERA collects and profiles details of research commercialisation income.

Commercialisation income is defined as commercial returns via income and/or capital gains resulting from the commercialisation of research outputs, services and intellectual property. To be included under this indicator, the research commercialisation income must directly arise from an exploitation of research (based on the ERA definition).

Research commercialisation income includes income resulting from intellectual property protection such as patents and subsequent licensing and royalties. It does not include commercial income from other sources such as research contracts and consultancies (which is included in the HERDC Category 3), commissioned works, student fees, the renting of space at universities or any other source.

Commercialisation income does not necessarily need to be reinvested into research. Commercialisation income earned by university-owned subsidiaries and spin-off companies is eligible for inclusion in ERA provided it meets the definition above.

Figure 18: Example profile of commercialisation income by FTE benchmarked by discipline

Applied: F04 Commercialisation Income Institution: University X Discipline Cluster: PCE FoR Level : Group Group Number: 0301 Group Name: Analytical Chemistry				
FTE	Total Amount	\$ per FTE	Discipline Benchmark per FTE	Ratio of Inst. against Benchmark \$ per FTE
3.1	\$5,408,320	\$1,744,619	\$658,000	2.65

Figure 19: Example profile of total research commercialisation income by year

Applied: F04 Commercialisation Income Institution: University X Discipline Cluster: PCE FoR Level : Group Group Number: 0301 Group Name:: Analytical Chemistry			
Research Income by Year			Total for period
2005	2006	2007	
\$896,520	\$1,526,800	\$2,985,000	\$5,408,320

Appendix I

Tier definitions for the Ranking of Journals

A*

Typically an A* journal would be one of the best in its field or subfield in which to publish and would typically cover the entire field/subfield. Virtually all papers they publish will be of a very high quality. These are journals where most of the work is important (it will really shape the field) and where researchers boast about getting accepted. Acceptance rates would typically be low and the editorial board would be dominated by field leaders, including many from top institutions.

A

The majority of papers in a Tier A journal will be of very high quality. Publishing in an A journal would enhance the author's standing, showing they have real engagement with the global research community and that they have something to say about problems of some significance. Typical signs of an A journal are low acceptance rates and an editorial board, which includes a reasonable fraction of well known researchers from top institutions.

B

Tier B covers journals with a solid, though not outstanding, reputation. Generally, in a Tier B journal, one would expect only a few papers of very high quality. They are often important outlets for the work of PhD students and early career researchers. Typical examples would be regional journals with high acceptance rates, and editorial boards that have few leading researchers from top international institutions.

C

Tier C includes quality, peer reviewed, journals that do not meet the criteria of the higher tiers.

HERDC research income categories

An overview of HERDC research income categories is provided below; refer to the *2008 Higher Education Data Collection Specifications for the collection of 2007 data* for more information.

Category 1—Australian Competitive Grants

Subject to meeting the definition of research and the specifications set out in this part (Part A, section 6), Category 1 consists only of those research schemes/programmes listed on the 2008 Australian Competitive Grants Register (ACGR).

Only those specific funding schemes registered in the 2008 ACGR can be claimed under this category. The ACGR is available through the department's website at: www.dest.gov.au > Research > Online forms & services > Higher Education Research Data Collection

Grants received from the Australian Government and not included in the 2008 ACGR may be eligible for inclusion in Category 2—Other Public Sector Research Income.

Category 2—Other Public Sector Research Income

Subject to meeting the definition of research and the specifications set out in this part (Part A, section 6), Category 2 includes research income:

- received from the Australian Government that is not eligible for inclusion as Category 1 research income
- from Australian Government business enterprises
- including contract research, from both state and local governments
- from state government business enterprises
- from partly government owned or funded bodies, and
- from Cooperative Research Centres (CRCs) in which the reporting Higher Education Provider (HEP) was not a core participant or participant (i.e. was not a signatory to the Commonwealth Agreement during the reporting period).

Category 3—Industry and Other Research Income

3(i) Australian

Subject to meeting certain definitions, Category 3 includes Australian:

- contract research income provided by industry or other non-government agencies
- grants for research other than government provided grants (which will be reported in either Category 1 or Category 2)

- donations and bequests for research from Australian business, Australian non-profit organisations and Australian individuals, and
- income received from syndicated research and development arrangements.

