

# The Role of Australian Institutional Repositories in Sharing Academic Research Research Report

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Contributor statements:

Niamh Quigley: Writing – original draft; Janice Chan: Writing – review & editing; Julie Clift: Writing – review & editing

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Email: [LibraryResearchSupport@curtin.edu.au](mailto:LibraryResearchSupport@curtin.edu.au)

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## Glossary

Term	Meaning
<b>CAUL</b>	Council of Australian University Librarians
<b>digital preservation</b>	Digital preservation is “the actions required to maintain access to digital materials beyond the limits of media failure or technological and organisational change”. <sup>1</sup> This includes planned activities such as monitoring of file integrity and file format obsolescence.
<b>engagement and impact assessment</b>	In addition to ERA, the ARC also runs an Engagement and Impact Assessment, which “assesses how well researchers engage with end-users of research ... it also assesses how well universities are translating research into impacts beyond academia”. <sup>2</sup>
<b>ERA</b>	Excellence in Research for Australia – a national framework for research evaluation in Australian universities <sup>3</sup>
<b>grey literature</b>	‘Published and unpublished research, produced by government, academia, business and industry, that is not controlled by commercial publishers’ <sup>4</sup>
<b>harvesting</b>	IRs make their metadata publicly available in a specific format called Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH). <sup>5</sup> Services such as Trove and Unpaywall are then able to ingest the IR metadata and index it on their websites. Google Scholar does not use OAI-PMH, and instead crawls <sup>6</sup> and indexes <sup>7</sup> IRs. The final result is that IR items are indexed in Google, Google Scholar, Trove and Unpaywall, show up in search results, and in some cases include a download link to get the actual research output from the IR.
<b>indexing</b>	see harvesting
<b>IR</b>	institutional repository (see repository)
<b>metadata</b>	Information used to describe an item, which adds meaning and can make the item more findable <sup>8</sup>
<b>NTRO</b>	Non-traditional research outputs, a term used by ERA. These research outputs are works other than journal articles and monographs. Examples of NTROs include original, live, or recorded creative works; curated exhibitions; building designs and websites; and commissioned research reports. <sup>9 10</sup>
<b>open research/ open scholarship</b>	‘Open Scholarship is the practice of research, education and knowledge exchange in such a way that others can collaborate and contribute, where research publications, data, lab notes and other

<sup>1</sup> <https://www.dpconline.org/digipres/what-is-digipres>

<sup>2</sup> <https://www.arc.gov.au/evaluating-research/ei-assessment>

<sup>3</sup> <https://www.arc.gov.au/excellence-research-australia>

<sup>4</sup> <https://libguides.library.curtin.edu.au/c.php?g=863554&p=6191902>

<sup>5</sup> <https://www.openarchives.org/pmh/>

<sup>6</sup> <https://scholar.google.com/intl/en/scholar/inclusion.html#crawl>

<sup>7</sup> <https://scholar.google.com/intl/en/scholar/inclusion.html#indexing>

<sup>8</sup> <https://www.naa.gov.au/information-management/describing-information/metadata>

<sup>9</sup> p35 – 38, <https://www.arc.gov.au/file/3781/download?token=Wq9o-CbM>

<sup>10</sup> p39, <https://www.arc.gov.au/file/3781/download?token=Wq9o-CbM>

	scholarly processes and works are properly and ethically managed and evaluated and, unless restricted for justifiable reasons, are freely available to all levels of society under terms that enable reuse, redistribution and reproduction of the work and its underlying data and methods. Open Scholarship may also be referred to as Open Science or Open Research. (Adapted from <a href="#">Foster's Open Science definition</a> ) <sup>11</sup>
<b>PID</b>	'Persistent identifiers (PIDs) are unique alpha-numeric codes that positively identify entities such as people, places, and things. In addition, they are connected to registries of information about those entities, known as metadata, that enable robust linking to and between those entities.' <sup>12</sup>
<b>repository</b>	A repository is a digital archive that stores records of research outputs, and sometimes the research output also. Repositories can be institutional such as space at Curtin University, and only accept outputs from researchers at that institution; they can be subject-based and accept outputs on a specific subject; or they can be general-purpose and accept all research outputs from everywhere. Repositories 'collect, manage, preserve and provide access to valuable research and educational content'. <sup>13</sup> Some repositories hold multiple types of research outputs, and some hold specific types of research outputs - for example dedicated data repositories.
<b>research outputs</b>	An outcome of research created by a researcher including journal articles, books, conference papers, non-traditional research outputs (NTRs) such as creative practice and evidence, theses, research data, software and grey literature (including reports, white/position papers, submissions and news articles). Note that some grey literature is not eligible for ERA submissions, for example non-commissioned reports and news articles. <sup>14</sup>
<b>RMS</b>	Research management systems are used by institutions to manage their research. Features include the ability to get metadata from other systems about research outputs. Many RMS are integrated with IRs to enable researchers to perform the workflow of adding their research outputs into IRs. Some RMS include academic profiles for researchers. RMS are also known as Current Research Information System (CRIS) or Research Information Management System (RIMS).
<b>SDGs</b>	Sustainable Development Goals from the United Nations <sup>15</sup>
<b>third-party repository</b>	A repository that is not run by an institution. For example the general-purpose repositories Zenodo, <sup>16</sup> Humanities Common CORE <sup>17</sup> and Figshare <sup>18</sup> (note that this refers to free Figshare rather than the paid Figshare for institutions)

