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**Mamtora, Jayshree, and Pandey, Prashant (2020) *Reframing research access*. *Library Management*, 42 (1/2). pp. 70-79.**

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<http://dx.doi.org/10.1108/LM%2D10%2D2020%2D0155>

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# Reframing Research Access

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## Abstract

Purpose – The paper describes how Charles Darwin University (CDU) used a three-pronged approach to better serve its researchers: it developed a single interface for improved accessibility and discoverability of its research outputs, consolidated its corresponding policies and procedures and implemented training programs to support the new portal. This in turn made its suite of research outputs more openly accessible and better discoverable. The intention was to make CDU research compliant with the FAIR (Findable, Accessible, Interoperable and Reusable) policy statement, affirming the need to make Australia’s research more visible, thereby enabling better access, better collaboration locally and internationally and researchers more accountable to their community.

**Keywords** Repository, Training programs, Research outputs, Charles Darwin university, Pure system, Research policies

## Introduction

Charles Darwin University’s 10 years Strategic Plan 2015–2025, Connect, Discover, Grow, outlines five major target areas of which one is for Charles Darwin University (CDU) to transform into “a successful research intensive university” (CDU, 2015). CDU is one of the smaller universities in Australia, but nonetheless is one of the most research intensive, with recognised excellence in a specialised suite of research fields, namely Indigenous and tropical health, environmental science and public policy (CDU, 2019a). A key priority identified in the plan is to improve the research support environment – resources, equipment, facilities and professional support – for high-quality research (p. 10). Both the Office of Research and Innovation (ORI) and the Office of Library Services (OLS), henceforth the Research Office and the Library, are playing a key role in supporting this direction, which includes maintaining and improving research infrastructure.

It is widely recognised that institutional repositories play the instrumental role of enabling open access to an institution’s research from a single portal, and in this way increase its long-term visibility and discoverability, as well as worldwide impact. This in turn can influence the prestige of both the author of the research and the institution with which they are affiliated (Crow, 2002; Kennison et al., 2013; MacGregor, 2013). The intention is to make CDU research compliant with the FAIR (Findable, Accessible, Interoperable and Reusable) policy statement, which affirms the need to make Australia’s research more visible thereby enabling better access, better collaboration locally and

internationally and researchers more accountable to their community. “Furthermore, implementing a national approach of F.A.I.R. access to Australia’s publicly funded research outputs will position Australia as a participant and leader in the growing international open research and innovation ecosystem. It will ensure that Australia maximises the return on its public investment in research and innovation” (GO FAIR, 2016; Benn and Borchert, 2018).

The long-term aim of this initiative is to make CDU’s research much more widely known, and for it to become accessible and therefore much more visible across the world. This would, in turn, have the long-term impact of elevating the status and prestige of the University and its researchers.

Specifically, this paper reports on the role of the CDU Library in working with the Research Office towards making the University’s research outputs – research publications, research datasets and the HDR (Higher Degree Research) theses collection – more openly accessible through a single repository.

### **Background**

In 2016, CDU’s Research Office carried out a review of research information systems and replaced its IRMA (Integrated Research Management Application) system with Elsevier’s Pure. Pure aggregates an organisation’s research information, from numerous internal and external sources, onto a single platform. The Research Office implemented the main Pure module (publications and other research activities), as well as Award Management (pre-and post-award administration), ERA Module and the CDU Research Web portal, which publicly profiles researchers and research outputs: <https://researchers.cdu.edu.au/en>.

CDU Library management staff were part of the new system tender process and expressed interest in moving across to share the system with the Research Office. Here was an opportunity to transition from eSpace, its Fez-Fedora repository, for an integrated system approach, to support CDU aspirations and strategic direction in times of financial austerity. Initial investigations were carried out into the ease with which this would be possible and after many discussions and testing of systems, it was agreed that only the research collections would be considered for migration into the new Pure repository. The eSpace repository housed a number of disparate collections in addition to research outputs, such as collections of photographs and other specialised archives, which were not appropriate to move across.

Whilst the Pure system is used widely in Europe, there were few users in Australia at the start of this project in 2016. By 2018, the number of users had grown to 11 institutions but with only a handful of these institutions using Pure as their sole repository for displaying research outputs in the way that CDU was. They included Bond University, Charles Sturt University and University of Western Australia.