As many research income arrangements involve grants covered by a contract, in categorising funds as either Australian contract research or as Australian grants, HEPs should regard:

- contract research as research where the project was developed primarily by the funding agency, or jointly by the funding agency and the investigator(s), and
- grants for research where the project was developed primarily by the investigator(s).

3(ii) International A Competitive, Peer-Reviewed Research Grant Income

- Competitive grants, peer reviewed grants for research from non-Australian industry or non-Australian Government agencies including non-Australian industry collaborative research grants.
- In order to qualify for inclusion in this category the granting schemes must comply with the following criteria:
 - funds must be provided on a competitive basis and clearly be for research only
 - the funding scheme must have a well-defined mechanism for competition and selection by a well-qualified panel
 - grants in kind such as the use of facilities, equipment etc. or subsidised travel or accommodation are not eligible
 - funding schemes used exclusively to fund student scholarships are not eligible, and
 - schemes that provide funding wholly or mainly for infrastructure purposes are not eligible.

3(iii) International B Other Income

Any other income research income from non-Australian Industry or Governments that cannot be included in International A research income such as:

- contract research provided by non-Australian industry or non-Australian Government agencies including non-Australian industry collaborative research grants
- non-competitive grants for research from non-Australian industry or non-Australian Government agencies including non-Australian industry collaborative research grants, and
- donations and bequests for research from non-Australian business, non-Australian non-profit organisations, and non-Australian individuals.

Donations and bequests (Australian and international)

- Where all, or a proportion, of a donation or bequest is invested then only the income earned from that investment which is available for expenditure on research in the reference year will be included.
- Any portion of a donation or bequest that is not provided specifically for research purposes cannot be included.

Category 4—CRC Research Income

General requirements:

Under Category 4—CRC Research Income, HEPs must report the research income received for the 2006–2007 financial year from a CRC in which they were a core participant (for CRCs funded prior to the 2006 CRC selection round) or participant (for CRCs funded in the 2006 selection round). A HEP is regarded as a core participant or participant if it is a signatory to the CRC's Commonwealth Agreement.

Income received from CRCs, in which HEPs are not core participant or participant, must be reported under Category 2: Other Public Sector Research Income.

Category 4 comprises the following subcategories:

- Research income derived from Australian Government grants to CRCs.
- Research income derived from non-HEP members of CRCs.
- Research income derived from third parties contributing to CRCs.

HEPs must consolidate the research income from all CRCs in which they are core participants or participants and enter this into Research Income Return—Return 1, split according to the appropriate subcategories. This data does not need to be split between HEPs and their subsidiaries.

Arrangements applying to the collection and certification of CRC Research Income:

HEPs must determine the eligible research income that they can report under Category 4—CRC Research Income for the financial year 2006–07 and must verify that research income data with the respective CRCs in which they are a participant or core participant.

HEPs must certify that Category 4—CRC Research Income data is correct, as reported in the Research Income Return—Return 1, through provision of the Vice-Chancellor's Certification Statement and the Audit Certificate.

Eligible research income:

To be counted in Category 4, all research income must:

- be received by a HEP and its subsidiaries for the financial year 2006–07
- be classified into subcategories
- comply with the definition of research, and
- be provided to a HEP account, for the HEP to spend.

Types of research income eligible to be counted include:

- funds for non-capital aspects of facilities such as laboratories, libraries, computing centres, animal houses, herbaria, and experimental farms
- funds for equipment purchase, installation, maintenance, hire and lease
- funds for salaries of research staff and research support staff
- funds providing a stipend to a student and/or the cost of a student's higher degree by research fee-paying place, unless the places are funded through the Research Training Scheme, Australian Postgraduate Awards, Commercialisation Training Scheme or Endeavour International Postgraduate Research Scholarships
- payments for contracted projects which meet the definition of research, and
- funds provided specifically for the purpose of travel to enable access to a programme of research. Researchers using the funds are expected to be active participants in the research programme, rather than observers or visitors.