<sup>11</sup> <https://www.tcd.ie/library/news/unboxing-open-scholarship/>

<sup>12</sup> <https://doi.org/10.5281/zenodo.7100578>

<sup>13</sup> <https://coartraining.gitbook.io/coar-repository-toolkit/introduction/role-of-repositories>

<sup>14</sup> <https://www.arc.gov.au/file/3781/download?token=Wq9o-CbM>

<sup>15</sup> <https://sdgs.un.org/goals>

<sup>16</sup> <https://zenodo.org/>

<sup>17</sup> <https://hcommons.org/core/>

<sup>18</sup> <https://figshare.com/>

## Executive Summary

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To skim this report, read the bordered boxes included at the start of some sections.

This project explored the role of institutional repositories (IRs) in sharing academic research via interviews and a desk review. Interviews were held with twelve library leaders, ten repository managers and three Curtin University researchers. The Australian IR landscape was documented by looking at the public websites of 39 CAUL Australian universities. This website review found that institutional Figshare and DSpace are the most prevalent IRs, and Elements and Pure are the most common research management systems.

IRs can be an integral part of a university wide open research strategy. Many libraries already fund open initiatives, some want to invest more, but some cannot. Some university libraries have strong high-level support for their IRs and feel that their IRs are positively valued. The number of staff providing support for IRs varies widely across the universities included in this research project – from 1 FTE to over 10 FTE.

However, many of the library leaders and repository managers find running their IRs challenging. The pain points include the integration between the IR and RMS, and the indexing of the IR. Researcher deposit and library curation of metadata are challenging workflows, and engaging researchers can be difficult due to low awareness of the IR. Digital preservation activities are generally not formalised. Some universities are already considering a new IR because their current IR does not meet their needs.

Library leaders and repository managers are aware of researcher use of third-party repositories, and some libraries are providing formal advice on third-party repositories. This advice includes suggesting specific generalist and disciplinary third-party repositories, and requesting that researchers provide metadata to their library when they use third-party repositories. Some library leaders and repository managers feel that third-party repositories are better than IRs for some researchers and research outputs. At some universities, IRs are already harvesting metadata from third-party repositories about research outputs affiliated with their institution. Concerns that third-party repositories might be commercialised in the future were also expressed.

Most library leaders and repository managers were positive about Read & Publish agreements, and feel that R&Ps reflect well on the library and encourage conversations about open research. In addition, R&Ps could affect the collection scope of IRs to include more unique research outputs. However, R&Ps can be complex to explain to researchers. Some library leaders and repository managers feel that they need more time to see the impact of R&Ps.

This report also includes suggestions for universities looking for a new IR, and suggestions for IR vendors. During focus groups, library leaders had many ideas for future important conversations in the Australian repository community. Topics for future conversations included the role of publishers, and a national approach to IRs and OA.

Researcher perspectives on repositories were provided by three Curtin researchers who are already making their research open via third-party general repositories, disciplinary repositories, and code repositories. Their reasons for choosing these third-party repositories instead of IRs depend on the features of third-party repositories.

The IRs discussed with participants varied widely in their collection scope, deposit mediation and curation. At least one university has moved from collecting only ERA-reportable

research outputs to collecting anything that researchers want to deposit, while other universities have future plans to expand the research output types they collect. This increased collection scope can showcase the strengths of universities. Some universities are moving from mediated deposit and curation, to instant DOIs and unmediated instant publication. One university wants to add further value to research outputs with metadata about connected PIDs, while other universities want the ability to highlight First People's research in their IR, and show how their research outputs meet the UN's SDGs.

Different factors have contributed towards the changing role of the IR. For many universities, the RMS that pulls from multiple sources is now the source of truth for publication metadata rather than the IR. One university feels that the engagement and impact agenda could increase the scope of research output types collected to be more than ERA-reportable, especially reports and working papers. The move to hosted IRs has enabled some universities to focus more on the value and service of the IR rather than infrastructure management.

