Excellence in Research for Australia

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Australian Research Council
Outline

Background
Consultation outcomes
System to Evaluate the Excellence of Research (SEER)
Indicators
Outlet Ranking Consultation
Indicators Development Group (IDG)
Where are we now?
ERA Initiative

Announced by the Minister - 26 Feb 2008

Consultation Paper released - 4 Jun 2008
Submissions closed - 30 Jun 2008

Consultation period on a draft journal rankings list began on 12 Jun 2008 and closed on 14 Aug 2008
Objectives of ERA

• Identify excellence across the full spectrum of research activity
• Compare Australia’s university research effort against international benchmarks
• Create incentives to improve the quality of research
• Identify emerging research areas and opportunities for further development
Important considerations

• Promote collaboration between institutions and between university researchers and end users
• Encourage scale and focus and thereby efficient use of research infrastructure and resources
• Facilitate interdisciplinary research
• Minimise the burden on individual researchers, institutions and expert reviewers
Proposed approach

• Evaluation by discipline (ANZSRC) and institution of the outputs of research
• Evaluation to be completed on a rolling basis by Research Evaluation Committees (RECs) in eight discipline clusters
• Indicators and measures to be specific to each discipline
• Initially decoupled from research funding
ERA Liaison Officers

At the beginning of the consultation, each institution nominated an ERA Liaison Officer to assist the ARC in coordinating feedback from their institution.
Clusters

- Physical, Chemical and Earth Sciences (PCE);
- Humanities and Creative Arts (HCA);
- Engineering and Environmental Sciences (EE);
- Social, Behavioural and Economic Sciences (SBE);
- Mathematics, Information and Communication Sciences (MIC);
- Biological Sciences and Biotechnology (BSB);
- Biomedical and Clinical Research (BCR); and
- Public and Allied Health and Health Services (PAHHS).
Consultation outcomes
Sector feedback

The ARC received:

- 103 submissions to the Consultation Paper
- 110 submissions to the journal rankings process
Issues arising from the consultation

Following feedback from the sector, the Minister has agreed to the:

– movement of some disciplines between clusters

– inclusion of categories 2-4 research income, with further work to do on ‘category 5’

– collection of all ERA data at four-digit FoR
Other (bigger) issues

– Attribution of research outputs
– Evaluation and reporting of cross-disciplinary research
– Collection of measures related to scale and focus
– Inclusion of staff FTE
– Inclusion of non-salaried staff
Outcomes of consultation so far

• Data should be collected at 4-digit FoR
• No clear consensus on the inclusion of non-salaried staff
• Some concern over the use of an input (i.e. research income) as a measure of quality
• Additional quality indicators should be kept to a minimum
Outcomes of consultation so far

• A three-year evaluation period for research income and other non-publication data was favoured

• Collection of grant numbers was favoured, particularly for those disciplines that do not typically have large grant amounts
Key policy decisions

- the attribution of publications will be determined based on the location of researchers as at a staff census date
- outputs from non-salaried staff will be included provided these staff meet specified criteria
- Australian competitive grant information will be collected for all disciplines
- all ERA data will be collected at the 4-digit FoR level (there are 157)
ANZSRC – two-digit level

<table>
<thead>
<tr>
<th>Code</th>
<th>Field of Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Mathematical Sciences</td>
</tr>
<tr>
<td>02</td>
<td>Physical Sciences</td>
</tr>
<tr>
<td>03</td>
<td>Chemical Sciences</td>
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<tr>
<td>04</td>
<td>Earth Sciences</td>
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<td>05</td>
<td>Environmental Sciences</td>
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<td>06</td>
<td>Biological Sciences</td>
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<td>07</td>
<td>Agricultural and Veterinary Sciences</td>
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<td>08</td>
<td>Information and Computing Sciences</td>
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<td>09</td>
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<td>10</td>
<td>Technology</td>
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<tr>
<td>11</td>
<td>Medical and Health Sciences</td>
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<tr>
<td>12</td>
<td>Built Environment and Design</td>
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<tr>
<td>13</td>
<td>Education</td>
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<tr>
<td>14</td>
<td>Economics</td>
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<tr>
<td>15</td>
<td>Commerce, Management, Tourism and Services</td>
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<tr>
<td>16</td>
<td>Studies in Human Society</td>
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<tr>
<td>17</td>
<td>Psychology and Cognitive Sciences</td>
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<tr>
<td>18</td>
<td>Law and Legal Studies</td>
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<td>19</td>
<td>Studies in Creative Arts and Writing</td>
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<td>20</td>
<td>Language, Communication and Culture</td>
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<tr>
<td>21</td>
<td>History and Archaeology</td>
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<tr>
<td>22</td>
<td>Philosophy and Religious Studies</td>
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</table>
ANZSRC – 4-digit level

DIVISION 01 MATHEMATICAL SCIENCES

This division covers mathematics, statistics, and mathematical aspects of the physical sciences.