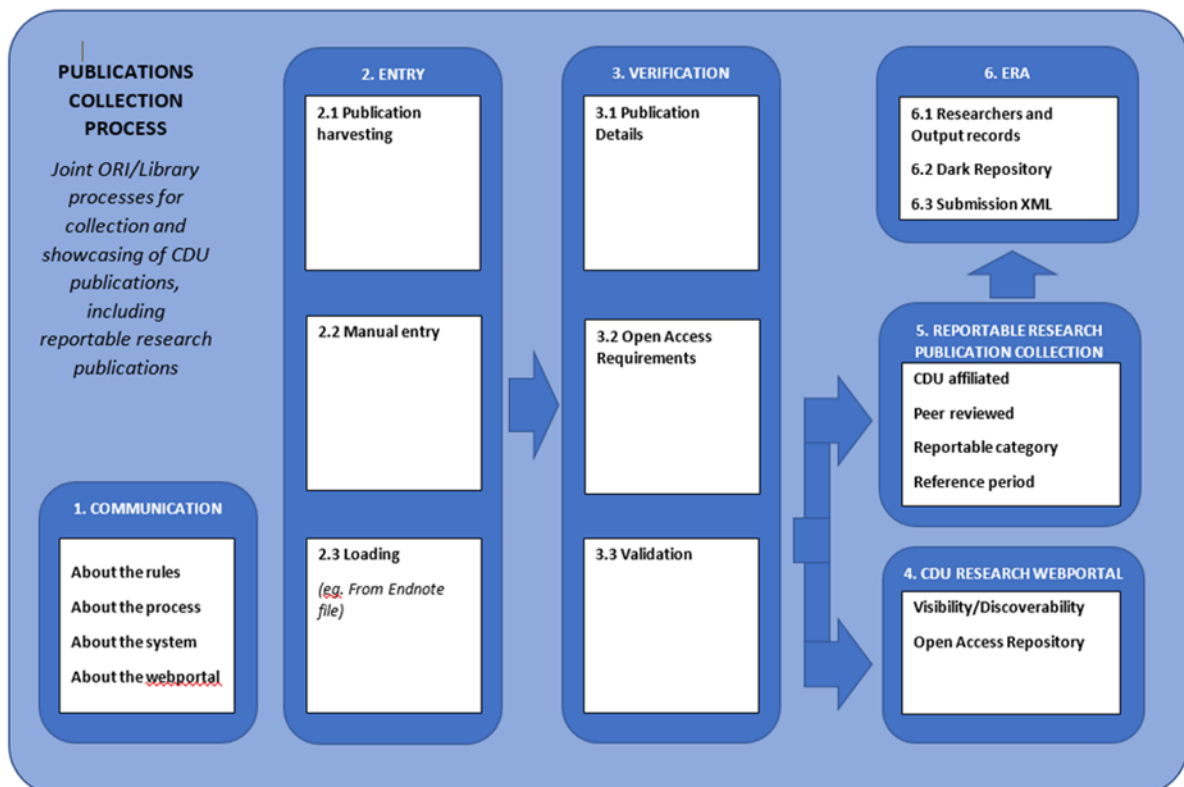
The challenge from the start was to transform the research life cycle across the various systems, processes and people. CDU had been using a number of systems to realise a series of different outcomes; the acquisition of the new system presented an opportunity to review and streamline some of these processes. The Library campaigned for the new system to be a single source of truth through the migration of collections, and by ensuring data quality was maintained, if not improved.

## The Partnership

What resulted was a newly formed partnership between the Library and the Research Office, with the first step being to develop a set of guiding principles to strengthen research support infrastructure mirroring the research life cycle. This included the elimination of unnecessary duplication of effort; clear, collaborative and solution-focussed communication; sufficient documentation to ensure an agreed understanding of objectives, outcomes and processes, while retaining capacity to be flexible and adaptable.

Within 12 months, close collaboration between key Library and Research Office staff began in earnest, and a transition plan was completed. By the end of 2017, a joint publication collection process was in place. Library staff working on the repository were to liaise closely with key staff in the Research Office and continue to verify publication metadata and collect publications. A training program for the Library's digitisation team was developed, and the processing of publications into Pure began. It was agreed that the Library would manage the institutional repository functions of the new system, including open access requirements and discoverability, along with validation and verification of research output records. The verification process would be critical to maintain consistency and quality as the Pure infrastructure allows: uploads from Scopus; allows researchers to add their own records; as well as the manual ingestion of batch records. The validation is carried out for a number of reasons including for internal reporting, for the ERA exercise and for following up on open access requirements as well as for doing metadata checks.