The institutional repositories explored in this project all varied in their infrastructure, level of staffing support and workflows. Despite numerous challenges, Australian IRs continue to enable the research outputs of their universities to be shared openly and widely. The engagement of the Australian IR community with this research project is a testament to their commitment to open research.

## 1 Introduction

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Researchers create a variety of outputs during their research, and sometimes save these research outputs to digital archives called repositories. These research outputs include: journal articles, books, non-traditional research outputs (NTROs) such as creative practice and evidence, research data, software and grey literature (including reports, white/position papers, submissions and news articles).

Repositories ‘collect, manage, preserve and provide access to valuable research and educational content’.<sup>19</sup> Repositories can be institutional, and only accept outputs from researchers at that institution; they can be subject-based and accept outputs on a specific subject; or they can be general-purpose and accept research outputs from anyone.

### 1.1 What this research project is about

Curtin University Library wanted to find out more about how other universities support their researchers in using repositories for their research outputs. 12 library leaders and 10 repository managers who plan and manage repositories were interviewed, across 17 Australian universities. 3 Curtin University researchers who use third-party repositories were also interviewed.

This report presents the findings of this research, and a desk review of 39 Australian universities. The findings of this project will also be used to identify opportunities to support Curtin University researchers in sharing their research outputs in repositories.

### 1.2 A brief history of IRs in Australia

IRs are digital archives used to share, preserve, and count research outputs. They share articles, reports, code, data and creative works beyond universities into the wider community. Research outputs are digitally preserved in IRs to keep them safe, and research outputs are counted during research evaluation activities such as Australia’s Excellence in Research for Australia (ERA).

The Australian National University implemented the first Australian institutional repository in 2000,<sup>20</sup> and in 2003 Curtin University established their institutional repository.<sup>21</sup> By 2006, government investment funded more IRs across Australia via the ARROW, ASHER, and RUBRIC programs.<sup>22</sup> Australia now has at least 82 institutional repositories across universities, research institutions and other organisations.<sup>23</sup>

Over the last few months, significant changes have occurred in the open access and research landscape. In Australia, the NHMRC (Australia’s major health research funder) updated their Open Access Policy to now require immediate and open access to NHMRC-funded research.<sup>24</sup> In the US, the outcomes of taxpayer-supported research must now be made freely and publicly available.<sup>25</sup>

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<sup>19</sup> <https://coartraining.gitbook.io/coar-repository-toolkit/introduction/role-of-repositories>

<sup>20</sup> <https://caul.libguides.com/connecting-the-dots-20-years-open>

<sup>21</sup> <http://hdl.handle.net/20.500.11937/15462>

<sup>22</sup> <https://caul.libguides.com/connecting-the-dots-20-years-open>

<sup>23</sup> [https://v2.sherpa.ac.uk/view/repository\\_by\\_country/Australia.html](https://v2.sherpa.ac.uk/view/repository_by_country/Australia.html)

<sup>24</sup> <https://www.nhmrc.gov.au/about-us/news-centre/nhmrcs-revised-open-access-policy-released> and <https://www.nhmrc.gov.au/about-us/resources/open-access-policy>

<sup>25</sup> <https://www.whitehouse.gov/ostp/news-updates/2022/08/25/ostp-issues-guidance-to-make-federally-funded-research-freely-available-without-delay/>

A recent article by Dr Ginny Barbour, Director of Open Access Australasia highlights how two Australian IRs are achieving open access.<sup>26</sup> UNSW now include rights retention for authors as part of their open access policy<sup>27</sup> and Queensland University of Technology's IR has high downloads of their open access content.<sup>28</sup> Recent research from the Curtin Open Knowledge Initiative (COKI) shows that open access articles in institutional and disciplinary repositories are cited by more diverse communities than open access articles on publisher platforms.<sup>29</sup>

### 1.3 Structure of this report

To skim this report, read the bordered boxes included at the start of some sections.

This research report has the following structure:

- Executive summary
- Introduction
- Project approach
- Snapshot of Australian university IRs
- Current IR services
- Challenges faced by IRs
- Future plans for IRs
- Thoughts on open research
- Perceptions of third-party repositories
- Perceptions of Read & Publish agreements
- Suggestions for universities looking for a new IR
- Suggestions for IR vendors
- Future important conversations
- Researcher perspectives
- Discussion
- Conclusion
- Appendix A – Methodology
- Appendix B – Desk review of Australian universities

Footnotes are included throughout this report, and separate endnotes for Appendix B 'Desk Review of Australian Universities'.