This division contains six groups:

0101 Pure Mathematics
0102 Applied Mathematics
0103 Numerical and Computational Mathematics
0104 Statistics
0105 Mathematical Physics
0199 Other Mathematical Sciences
Key policy decisions

• All discipline clusters will use the same reference dates for determining eligibility of outputs, regardless of when the evaluation takes place

• The ARC is doing more work on the evaluation of interdisciplinary research

• Further consultation necessary on the collection of research income in categories other than Australian competitive grants, including:
  – International peer reviewed grants
  – Grants in collaboration with industry and government
ERA Guidelines

• Key decisions incorporated in Guidelines

• First draft of ‘Submission Guidelines’ released in September 2008

• Additional guidelines released as decisions are ‘locked in’ (e.g., which metrics will be used)
ERA/SEER Pilot

Is confined to the Physical, Chemical and Earth Sciences Disciplines (Cluster 1)

The principles and procedures underlying the Pilot will strongly inform the formal ERA process

Only collecting data from institutions. No analysis will be conducted of data for the Pilot

Using an ARC-developed IT system, known as the System to Evaluate the Excellence of Research (SEER)

Institutions participating in the ERA Pilot are able to submit data from Wednesday 1 October until Friday 14 November 2008
Why an ERA/SEER Pilot?

- facilitate the sector’s feedback on an early draft of the ERA Submission Guidelines;
- ensure that institutions can successfully make submissions through SEER;
- test that the SEER technology works in terms of core submission functionality (proof-of-concept);
- will allow early testing of SEER access to research outputs in institutional repositories.
Other factors that may influence ERA

• National Innovation System Review – Green Paper
• Mission-Based Compacts
• Accessibility Framework
ERA indicators development
Process Overview

<table>
<thead>
<tr>
<th>Metrics Profile 1</th>
<th>Metrics Profile 2</th>
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<tbody>
<tr>
<td>Metrics Profile 3</td>
<td>Metrics Profile 4</td>
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<td>Metrics Profile 5</td>
<td>Metrics Profile 6</td>
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Peer Review

Research Evaluation Committee

Final report
Indicators 1 – Publications

Research Publications data
Books, book chapters, journal articles and refereed conference publications as a minimum

Publication Reference Period(s)
A fixed reference period will be used for all clusters

Attribution:
- staff affiliation at census date
Indicators 2 – Publications

Data Supplier
ARC will examine the use of multiple citation data suppliers to ensure broad coverage

Outlet Rankings
A range of research output types profiled across four tiers
Includes journals and where relevant publishers, refereed conference proceedings, and other outlet types
Indicators 3 – Publications

Bibliometrics (where relevant)

- Citations per publication against international benchmarks for each discipline
- Centile analysis

Quality indicators relevant to discipline
- Specific outputs
Examples of Indicators of Success in Applied Research and Translation Of Outcomes

• Indicators for practitioner-focussed outlets
• Patents produced (by type)
• Plant breeders’ rights
• Licence income and other commercialisation revenues
• Research income awarded in collaboration with end users
• Exhibitions and/or performances with a research component and international recognition
• Other discipline-specific indicators as identified by the Indicators Development Group
Indicators Development Group (IDG)

**Discipline-specific Indicators**: to consider, test and recommend appropriate indicators (working with relevant REC)

**Testing of Indicators**: analytical testing of all indicators to identify anomalies within each discipline (supported by an analytical testing team)

**Reporting Profiles**: recommendations regarding appropriate reporting of indicators to ensure transparency and validity
Key outputs of the IDG

The **ERA Indicator Principles** document will be a recommendation to the CEO based on the issues outlined in the *Research Assessment Indicator Principles* paper.

The **ERA Indicator Methodologies** will ensure international benchmarking, outline the calculations for each indicator and allow institutions to replicate calculations in-house.

The **Discipline Specific Indicator Matrix** will include details of the citation database supplier to be used for each discipline and any irregularities for specific disciplines.
**Indicator matrix (example)**

<table>
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<tr>
<th></th>
<th>discipline 1</th>
<th>discipline 2</th>
<th>discipline 3</th>
<th>discipline 4</th>
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<th>discipline 7</th>
<th>discipline 8</th>
<th>discipline 9</th>
<th>discipline 10</th>
<th>discipline 11</th>
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<td>Plant breeders rights</td>
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</table>
Outlet ranking consultation
Draft journal ranking list

In late 2007 the four Learned Academies and a number of discipline peak bodies undertook a journal ranking exercise to develop draft journal rankings for their relevant disciplines.

19,500 unique peer reviewed journals were identified to form a draft list of ranked journals. Each journal was given a single quality rating and assigned to one or more disciplines defined by Field of Research (FoR) code(s) (four-digit).
Quality rating

Journals relevant to a particular Field of Research have been sorted into tiers according to the following distribution:

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

A Journal’s *quality rating* represents the overall quality. This is defined in terms of how it compares with other journals and should not be confused with its relevance or importance to a particular Field of Research (FoR)
Quality rating

Tiers for the Australian 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 lowish acceptance rates and an editorial board which includes a reasonable fraction of well known researchers from top institutions.
Quality rating

Tiers for the Australian Ranking of Journals

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.
Assignment of FoR for citation benchmarks

**FoR codes** were assigned to each journal based on the research considered **core** to the particular journal.

The FoR assignment will be used to develop the **Journal Sets** used to derive citation benchmarks.

