This presentation covers the creation of new research infrastructure at Deakin University, especially the repository Deakin Research Online, through cross divisional collaboration due to a focus caused by the Excellence in Research for Australia audit.
We needed to ensure that research outputs were available for citation or review by others.

ERA 2010 evolved from Research Quality Framework (2006-) which selected outputs from the best performers in each field, chosen by the institution.

After a change of government the body responsible for the audit changed from DEST to the ARC.

ERA emerged in 2008, based on a whole of institution approach:

Research performance and potential was to be judged by the impact of quality outputs of all researchers employed at the University measured by the citation or review by others.
Traditionally research outputs have been reported annually through the Higher Education Research Data Collection (HERDC). HERDC requires:

- A citation of the item published with calculations and weightings for the publication for researchers employed at the University.
- Ensuring evidence is on hand to support the citations (at Deakin University - photocopies in archive boxes).
- Ensuring a count of strict categories of research books, book chapters, peer reviewed journal articles and refereed conference papers.
- And a summarised report of the outputs.

The focus is on quantity of traditional quality research publications.
The focus of ERA is on quality rather than quantity.

- Universities are expected to explain their ERA results in terms of their research strategy. This research strategy includes building areas of research strength and either improving or discontinuing areas that are performing poorly. It is anticipated that the Government will also over time use the results more widely so as to further build research concentration in areas of quality.

- In order to enable assessment of the quality of outputs, repositories were required – to make them conveniently available to assessors and then sustained for future ERA processes.

- ERA built on the 2004 Accessibility Framework so open access to the wide world was required wherever copyright allowed.

- ERA required a change in nature and amount of information collected on researchers and research outputs.

- The game has changed!
The Accessibility framework was part of Backing Australia’s Ability – Building our Future through Science and Innovation package

- It provided a strategic framework to improve access to research information, outputs and infrastructure.
- It stated that there will be an agreed system-wide approach for managing research outputs and infrastructure so they are **discoverable, accessible and sharable**, in order to improve the quality of research outcomes, reduce duplication and better manage research activities and reporting.
- And this included open access to the public, the wide world
- ERA embraced the principles expressed in this framework
ERA obviously required more than HERDC or the RQF
- All relevant outputs from census authors, regardless if done at the University (looking at research potential)
- Full and accurate citations with identifiers for matching with metrics
- All of the HERDC categories of material and more, including non traditional ‘publicly available’ research outputs from creative arts
- Classification by Fields of Research
- Information on research income
- A dark archive and an open access repository to provide the evidence online
- Reports and statements at many levels
- Research from 7 to 2 years old and kept for future audits
HERDC reported only the past year of publications, ERA reported 5 years with a delay of 2 years to enable their impact to be assessed.

Online access to past research outputs, in open access where possible, raises several issues:

• Public access – we needed to know what copyright researchers had retained and then seek their permission
• Evidence – needs to be gathered. In some cases researchers needed to supply the output and/or other supporting evidence of their old publications to the repository if not easily obtainable
• Faculty and researchers needed to be engaged in regard to providing, classifying and re-evaluating work they had long since finished and previously reported – more work for them in already busy schedules.
The government funded new research infrastructure and repositories with content through two grants.

It was clear that we needed two databases and a portal to achieve a successful ERA submission.

1. A discovery database/repository for description, classification and storage of outputs that also was structured for preservation
2. A database to ingest information from the discovery database and to link administrative information e.g. esteem factors, income etc
3. Finally a portal as a platform to present diverse information to support faculty and researcher collaboration in the development of coherent statements about research strengths and directions.

Facilities in the portal included

a. the presentation of publications by Field of Research School or individual for selection with the capacity to select for peer review or creation for portfolios
b. the capacity to supply statements
c. and ability to revise Field of Research code review and identify clusters.
It was obvious that we needed more skills to build this infrastructure and content. A project team was set up between Research Services, the Library and ITSD. Who did we need to help?

....as it turned out, between us we had all the skills required
The reporters?