<sup>26</sup> <https://oaastralia.org/2022/08/09/open-access-research-repositories-provide-diversity-and-innovation-publishers-cant-match-they-have-a-critical-role-in-archiving-preserving-and-sharing-the-diverse-content-produced-by-unive/>

<sup>27</sup> <https://www.unsw.edu.au/content/dam/pdfs/governance/policy/2022-01-policies/openaccesspolicy.pdf>

<sup>28</sup> <https://eprints.qut.edu.au/statistics/>

<sup>29</sup> <https://doi.org/10.5281/zenodo.7099438>

## 2 Project Approach

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This project was initiated and funded by Curtin University Library, and ran from 2nd May to 10th November, with Niamh Quigley employed as a Research Associate at 0.6 occupancy (approx. 4 months FTE).

### 2.1 Research questions

The reason for this research was to find out the views of library leaders and repository managers in Australian universities, and researchers at Curtin University on institutional and third-party repositories.

RQ1: What are the views of library leaders in Australian universities on strategic directions for IR services, their perceptions of third-party repositories, and the role of repositories in open scholarship?

RQ2: What are the views of repository managers in Australian universities on strategic directions for IR services, their perceptions of third-party repositories, and the role of repositories in open scholarship?

RQ3: What are the views of Curtin University researchers on the role of repositories in open scholarship?

### 2.2 Data collection and analysis

Ethics approval was obtained to interview library leaders and repository managers in Australian universities, and also researchers at Curtin University (HRE2022-0357). Details of sampling and recruitment are available in 'Appendix A – Methodology'.

#### Data collection

Data collection took place in July and August 2022, and 25 people were interviewed:

- 12 library leaders across 3 focus groups (L1 – L12 where L represents leader)
- 10 repository managers in one-on-one interviews (M1 – M10 where M represents manager). M7 and M8 were also asked some library leader questions due to the dynamics of their libraries.
- 3 Curtin University researchers in one-on-one interviews (R1 – R3 where R represents researcher). The deidentified transcripts of researcher interviews are available as open data<sup>30</sup>

Where possible, participant codes have been included with quotes throughout this report. However, in some sections participant codes have been omitted where the quotes could potentially make participants identifiable. All question guides are publicly available at <https://doi.org/10.25917/4ATF-F968>, and can be reused.

#### Data analysis

Data analysis of library leaders and repository manager transcripts was combined, because similar questions were asked of participants. Data analysis of researcher transcripts was completed separately to library leaders and repository managers. This report answers the research questions in the following sections:

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<sup>30</sup> <https://doi.org/10.25917/4ATF-F968>

- Current IR Services (RQ1 & RQ2)
- Challenges Faced by IRs (RQ1 & RQ2)
- Future Plans for IRs (RQ1 & RQ2)
- Thoughts on Open Research (RQ1 & RQ2)
- Perceptions of Third-party Repositories (RQ1 & RQ2)
- Perceptions of Read & Publish Agreements (RQ1 & RQ2)
- Researcher Perspectives (RQ3)

Themes generated in this research are discussed in the following sections:

- Suggestions for universities looking for a new IR (section 10)
- Suggestions for IR vendors (section 11)
- Future important conversations (section 12)
- Researcher trust in repositories (section 13.6)

More details about the research methodology and methods can be found in Appendix A – Methodology.

### 3 Snapshot of Australian University IRs

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#### **What does the Australian IR landscape look like?**

- Institutional Figshare and DSpace are the most prevalent IRs, with smaller numbers of Pure and EPrints
- Many other IR platforms are found at between 1 and 3 universities: Digital Commons/bepress, Esploro, Vital, Islandora/Drupal 7, EQUELLA, Haplo/Cayuse Repository, Oni, Primo<sup>31</sup> and Dryad (institutional access)
- 23 universities run 1 IR, 14 universities run 2 IRs and 2 universities run 3 IRs
- Elements and Pure are the most commonly found RMS platforms

A desk review of the 39 CAUL Australian universities<sup>32</sup> was undertaken in July and August 2022. For each university, this desk review looked at the scope of research outputs, what IR software was being used, which RMS was being used and other criteria (see 'Key to table' in Appendix B for all criteria). All information in the desk review has been taken from public websites, and does not include any information discussed with the participants in this research project. This section presents a summary of some elements of the table 'Desk review of Australian universities' in Appendix B of this report:

- IR platforms in Australian CAUL member universities
- Number of IRs at Australian CAUL member universities
- RMS platforms in Australian CAUL member universities
- Range of research output types in IRs
- Advice provided to researchers about third-party repositories

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<sup>31</sup> Note that Primo is a discovery layer rather than an IR

<sup>32</sup> <https://www.caul.edu.au/about-caul/members/all>

### 3.1 IR platforms in Australian CAUL member universities

This table presents a breakdown of the repository platforms found across 39 Australian CAUL member universities. Note that many universities have multiple IRs, so the total number of IRs is greater than the number of universities.

