Australian Government
Australian Research Council

ERA

ERA Indicator Principles

19 December 2008

Introduction

The Excellence in Research for Australia (ERA) Indicator Principles have been developed by the Australian Research Council (ARC) in accordance with international best practice and informed by the ERA Indicator Development Group (IDG) with analytical testing of data from the Australian higher education sector. The ERA indicator development process was underpinned by the objective of minimising the burden on researchers, administrators and institutions.

In developing the Principles, it is recognised that there are a wide-range of discipline-specific behaviours and norms, and also that no single indicator could necessarily be applied across all disciplines. In some cases, peer review may form the major component of the evaluation of research in a particular discipline with quantitative indicators providing supporting information to the Research Evaluation Committees (RECs).

In this document, all references to indicators apply to indicators for the ERA initiative.

Further details will be provided to institutions in the ERA *Indicator Descriptors* document.

The Indicator Principles

The indicator development process has been informed by analytical testing to verify the validity of the indicators. Where an indicator has not been clearly demonstrated to be a valid and robust measure of research quality for a discipline, it will not be used in ERA. It is anticipated that future rounds of ERA may use a greater number of quantitative indicators once they have been further developed, tested and shown to be valid and robust.

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 reliably 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.

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 should allow institutions 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.

General principles

Unit of Evaluation

The unit of evaluation for ERA is the research discipline for each eligible institution[1], defined by 4-digit Field of Research (FoR) codes[2]. It is recognised that for some disciplines there may not be sufficient research volume to undertake a valid analysis at the four-digit level. In these instances, the ARC will undertake quantitative analysis at the two-digit FoR level.

---

[1] Eligible institutions are Table A and Table B providers, as defined in the *Higher Education Support Act 2003 (HESA)*. This includes all campuses of an institution in Australia and overseas.
[2] Field of Research Codes as defined by the Australian and New Zealand Standard Research Classification.

In the case of very low volumes at either the two- or four-digit FoR level, the ARC will not undertake an assessment of that discipline for that institution (see 'Low volume' section on page 5).

Interdisciplinary research

ERA is a disciplinary research assessment exercise. As such, interdisciplinary research will be disaggregated to its discipline components.

To ensure that interdisciplinary research is tracked through the ERA assessment process, institutions may submit up to two Institutional Unit codes (free text) and up to two separate fields to identify the theme of the research (from a defined list) with each research output. This enables the spread of interdisciplinary research to be identified by institutions throughout the ERA data set. It also enables institutions to undertake in-house analysis of interdisciplinary academic units following evaluation.

Elements evaluated by ERA

ERA will evaluate research within the reference period using indicators of research outputs, research income, esteem and applied research.

Background statement

Institution submissions can be accompanied by a succinct written background statement to support the submission. The statement will enable institutions to provide appropriate background for the quantitative indicators and to describe the research environment in which the disciplines operate. It will also enable institutions to include in their submission any other relevant information such as the development of a new research capability.

The background statement will be limited to two A4 pages for each two-digit FoR code.

Reference period

Research publications will be evaluated over a six year period; 1 January 2002–31 December 2007.

Non-publication outputs will be evaluated over a three year period; 1 January 2005–31 December 2007.

Indicator attribution

ERA use two methods of indicator attribution: staff affiliation as at the census date; and the HERDC method (i.e. institution based). Table 1 below summarises indicator attribution. For the first round of ERA, the staff census date will be 31 March 2008.

Table 1 – Summary of ERA indicator attribution

Indicator Type	Attribution
Publications	Staff affiliation at census date
Income	HERDC
Esteem[3]	Staff affiliation at census date
Applied	HERDC

Attribution of research publications will be based on the institutional affiliation of the researcher(s) at the census date. Affiliation will be based on the individual meeting ERA-specific criteria.

An institution will receive one count for each research publication, regardless of the number of authors listed on the paper or the role of the author. An example of this approach is outlined below:

> Each institution is awarded an equal share of the paper, irrespective of their share of authors. For example, a paper with 4 authors:
>
> - University X (2 authors)—1.0 (i.e. one count)
>
> - University Y (1 author)—1.0 (i.e. one count)
>
> - University Z (1 author)—1.0 (i.e. one count)

Research income may be apportioned across FoRs, but will not be double counted.

Research Evaluation Committees — Expert review

The ARC will use a number of Research Evaluation Committees (RECs) to undertake expert review of relevant disciplines. ERA indicators will be presented to RECs as a 'dashboard' of information, with supporting documentation to guide the interpretation of the data.

Both profile and trend data will be provided to the RECs, as well as discipline benchmarks where applicable.

Each REC will include internationally-recognised members with expertise in research evaluation and broad discipline expertise.

Peer review

Where there is an insufficient number of valid quantitative indicators to provide a reliable evaluation of research quality, the ARC will undertake peer review of a sufficient selection of research outputs to converge on a judgement of quality.