Research Services obviously as they have the skills and responsibility for reporting research.
Research Services staff

- Understanding of the citation requirements for reporting
- Understanding of research classification and clusters
- Knowledge of administrative information e.g. researcher and school ids, grants, esteem factors
- Ability to guide faculties and schools through analysis and preparation of reports
- Ability to extract a strategic view of institution strengths and build the best cases
- Understanding of potential financial implications and the ability to explain this to require cooperation
- Systems skills to craft reports

Research Services have staff who

- Understand the citation requirements for reporting
- Understand research classification and clusters
- Gather administrative information e.g. researcher and school ids, grants, esteem factors
- Have ability to guide faculties and schools through analysis and preparation of reports
- Have ability to extract a strategic view of institution strengths and build the best cases
- Understand very well the potential financial implications and the ability to explain this to require cooperation
- Systems skills to present information and craft reports from diverse sources
For Librarians, sharing of information is fundamental to their role. They are ideally placed to support research in their development of sharing infrastructure.
**Librarians**

- Knowledge of options and features of repository software
- Knowledge of copyright, licences and publisher contracts
- Broad experience in rule based descriptions of a wide range of materials in a wide range of languages
- Expert searching ability and familiarity with an extensive range of databases to collect evidence
- Ready access to interlibrary loans, acquisitions department and ‘on demand’ electronic resources
- Knowledge of the variation and use of ISSNs, ISBNs, DOIs, Handles and publishing processes
- Experience with helpful technologies such as open URL resolvers, unicode, harvesting, scanning, digitisation
- Teams of librarians at all levels and all campuses to spread the word about the repository, open access and its potential benefits to the researcher

**The Library provided a range of extra skills**

- Knowledge of options and features of repository software
- Knowledge of copyright, licences and publisher contracts
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- Expert searching ability and familiarity with an extensive range of databases to collect evidence
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- Teams of librarians at all levels and all campuses to spread the word about the repository, open access and its potential benefits to the researcher
Information Technology personnel have the technical skills required and are experienced in delivering complex systems based projects.
Supported the establishment and maintenance of the repository and databases

- Appropriate firewalls and sufficient but not too much security
- Support for non ITSD staff working with open source software (permissions etc)
- Appropriate backup, server space
- Consultation in regard to common service upgrades and their impact e.g. Red Hat
- Additional specialist skills as required

Project management skills to ensure

- Appropriate resources are available in all areas
- Roles coordinated
- Timelines are met
- An independent arbiter to ensure understanding and consensus
- Take responsibility for internal reporting

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We built the Fez/Fedora repository (Deakin Research Online established September 2008) by populating it with 16428 RSD database records collected for annual publication reports, then checked, “cleansed” and linked each.

by adding 4535 outputs from new researchers who were census authors for ERA

By adding more than 8000 documents or objects

• Extract the cleansed data from DRO, applied joint HERDC and ERA business rules and
The repository is the logical start for quality online research audits

- Richer metadata
- The evidence is available
- Librarians verify and supply the more complex data and evidence
- Permanent, fully backed up with preservation metadata and checks

Following the principle of “cataloguing” with the item in hand: richer metadata can be supplied

The repository supports
  - More data fields
  - Unicode i.e. non roman characters

Links to or supplies the evidence
  - Ensures ready check for accuracy
  - Inbuilt flexible security enables seamless access to ‘dark’ evidence
  - A wide range of formats up to 5 gigabytes can be stored and presented

Librarians verify the data
  - Multiple language skills
  - Understand multiple identifiers
  - Understand and interpret licence/copyright issues for open access
  - Understand the best links
  - Extensive experience with databases to find evidence and verify licence details
  - Can use document delivery services to obtain old documents

Permanent
  - International best practice preservation metadata built in (PREMIS)
  - Program used to check for format obsolescence (AONS)
Through ERA and the establishment of new research infrastructure the nature and extent of our work with the faculties from its administrative staff, its leaders and its researchers changed. They are the essential fourth partner, rather just a stakeholder.
• Creating repository structures and capability **L I**
• Identifying researchers who qualified for ERA (creative folk often have non-typical work arrangements) **R F**
• Identifying outputs **R F L**
• Persuading researchers to provide them **F L**
• Finding the evidence to support them **F L**
• Skilling to provide suitable research statements **F F**
• Supplying evidence required **F L I**
• Creating portfolios to reflect research work **R F L**