Repository platform	Number of IRs
Figshare (institutional)	11
DSpace	10
Pure	8
EPrints	6
Digital Commons/bepress	3
Esploro	3
Vital	3
Custom	2
Islandora/Drupal 7	1
EQUELLA	1
Haplo/Cayuse Repository	1
Oni	1
Primo <sup>33</sup>	1
Dryad (institutional access)	1
Unknown	5
Total number of IRs	57

#### DSpace – breakdown of versions

This table presents the DSpace versions being used.

DSpace version	Number of IRs
DSpace unknown	1
DSpace 5.5	1
DSpace 5.8	2
DSpace 6	1
DSpace 6.3	3
DSpace 7	2
Total DSpace	10

#### EPrints – breakdown of versions

This table presents the EPrints versions being used.

EPrints version	Number of IRs
EPrints unknown	2
EPrints 3.3.14	1
EPrints 3.3.15	1
EPrints 3.3.16	1
EPrints 3.3.4	1
Total DSpace	6

<sup>33</sup> Note that Primo is a discovery layer rather than an IR

### 3.2 Number of IRs at Australian CAUL member universities

As noted in section 3.1 ‘IR platforms in Australian CAUL member universities’, the 39 Australian universities in this desk review run 57 IRs. These 39 universities run between 1 and 3 IRs for different types of research outputs. Note that the two universities running 3 IRs appear to both be running a legacy IR (University of Tasmania and Flinders University). For more details, see the columns ‘IR’ and ‘Research outputs collected’ in the table ‘Desk review of Australian universities’ in Appendix B.

Number of IRs	Number of universities
1	23
2	14
3	2

### 3.3 RMS platforms in Australian CAUL member universities

This table presents a breakdown of the RMSs found across 39 Australian CAUL member universities. A large number of RMSs are unknown because they were only available with employee logins.

RMS platform	Number of universities
Elements	10
Pure	10
Integrated Research Management Application (IRMA)	3
Research Master (ORION)	1
DSpace CRIS-6.1.0	1
Custom	1
Unknown	14
Total number of RMS <sup>34</sup>	40

### 3.4 Range of research output types in IRs

Many universities have multiple IRs, with some choosing to accept ERA-eligible research outputs in one of their IRs, and all other research output types in another IR. Some IRs hold over 40 different types of research outputs. Many universities have separate repositories for storing data. For more details of the range of research output types in the IRs, see the column ‘Research outputs collected’ in the table ‘Desk review of Australian universities’ in Appendix B.

### 3.5 Advice provided to researchers about third-party repositories

University websites were searched to identify if they provided any advice to researchers about third-party repositories. The advice provided online includes suggesting specific generalist and disciplinary third-party repositories, and requesting that researchers provide metadata to the Library when they use third-party repositories. For more details, see the column ‘Mention third-party repositories’ in the table ‘Desk review of Australian universities’ in Appendix B.

<sup>34</sup> Australian National University is running 2 RMS (see ‘Research man. system’ column in the ‘Desk review of Australian universities’ section of Appendix B)

## 4 Current IR Services

### What services are IRs currently providing?

- IR support staff numbers vary from 1 to over 10 people (FTE)
- Key IR workflows are deposit and curation of research outputs and their metadata
- IR support areas include deposit, RMS, ORCID, open research, data curation, creative works
- IRs are integrated with RMSs and academic profiles
- IRs support ERA with metadata about research outputs & copies of research outputs
- Most do not perform formal digital preservation, and instead rely on IR platform and cloud
- Good experiences with hosted IRs due to less infrastructure management
- Some universities monitor compliance with funder OA policies
- Incentives for researchers to use IRs include academic profiles and availability of DOIs
- Some feel their IRs are positively valued, some do not

Library leaders and repository managers were asked questions about their IR infrastructure and services.

*Note that participant codes have been omitted in quotes in this section where participants could be identifiable from their processes, team sizes or platforms.*

### 4.1 Repository support staff

Library leaders and repository managers were asked how many staff supported their IRs (in terms of full-time equivalent or FTE). Answers varied from 1 FTE to more than 15 FTE. Duplicate answers where two participants were from the same university have been omitted. Note that variable team dynamics mean that these staff numbers are estimates, and are not exact.