**Citation rates** vary considerably across FoR and including journals not core to the field could diminish the quality and accuracy of the citation benchmarks.
Finalising the ranked journal list

The ARC will consider submissions

Where there are conflicting recommendations, the ARC may contact institutions, Learned Academies or peak bodies to inform its decisions

The ARC will give weight to the number of submissions and the strength of supporting information in making changes to a Journal ranking or FoR coding
Presenting indicators to RECs
## Ranked journals

<table>
<thead>
<tr>
<th>Tier</th>
<th>Number</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>A*</td>
<td>82</td>
<td>23%</td>
</tr>
<tr>
<td>A</td>
<td>105</td>
<td>30%</td>
</tr>
<tr>
<td>B</td>
<td>104</td>
<td>30%</td>
</tr>
<tr>
<td>C</td>
<td>46</td>
<td>13%</td>
</tr>
<tr>
<td>Not ranked</td>
<td>13</td>
<td>4%</td>
</tr>
<tr>
<td>Total</td>
<td>350</td>
<td>100%</td>
</tr>
</tbody>
</table>
## Citation analysis

### Citations per publication (cpp)

<table>
<thead>
<tr>
<th>Total Publications</th>
<th>Sum of Cites</th>
<th>Institutional cpp</th>
<th>World cpp Average</th>
<th>Australian cpp Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>337</td>
<td>2,871</td>
<td>8.52</td>
<td>5.08</td>
<td>4.53</td>
</tr>
</tbody>
</table>

**Relative citations against world and Australian average**

| 1.67 | 1.88 |

### Centile analysis

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<thead>
<tr>
<th></th>
<th>&lt;1%</th>
<th>2-5%</th>
<th>6-10%</th>
<th>11-20%</th>
<th>21-50%</th>
<th>&gt;50%</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Number</td>
<td>13</td>
<td>35</td>
<td>25</td>
<td>38</td>
<td>111</td>
<td>115</td>
<td>337</td>
</tr>
<tr>
<td>Percentage</td>
<td>4%</td>
<td>11%</td>
<td>7%</td>
<td>11%</td>
<td>33%</td>
<td>34%</td>
<td>100%</td>
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</table>
### Profile for Research Income

**Institution:** University of X  
**Discipline Cluster:** PCE  
**Two-digit FoR:** Chemical Sciences  
**FTE:** 48.7

<table>
<thead>
<tr>
<th>Category</th>
<th>Research Income Type</th>
<th>No of grants</th>
<th>Amount</th>
<th>$ per grant</th>
<th>Income per FTE</th>
<th>Discipline Benchmark Per FTE</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>Category 1 Total</td>
<td>Australian Competitive Grants</td>
<td>40</td>
<td>$22,617,000</td>
<td>$565,425</td>
<td>$464,415</td>
<td>$451,814</td>
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<tr>
<td>CATEGORY 1</td>
<td>Analytical Chemistry (4.2 FTE)</td>
<td>4</td>
<td>$1,515,000</td>
<td>$378,750</td>
<td>$291,346</td>
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<td></td>
<td>Inorganic Chemistry (8 FTE)</td>
<td>9</td>
<td>$5,950,000</td>
<td>$661,172</td>
<td>$595,000</td>
<td>$545,010</td>
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<td>Macromolecular and Materials Chemistry (7.5 FTE)</td>
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<td>$326,666</td>
<td>$115,294</td>
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<td>Medicinal and Biomolecular Chemistry (10.4 FTE)</td>
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<td>$6,340,000</td>
<td>$704,444</td>
<td>$511,290</td>
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<td>Organic Chemistry (5.2 FTE)</td>
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<td>Physical Chemistry (incl. Structural) (11 FTE)</td>
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<td>$4,040,000</td>
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<td>Other Chemical Sciences (2.4 FTE)</td>
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<td>$922,000</td>
<td>$922,000</td>
<td>$271,176</td>
<td>$297,416</td>
<td>0.91</td>
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Next steps

- Release of ERA indicator principles
- Release of ERA citation data supplier tender
- Development of discipline specific indicators through the work of the sub-committees
- Indicator testing continues
- Finalise the journal rankings
- Continue SEER build
Analytical testing

- Whether interdisciplinary research is likely to be disadvantaged under ERA
- Examine the volume and type of research publications across all disciplines
- Examine citation data supplier coverage
- Examine a range of methods for deriving appropriate discipline specific citation benchmarks
- The ability to assign books/chapters to a FoR based on library cataloguing
- An appropriate method to re-assign publications to 4-digit FoR codes where they are currently assigned to multidisciplinary or a 2-digit FoR