It was apparent that in the meantime, the existing repository would have to be maintained while working with the Research Office, to showcase the University's publications through the CDU Research Web portal. Specifically, it was agreed that all existing processes would be consolidated into a single workflow, with regular meetings between staff, a shared wiki space, data quality assurance and so on (see [Figure 1](#))



## **Figure 1** Joint Publications Collection Process

Research data and thesis management was a shared responsibility with complex workflows and multiple system interfaces. Over the last two years, the series of research collections – research publications, research datasets and the HDR theses collection – have progressively been migrated from the existing repository to the new Research Information System (RIS) to make it accessible through CDU's new Research Web portal. This partnership has ensured that both the Library and ORI are jointly responsible for the communication, engagement and training efforts in relation to the publications collection.

### **Research Outputs**

The Library is collaborating with the Research Office in consolidating three research collections available from the Pure repository: research publications, student theses and research datasets. Each collection has had a slightly different journey in the transition from one platform to another. Research publications and theses were migrated from eSpace into the RIS, whilst the small collection of datasets was manually uploaded. CDU research outputs range from journal articles, conference papers, book chapters and other traditional publications, to datasets, non-traditional research outputs, impact and engagement items and other activities. These activities continue to be recorded in the RIS for reuse, in order to showcase CDU's Research and researchers. Currently all research staff have a profile displaying on the CDU Research Web portal (the public-facing component of CDU's institutional repository), and Higher Degree Students are in the process of being added.

### **Research Publications**

The CDU Research Web portal has now become the single point of access for CDU publications supporting CDU's open access aspirations and requirements. The collection informs CDU's external reporting requirements and internal research planning and research support activities. The information is also used to populate research-activity track records (for showcasing and to support activities such as external funding applications, performance review and promotion).

The Research Office and the Library jointly support researchers to record and highlight their research outputs. Eighty per cent of the University's traditional research outputs are now harvested automatically from international bibliographic databases, including Scopus, through the CDU affiliation by-line on each publication. The Library is responsible for processing the harvested records and verifying them as being accurate and complete, as well as confirming the open access status of each publication and sourcing copies as required. The Library is also responsible for the discoverability of publications via the Web portal fulfilling external and internal requirements in accordance with policies. As the single source of truth for research publication records, it effectively meets compliance reporting requirements both for the ERA and for internal reporting needs of the colleges.

### **Theses**

HDR student theses are a key research collection which until recently had been housed in separate collections based on their format types. From 1989, CDU Library was responsible for housing the University's theses in print format and managed their discoverability via the Library catalogue. Subsequently a change in policy required that students needed to submit their theses both in hard copy and in electronic format on a CD.

While print theses were still discoverable via the catalogue, access to them was restricted

to the physical confines of the Library. In response to the policy change, the Library made the theses available as full text via its eSpace institutional repository from 2012. Over time, this practice resulted in a fragmented collection of theses with different workflows involving a number of different staff.

With the roll-out of the new RIS, the Library took the opportunity to streamline work practices and improve the discovery of, and access to the theses collection ([Mamtora and Pandey, 2018](#)). In partnership with relevant stakeholders, the Library championed the review of the University's overall research policy, the Responsible Conduct of Research Policy ([CDU, 2019e](#)), and oversaw the amendments towards theses management. Print copies of the theses are now no longer required, unless there are exceptional circumstances. In future, all new theses completions will be deposited directly into the RIS. A backlog of print theses for scanning remains, with priority for digitisation assigned according to priority of research topic. The HDR theses collection has very recently been migrated from the repository into the RIS, with the process around their management having been streamlined internally. At the time of writing, CDU is the only institution to have done a batch upload of theses into Pure in Australia. Bond University, the other University to make theses available in Pure, has used a different approach.

### **Datasets**

CDU's small collection of existing datasets has been uploaded into the RIS manually. Much of it is metadata, with a handful of datasets linked to spreadsheets. The Pure repository is able to store up to 2 gigabytes of data, so other avenues to store data are being looked at. Meanwhile work has begun in earnest with a plan for supporting researchers with their data needs as a matter of priority. Key stakeholders in the Project have been identified as being the Research Office, IT Services and the Library, who have come together in formulating a framework and accompanying plan. A survey is being circulated to the research community to gain a complete picture of data from the researcher's point of view: how much data is generated, where is it stored; the size of the data, whether there are accompanying data plans, and if so where they are housed. The results will help inform a systematic approach to providing support to the CDU research community.