Number of staff (FTE)	1 to 3 staff	4 to 6 staff	7 to 10 staff	>10 staff
Number of universities with this number of staff	5	6	1	5

### 4.2 Functions of the IR

IRs vary across universities in their function and use. One library leader noted the wide range of IR experiences shared within their focus group: “You know, we've shared four very different stories about repository, infrastructure, repository purpose, repository maturity and repository value” (L9). A repository manager also noted this difference across universities in the use of IRs (M9): “we're all still doing different things, obviously ... You can sort of see the differences of how institutions use and work with it and what they need to get out of it.” One repository manager feels that their IR is valued, especially for the data it provides: “As soon as the profile got raised and people started to see what it could do, they wanted more out of the data ... it is all about the data essentially” (M9).

## Workflows

Two workflows were discussed by library leaders and repository managers – researcher deposit and library curation of metadata. The deposit workflow varies across IRs. In some cases IR support staff approve deposits before they are published: "we really don't have any self-deposit in our repository ... I guess we kind of like to have really good quality metadata". For some universities the deposit workflow can also be performed by staff in the Research Office, on behalf of researchers. At least two universities offer self-deposit to the IR, with instant DOIs and publication of the research output. The goal for one university is to make it easy for researchers to get research outputs into the IR:

"... our job was to make it as easy as possible to get records into our repository, hopefully without even noticing that it happens like not going and saying, could you please put your record in" (M8)

However, one repository manager feels that some universities with non-mediated self-deposit have prioritised quantity of research outputs over quality of metadata (M4):

"... there are other places I know that are making their repositories a lot more of a free for all and I suspect in terms of quantity, maybe that is helpful, but I do despair about the quality of some of what I see and basically I don't think that's necessarily an academics job." (M4)

The metadata provided by researchers for research outputs is reviewed by IR staff (L2, M6, M10). In some cases less curation is performed where research outputs are not reportable for ERA: "assuming nothing is missing or improperly placed, I can tick off on it and then it's published - a lot more straightforward than the [ERA eligible research outputs]". M4 feels that resourcing quality metadata in library is a good investment:

"You know that's where the library can add value because we have the skills in creating good metadata and we understand how discovery works. And so that seems to me to be a good investment at the university level as a whole" (M4)

## Scope of research output types

IRs accept a variety of research output types. One IR that is already accepting a range of research output types acknowledges that accepting "whatever they [researchers] really wanna showcase on their profile ... does increase our workload". However, they feel that their IR is now "considered such a central tool for our staff and researchers and university".

### 4.3 Support services

Libraries support researchers with depositing their research outputs to IRs: "... libraries [have] always been the one who's joined the dots for everyone or sort out some help in IT or research office" (L1). Other areas of support include the RMS and ORCID (M4), copyright (L2, M10), open research and data curation (M2).

Some universities provide tailored support services for specific research output types such as creative practice research outputs and theses. One university supports their creative practice researchers by providing DOIs for their creative works:

"... how do I showcase my work or make your case in promotion, and this way there's a DOI ... and then they can track it in Altmetrics to see where those works have been picked up."

Providing IR functionality for collections of creative works has been successful for one university, where “some of the researchers are quite excited about because it's a different way of showcasing some of the work they've done in the past”. Usage statistics from some IRs show that open access theses are a highly downloaded research output type for L7 and L8, with feedback on top downloads communicated within the university (L7). Some universities report IR usage and download statistics to university management, committees, and faculties (L1, L7, M3, M9, M7). Copyright is a shared responsibility between the researcher and the IR support staff for L2: “we can expect them to do their due diligence, but the buck stops with us in making sure” (L2).

#### 4.4 IR integration with other systems

An IR is usually integrated with other systems and platforms, such as research management systems (RMS) and academic profiles. The RMS is seen as the source of truth for research publications for many universities (L1, L3, M1, M3, M8, M10). One library leader observed that the IR used to be the source of truth for research publications, but this has now changed (L3):

“... the source of truth around publications is no longer the repository, [RMS] is our source of truth around [university] publication data. And so you know that to me is kind of the most critical role that repositories used to play. In terms of research, assessment, understanding the universities publication output and it's legacy as an institution, that data resides elsewhere now. So you know the repository is kind of this weird front end that produces metadata that is also available through other many other sources now.” (L3)

Many IRs are integrated with RMSs, and the researcher workflow is to deposit research outputs via the RMS so that they appear in the IR. Due to their high level of integration of the IR with other research systems, L12 feels that their IR is “... not just a repository. So it's part of that broader university enterprise level system” (L12). Academic profiles are populated through the IR for some (L6, L8, M9), and through the RMS for others (L2, L3, M8, M10).

#### 4.5 The IR is not a destination

The IR is seen by two repository managers as an indexing source for Google, rather than being a destination. This acknowledgement that Google is “where they're actually going to look for all this stuff”, has led to a focus on maximising how the IR is indexed. One repository manager recognises the importance of “pushing stuff out to where people want to find it and we do that very well in some ways”. This awareness that the IR is not a destination has influenced the level of customisation in their IR:

“it's not a destination, no, we're not gonna customise it. So you know we've possibly got a bit of a different mindset from other places that are trying to squish a square peg in a round hole.”