Legend: **L** = Library; **R** = Research services Division; **I** = ITSD; **F** = Faculty
The challenge – census authors

• 20% new researchers between 2008 and 2009 R L
• Needed lists of unreported works from anyone who started after 2003 F L
• Communication, persuasion, communication F L R
• Didn’t know how much to expect – planning staff resources L
• Finding evidence was not always easy F L R

Legend: L = Library; R = Research services Division; I = ITSD; F = Faculty

• Research Services provided HR lists of researchers 2008 and 2009 – approximately 20% researchers were new in this year alone, and many had joined since 2003.
• The library needed to add publications for all new comers
• DVCR sent emails to new researchers, then all researchers for licences for open access and lists of missed publications
• Repository staff converted lists to records, found items and contacted researchers where other resources failed.

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"Scopus has recognised that some of data matched may contain errors” email Thu 4/1/2010, The ERA team.
In addition we reported legitimate articles in ranked journals, which were rejected because they didn’t have a Scopus Id – because the issue of the journal hadn’t been processed by Scopus
Ranked lists caused difficulties for us all

- Journals title changes not always handled well
- Not all issns are reported
- Non peer reviewed professional journals were unexpectedly included (rethink database classification)
- Conference names and titles are not listed in a standard or extensive manner to identify uniquely – automated database matching difficult
- No absolute method of matching conferences
- Both lists were finalised late

Ranked lists has changed researcher publishing behaviour
Education and reassurance is required. Researchers asked:

What about copyright?
My publisher may not like it
All my colleagues have the same access to information as I have

Some researchers don’t like their earlier versions to be visible
But publishers mostly don’t allow published versions in open access repositories
Perceived lower quality of final manuscript
Problems with citing versions

Researchers have already provided evidence
Evidence for research reporting is the published version and is required

Most don’t understand the need to deposit their...
The repository (DRO) became the one stop shop …the place to add all new outputs, publicise them and feed other databases

**Why?**

- **Evidence online**
- **Flexibility**
- **Immediacy**
- **Publicity**
- **Chance**

It is the convenient place to store the evidence online

– you need to describe it as you store it to be able to find it again!

– and the library provides a quality and copyright check

Flexibility - will support a wide range of formats, including creative

Immediacy – supports early claim to results

Publicity – harvested regularly to all the right places

Available – the alternative, RM wasn’t ready
Now new outputs are added by Faculty administrators, or researchers or DRO staff

- All new and updated records from DRO to RSD RC
- RSD sets the business rules for extraction and continues to produce reports and supply the portal for internal ERA collaboration
- Feed RSD Publication Collection to Research Master (RM) before disbanding RSD RC. RM will replace RSD RC.
- In future DRO will supply RM with Publications data and in turn be supplied by or interrogate RM for researcher and other administrative data
Your repository can be the one stop shop for University research outputs

Create research records only once
Use them many times

....and through collaboration quality control is built in!

- DnD (the SRA created repository we had to have) is now a one stop shop for University research outputs
- It is based on the following principles:
  - Create research records only once
    - describe them in the place where they are to be stored
    - from where they may be used
    - And where links to the published version may be made
    - Contributed using existing Faculty staff structure AND non faculty researchers AND Library staff
  - Export research records
    - To research databases and faculty web pages as required
    - Enable researchers to use for many purposes
    - Structured for discovery – harvested by other databases e.g. Trove, RDA
    - Crawled by web crawlers e.g. Google Scholar, Google, Yahoo etc
- ...and quality control is built in
  - Faculty staff for collecting evidence, classification and input
  - Library staff review against the published version, do copyright checks and provide links
  - Research Services set business rules for extraction and an automated error log
- A focus on quality rather than quantity of research
- A new mechanism for funding research
- Higher visibility and profile for research by field
- Open access flagged as best practice
- All students, including overseas students, being able to more critically select high ranking universities
- Opportunities for greater research collaboration
Some of the changing factors in this environment that provide a challenge
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The repository may be found at www.deakin.edu.au/dro