As with the other collections of research outputs, the Library and the Research Office are jointly responsible for the development and maintenance of access to metadata records and research data.

### **Policies and procedures**

This section will focus on, and bring together the various University policies that inform the work being done in establishing and growing the University's research collections in their new environment. In particular, it will highlight the Library's role in the development of these policies, and updating of procedures with a view to consolidating its open access research and research data collections.

### **Responsible Conduct of Research Policy**

Following updates to the [Australian Code for the Responsible Conduct of Research, \(2017\)](#), CDU revised its Research Practice Policy (the overarching policy overseeing research at CDU) and renamed it Responsible Conduct of Research Policy ([CDU, 2019e](#)). The Code governs research integrity in Australia and is a joint statement of the, National Health and Medical Research Council (NHMRC), Australian Research Council (ARC) and Universities Australia. Furthermore, the addition of statements relating to open access and research data management in the Code led

to additions to the CDU Policy. The Library was instrumental in taking the initiative to work with the Research Office in the development of these additions – the positioning of open access and research data management – as critical elements of this umbrella policy.

The Library's Institutional Repository Policy and Research Data Management Policy with accompanying procedures were both originally developed in 2014, to support the original eSpace repository. With the transfer of CDU's research collections to the newer Pure-based repository, both these policies were subsumed by others.

### **Open Access Policy**

The Institutional Repository Policy was not fully implemented at the time for a number of reasons, the main reason being that the online research collections were still in the process of being developed. As a result of updates to the RCR Policy, the Library took the initiative of transforming the IR Policy into the more robust Open Access Policy, which has been newly released ([CDU, 2019b](#)). The plan is to roll it out to the research community during Open Access Week this year.

### **Research Data Management Policy**

Similarly, the updating of the overarching research policy as mentioned above also led to changes in the policy governing research data management. The result is that the Research Data Management Policy has been subsumed by the Responsible Conduct of Research Policy, with key excerpts relating to the management of research data and primary materials moved to the broader research policy. However, it is important to retain the accompanying Research Data Management (RDM) procedures, which have now been updated with key feedback from key stakeholders. The final remaining step to the procedures being endorsed is approval by governance.

Furthermore, the Library is liaising with key stakeholders to put in place a training and educational program to educate and bring on board its academic and research community with the new changes.

### **Training and resources**

The Research Office is responsible for the working of the overall Pure system, but support to researchers using the system for any issues that may arise is provided by the staff of both the Library and Research Office. When the RIS was first rolled out, the Research Office undertook to provide training sessions for all University staff, to introduce the new system and to demonstrate the process of uploading their outputs, i.e. self-submission. New staff of the University are captured when they first join, with individual appointments made to ensure they are familiar with system.

It is the responsibility of the Library to overall promote open access scholarship and its benefits to the academic and research community. It does this in a number of ways – it runs workshops on open access publishing, and Open Access Week is marked annually with a series of events such as seminars and workshops. The annual CDU Library Open Access Award is presented at this time to help generate further interest. There is an accompanying subject guide on open access available ([CDU, 2019c](#)) which outlines some of the benefits of making research available open access. It also details the ARC and NHMRC mandates that require the results of any research that they fund be made freely available.

Workshops and training materials are being developed in an effort to train researchers to

self-archive and curate their own research data sets. Regular workshops on managing data will be facilitated as part of the RDM Project currently in progress. Both the Library and the Research Office will be responsible for providing guidance, support and training regarding appropriate research data management. The key aim is for researchers to embed RDM within the research life cycle so that it is integrated within their research workflow. A comprehensive subject guide on research data management ([CDU, 2019d](#)) is also available. These workshops have been run regularly for HDRS, and a theses guide has been released. The guide demonstrates how to search for CDU theses, as well as theses from other Australian and international institutions. It also includes information on the University's thesis guidelines ([CDU 2019f](#)).

## Challenges

### Staffing

During the two-year life of this project, a number of issues have arisen that have affected the progress being made. Firstly, there was the departure of the Deputy Vice Chancellor, Research, who was a key driver of some of the work undertaken by the Research Office in relation to this project, such as updates to key policies, which influenced the future pathways and policy updates. This was followed some months later, by the resignation of the Associate Director, Resources, who led the Library component of the new collaborative project to setting up the single access portal. This affected the initial momentum, although fortunately processes were already in place so day-to-day work has been allowed to continue. Now, several months later, a restructure of the Library is in progress with the possible movement of key staff on the repository posing yet more challenges.