Research income that may not be eligible to be counted include:

- funds provided to the personal accounts of HEP staff, or funds used by the CRC to purchase goods or services for use by the HEP
- funds provided specifically for travel to conferences, workshops and/or meetings
- in-kind contributions
- cash contributions made to a HEP on condition that the HEP use these contributions to purchase goods or services from a CRC or other funding provider (such arrangements are regarded as in-kind contributions)
- capital grants (i.e. grants for construction of buildings), even if for research purposes
- funds provided to HEPs for them to manage on behalf of other parties, which are not to be used for research purposes by the HEP
- omissions from previous Research Income Returns-Return 1
- payments to HEPs which are not earmarked for research, even if they may be spent on research at the HEPs' discretion
- funds provided specifically for the purpose of hosting, organising or attending a conference or workshop

- funds provided specifically for the purpose of producing research publications (that is, for publishing research rather than conducting it)
- funds provided to a HEP which is not a participant in the CRC. These funds may be counted under Category 2—Other Public Sector Research Income, provided they are for the purposes of research, and
- GST amounts.

Breakdown by Source Category:

If a CRC’s accounting systems do not readily enable it to distinguish between the funds provided to HEPs which are sourced from government grants, and funds provided to HEPs which are sourced from non-HEP participants, the CRC may split the funds between these two components in the same proportion as the cash funding it receives from these sources.

If the receipt of funds from third parties can also not be tracked separately, the principle described above again applies. Income sourced from Australian HEPs or subsidiaries of Australian HEPs is not eligible to be counted (consistent with section 6).

Example:

In the 2007–08 financial year a CRC receives into a single account cash funding from:

- Australian HEP sources: \$5 million (25 per cent)
- Government grant: \$3 million (15 per cent)
- Non-HEP participants: \$7 million (35 per cent)
- Third parties: \$5 million (25 per cent)

If the CRC allocates \$800,000 of the funds—which it is not readily able to attribute to particular sources—to HEP X for research purposes, in its Certified Statement for HEP X, the CRC may attribute:

- \$120,000 (15 per cent of the \$800,000) to the ‘Allocation of funds from Commonwealth Grant’ component
- \$280,000 (35 per cent of the \$800,000) to the ‘Allocation of funds from non-HEP participants’ component, and
- \$200,000 (25 per cent of the \$800,000) to the ‘Allocation of funds from third parties’ component.

The 25 per cent share of the \$800,000 sourced from Australian HEPs is not able to be counted.

Special Cases:

Refunds

Where, in the reference year covered by the Research Income Return-Return 1, a HEP refunds any monies received, either in the current year or an earlier year, income reported in the reference year must be reduced by the amount of the refund.

CRCs which are no longer operational

Where a CRC is no longer operational, and it is not possible to verify the research income data with the CRC in which the HEP was a core or non-core participant, the amount reported and attributable to that CRC may be reported on the basis of the HEP's financial records alone.

The HEP must ensure that the amounts reported are accurate, including the breakdown of funds.

Note that this is only for CRCs that are no longer operational.

Appendix III

Registered Designs

IP Australia provides the following public definition of design on their website³:

A design is the overall appearance of a product. The visual features that form the design include the shape, configuration, pattern and ornamentation which, when applied to the product, give it a unique appearance. A registered design can be a valuable commercial asset—registration of a design gives the owner protection for the visual appearance of the product but not the feel of the product, what it is made from or how it works.

To be registrable, a design must be new and distinctive. 'New' means the identical design (or one very similar) has not been publicly used in Australia nor has it been published in a document within or outside Australia. For example, a design would not be considered new if it had been 'published' on the Internet before the date it was filed (or its priority date, whichever is earlier).

A design is 'distinctive' unless it is substantially similar in overall appearance to other designs already in the public domain.

Before filing an application, you should search existing design records. If your design is not new and distinctive, any registration you receive could be revoked as a result of examination and your registration could be worthless.

You may also face legal action if you infringe the design rights of the owners of other similar designs.

³ From http://www.ipaustralia.gov.au/designs/what_index.shtml. Accessed on 13th November 2008 at 10.09am.