The ARC acknowledges that peer review will have already occurred on a significant majority or research outputs and is already a condition of a research output being

---

[3] Except where awarded to an institution.

considered as one of the four major research output types collected for the HERDC (i.e., book, book chapter, journal article, refereed conference publications). Similarly, competitive grant income submitted for ERA will have been awarded on the basis of peer review. Any peer review process conducted in ERA will therefore be designed to avoid unnecessary duplication of effort.

Assessors of national and international standing will be selected to undertake an evaluation of research outputs to supplement the review undertaken by the REC members. ERA will draw on both the ARC and the NHMRC's well established and extensive peer review databases to identify relevant experts to undertake peer review of a sufficient sample of research outputs in order to make an informed judgment of quality.

Each research output selected for peer review will be assessed by a minimum of two peer reviewers, in addition to the REC Members.

For disciplines where peer review will be used, institutions are asked to identify a pre-determined proportion of their best quality outputs for peer review. The proportion of outputs required for peer review may vary across disciplines (see below).

Identifying research outputs for peer review

For disciplines where peer review is used, institutions are asked to identify a pre-determined proportion of their outputs for peer review. Where possible, these research outputs must be made available to the ARC for evaluation by RECs via an institutionally-supported repository.[4]

The proportion of outputs required for peer review may vary across disciplines. The standard proportion will be 20 per cent of all outputs at the four-digit FoR level.

Irrespective of the proportion requirements for peer review, institutions must submit their full list of all research outputs for the reference period, and copies should be available if requested by the ARC.

Low volume

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'*.

For disciplines where citation analysis will be used, assessment (at both the four- and two-digit FoR levels) is limited to FoR codes containing 50 or more indexed journal articles.

For disciplines where citation analysis will not be used, assessment will be limited to FoR codes containing 20 or more journal articles, or equivalent based on the Higher Education Research Data Collection (HERDC) publication weightings.

---

[4] Where neither the institution nor the researcher have a licence to make the output available, the ARC is seeking to ensure that institutions are able to store these research outputs in their repositories, in closed access, for ERA evaluation purposes.

All research outputs are included in the national analysis of the discipline, where low volume should not be an issue.

Peer review will not be used in the case of low levels of research activity for a particular institution unless it is an agreed measure for the entire discipline.

Assigning research outputs to one or more Field of Research code(s)

Research outputs can be assigned to more than one FoR code where relevant. Where a research output is assigned to more than one FoR code, it must be submitted with full weighting to each of the assigned codes and their respective clusters.

For journals, the ARC will use the journal ranking FoR code assignment(s) identified as part of the ranked outlet consultation process. Journals may be aligned with up to three four-digit FoR codes. Journals with more than three four-digit FoR codes are classified as multi-disciplinary.

Prior to submission, the ARC will release a full list of all journals for each four-digit FoR code.

The ARC will use an accepted methodology to map cited and citing references from multi-disciplinary journals and journals mapped to a two-digit FoR code to allow articles to be assigned to a four-digit FoR code.

For books, book chapters and conference proceedings, submitting institutions are required to assign up to three four-digit FoR codes that most appropriately reflect the content of the research output. Institutions must also supply the ISBN for each book or book chapter.

Double counting of research outputs in ERA

While ERA allows for research outputs to be assessed with full weighting within more than one four-digit FoR code, in instances where the outputs are aggregated to the two-digit level due to low volume, each single research output is only counted once per two-digit FoR code.

The ERA IT system is being developed to ensure double counting at the two-digit FoR level does not occur.

Citation analysis

Citation data suppliers

ERA will use the most appropriate citation data supplier for each discipline. Only one supplier will be used for each discipline (at the two-digit FoR level).

Defining the ERA citation dataset

The ARC will define the citation dataset for ERA prior to submission. The ARC will also provide publication benchmarks to institutions. This will allow institutions to

undertake in-house analysis and modelling using the same dataset and benchmarks used for ERA.

The exclusion of self citations and citation clubs

There is insufficient evidence that self-citations and citation-clubs have such a significant impact to warrant the effort to exclude self-citations or collusive citation practices. All citations will be included in the citation profiles.

Weighting of indicators

In arriving at an overall research quality profile, the ARC will not weight or sum indicators in a computational manner. As described above, indicator profiles will be presented to the RECs as a dashboard of information, with supporting documentation to guide the interpretation of the data and the importance of each indicator for the specific discipline.

Repository statistics

Repository download statistics will be used as a measure of research quality. It is recognised that download statistics and other repository-related indicators may develop into valid measures in the future.

Esteem measures

In recognition that research excellence can be evidenced by a range of non-publication related indicators, a range of esteem measures are included in ERA.

ERA Indicator Sets

ERA uses a range of indicators to assess research quality. Below is a list of indicators developed for ERA. The full description of each indicator is set out under the *ERA Indicator Descriptors*.

- **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