### The system

In establishing a single source of truth through the migration of collections, and ensuring data quality was maintained, a number of issues were encountered.

*Publications.* The Research Office had initially used IRMA as an internal record-keeping system for research publications and as a back-end system, and therefore the quality of records for discovery and access had not been considered a priority. As a starting point for the new integrated system, these records were used as a source for migrated records into Pure. In hindsight, a better approach would have been to merge the various versions of records via scripting solutions before migrating into Pure. In addition, IRMA records did not include full-text materials and therefore, the retrospective verification of records, with the addition of full text and open access validation processes turned out to be manual, and very labour intensive.

The eSpace repository contained a subset of highly customised publication records. Prior to the acquisition of the new system, IRMA records were migrated into eSpace and Library staff then enabling them for open access, while optimising metadata for discovery and access through the IR. Merging these enhanced records with the migrated IRMA records turned out to be a nightmare as it had to be done manually. eSpace also contained the fulltext attachments, and without any unique identifiers across the system, it became impossible to have a scripted solution to retrospectively attach them with the migrated records into Pure.

*Theses.* Digital theses records were curated in eSpace while CDU continued managing the print theses via the Library Management System (LMS). Theses on CDs had been treated as digital with print manifestations and were catalogued in eSpace as well as the LMS. A number of different formats for theses including microfilm, print, digital PDFs and CDs,



emerged over the years resulting in a very complex landscape. Library systems staff developed various iterations of scripted solutions to merge bibliographic descriptions and aggregated various formats with a single unique theses record. The process was mostly accurate but about 20% of the records still needed manual handling

As a result, a number of streamlined workflows were developed in order to improve the throughput and reduce the processing time and thus make the records discoverable as soon as was possible.

*Datasets.* It took time to bring all the stakeholders on board for a shared understanding of the issues and opportunities in relation to RDM due to differing priorities for different areas.

### **The New Portal**

A number of issues have arisen with the new system, including technical shortcomings of the Pure infrastructure, which are being addressed at the time of writing:

- Severe restriction of the customisation of fields to change the user interface for open access. As a cloud-based proprietary system, it is quite limited in terms of what can be customised and localised from metadata forms to the user interface.
- Reduced discoverability in search engines such as Google due to use of a universally unique identifier (UUID) that creates complex URLs.
- Current APIs (Application Programming Interface), including OAI-PMH (Open Archive Initiative – Protocol for Metadata Harvesting) for Pure, are restrictive in their usage, making it difficult to harvest by aggregators.
- New enhancement requests can take a long time to accomplish.

### **The community**

When making significant changes that affect the wider University community, it is vital that all the stakeholders, the academic and research community in particular, remain involved. Whilst a number of information sessions and workshops have been carried out, it is an ongoing process, and the changes need to be promoted through a variety of different channels. Researchers attending the sessions have responded positively to the new streamlined process which provides better visibility and access to their profiles as well as research and publications.

### **Conclusion**

Over a two-year period, significant progress has been made in creating a single, new, integrated interface to accessing CDU's research outputs. In doing this, a major achievement of the initiative is the reduction in the duplication of effort, and development of a shared understanding of the overarching research management life cycle. Furthermore, this approach has resulted in better reporting and intelligence through a single source of truth. CDU's research is now being showcased through the CDU Research Web portal, and new policies and training programs are in place to ensure better and freer access to more comprehensive CDU research collections.

Work will continue to refine and enhance the collections and the portal. Communication with key stakeholders and the research community will be on-going.

### **Addendum**

Considerable progress has been made with the project since the completion of this paper. The retrospective digitisation of CDU theses has been completed, and the complete collection of theses is now accessible from the Web portal. HDR profiles and publications have been added to the repository and are now visible alongside those of academic and research staff. Research

Office staff together with Library staff are running regular drop-in sessions to help researchers familiarise themselves with the new, streamlined processes. Whereas liaison librarians previously only played a minor role in supporting researchers, their revitalised roles are ensuring a more holistic approach to the new research support service. The results speak for themselves with high engagement from research staff, and the steady increase in the number of research records in the repository.

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