Another repository manager wants their IR to be “invisible”, rather than a destination: “... the key is that would just be invisible infrastructure for the majority of people rather than thinking about it as a place where people go to see it, a set of things”.

While IR indexing is seen a challenge for universities (see Integration in section 5.1 ‘Technical challenges of IRs’), one library leader has had success in making the research of their university visible via Google indexing of their IR: “I think the other thing that always works for us is if you put things in [IR], they turn up in Google really quickly at the top of the list”.

#### 4.6 The role of the IR in ERA

IRs play a role in preparing submissions for Excellence in Research for Australia (ERA), the national framework for research evaluation in Australian universities. ERA submissions include some metadata from IRs and RMSs about research outputs, and in some cases IRs (or copies of IRs) are used to make copies of research outputs available. Shortly after interviewing the participants in this project in August 2022, ERA was indefinitely postponed by the Australian government.<sup>35</sup> A working group has been established to deliver an ERA transition plan by the end of 2022.<sup>36</sup>

The creation of a copy of an IR for the ERA submission process is sometimes called a dark archive. At least six of the library leaders and repository managers interviewed provide access for ERA assessors to copies of research outputs in this way. Two of the library leaders feel that their libraries are acknowledged for their role in ERA, and one feels that the “library is seen as an absolute key partner in ERA”. One library leader feels that their library is not properly acknowledged for their part in ERA, and that the Research Office are “the ones that get the recognition ... but we do all the leg work underneath that”.

The IR has a dual function of being an archive of research outputs, and of providing copies of research outputs for ERA. One library leader feels this dual function of the IR is sometimes not clearly defined:

“I think there's sort of always a bit of an argument in the library about what is the repository for ... is it really an archive for our institutional research or are we actually making it more applicable for what needs to be done for ERA. So I think the jury's out on that front” (L6)

Another library leader feels that the IR is better known for its role in ERA, rather than as an archive of research outputs, “... if it wasn't for ERA would they know that ... we had a repository and kind of use it”.

#### 4.7 Digital preservation

Digital preservation in an IR involves the planned activities of keeping multiple copies, and actively monitoring file integrity and file format obsolescence. Library leaders and repository managers were asked what digital preservation activities their IRs support. Just one has formal digital preservation activities. Many rely on their IR, university IT or cloud-based storage (where implemented) to perform some kind of automatic digital preservation (M1, M4, M6, M9, M10). One repository manager acknowledges that this is not true digital preservation: “We are not doing, we have no policies around digital preservation or any of that kind of stuff. That's a big gap.” One repository manager highlights the importance of digital preservation for NTRs, because they are “our unique research assets” (M8).

#### 4.8 IR platform experiences

##### Benefits of hosted IRs

Many IR platforms offer hosted repositories via vendors and service providers, where all IR software and research output files are hosted and stored outside the university. Three library leaders and three repository managers spoke positively about their moves to hosted IRs. They shared the benefits including less infrastructure management, no upgrades to manage, minimal downtime and staff have been freed up to work on other activities.

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<sup>35</sup> <https://www.arc.gov.au/about-arc/our-organisation/statement-expectations-2022>

<sup>36</sup> <https://www.arc.gov.au/news-publications/media/media-releases/new-working-group-advise-era-transition>

One repository manager is happy with their hosted IR: “I’m quite happy with that now that someone else looks after it, who knows what they’re doing”. They feel that they can focus on the collection now that the infrastructure is taken care of: “... we’re not worrying about infrastructure, more worrying about getting stuff to put in and then make it available”. One library leader has experienced almost no technical issues with their hosted IR: “we have had so little trouble with it in [number] years compared to the number of conversations I had about the old repository before we replaced it”. They also note that “we have no downtime” in their vendor-hosted IR, partly because they do not have the overhead of upgrades. Another benefit for this library leader is not needing library staff to be technical experts in the IR “it just sits there and it runs and I don’t have to have anyone who knows how that works”.

Two other library leaders who have moved to hosted IRs have changed their focus now that they do not need to manage the IR infrastructure. A second library leader feels that their move to a hosted IR has provided the opportunity to “consider different ways that [the IR] can add value to the university”. A third library leader is focused on improving service “... we’re letting go of managing the back end and the infrastructure and really concentrating on the service that we can provide ...”. The move to a hosted IR has freed up staff for two universities: “free up resource for us which is great because then we can actually start investing that technical expertise in other areas”.

### **Open-source platforms**

Using an open-source platform has been a success for one repository manager, who feels that “the model of open-source solutions supported commercially by a partner that shares your goals is a really good model”.

### **Unsuccessful IRs**

One repository manager acknowledges that some universities have not had success with their IRs (M4):

“... there’s been a lack of maybe technology, strategy and leadership in this space ... universities have kind of failed to make the case for the platform as an enterprise solution that supporting enterprise goals, and then they’ve kind of dug themselves into a bit of a hole with technology and now wanting someone else to kind of bail them out of this” (M4)

## **4.9 Compliance with OA policies**

Library leaders and repository managers were asked if they use the IR to monitor funded research for compliance with funder policies on open access. Three library leaders and repository managers do not currently monitor, or plan to monitor if funded research is compliant with funder policies on open access (L2, L3, M7). Of these participants, two feel that it is the author’s responsibility to ensure compliance (L3, M7). Some checking is undertaken by M1, M2, M9 and M10.

## **4.10 Incentives for researchers to use an IR**

Some features of IRs are seen as incentives for researchers to put the time into depositing their research outputs. This includes features such as academic profiles, ease of use and availability of DOIs. The integration of academic profiles with the IR is seen as an incentive for researchers to keep their publication history up to date: “It does really showcase someone well and their research, and if it’s open, it’s all there (M9). Minimal metadata entry is seen as a low barrier to use the IR by one library leader “... it doesn’t have librarian

metadata in it. It has academic metadata in it. It puts in fields that they understand. They don't care about us saying can you just fill in these 37 fields". Instant DOIs without library intervention is seen as a selling point by the same library leader: "Here it is, it's discoverable, it's got a nice DOI, you can give out your DOI to all your friends and everyone, and it's easy to find."

#### 4.1.1 How is the IR valued

Some participants spoke about the value of their IR during early focus groups. This led to the addition of a question in subsequent interviews and focus groups, asking library leaders and repository managers if they feel that their IR is valued. Some library leaders and repository managers spoke about how their IR is positively valued (L3, L12, M3, M9), for example L12 feels their IR is "highly valued" and "our role is well known in things like ERA" (L12). Two library leaders and two repository managers feel their IRs are not as valued, for example one library leader commented "I do wonder sometimes if we didn't have a repository, would anyone notice".

Some university libraries have strong high-level support from university management for open research and their IR (M9, L4, L5, L9, L12). However, this high-level support is lacking for one library leader, when asked about their future funding for the IR, they responded: "I can't say that I think anyone in the senior leadership positions would even know or care." Other library leaders see room for improvement in high-level support for open research, and are advocating for stronger OA policies (L2, L11).

One library was included as a stakeholder in the planning of new research systems at their university, and feels that this is important to represent the perspective of researchers (L9):

"Our experience in terms of engagement with faculty, with researchers and scholars bought in a different perspective, one that they may not have considered in terms of ... what are the features, what is the value for the people who produce the research for engaging with these systems. And sometimes they were diametrically opposed [to the Research Office requirements]." (L9)

## 5 Challenges Faced by IRs

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### **What challenges do library leaders and repository managers face in getting the IR to be everything they want it to be?**

- Some would like better or additional functionality from IR vendors
- Pain points include the integration between the IR and RMS, and the indexing of the IR
- Researcher deposit and library curation of metadata are challenging workflows
- Customisation can cause IRs to be difficult to maintain and upgrade in the future
- Some are considering a new IR because their current IR does not meet their needs
- Engaging researchers can be challenging due to low awareness of the IR
- Non-traditional research outputs are particularly challenging

Library leaders and repository managers were asked to share any challenges they face in getting their IR to be everything they want it to be. The challenges spanned across multiple types including technical (integration and workflows), engagement from researchers with the IR, and challenges with strategy, resources and funding.

*Note that participant codes have been omitted in quotes in this section where participants could be identifiable by their IR platform.*

### 5.1 Technical challenges of IRs

#### **Integration**

An IR is usually integrated with other systems and platforms, such as research management systems (RMS) and academic profiles. IRs are also harvested by Google, Google Scholar<sup>37</sup>, Trove<sup>38</sup>, Unpaywall<sup>39</sup> and WorldCat<sup>40</sup>. Many of the library leaders and repository managers interviewed noted challenges in how the IR is integrated with these systems and platforms (L6, L8, L9, L10, M1, M2, M3, M4, M6, M9, M10). One of the pain points mentioned was the integration between the IR and the RMS (L9, L10, M1, M4), for example:

“... the integration with [RMS] is more complicated than we thought ... that is a very complex piece of work and I'm not sure that people realize how complicated the metadata mechanics stuff is ... and maintaining that over time as well every time you do upgrades” (M4)

Another pain point was how the IR is harvested by Google and other systems (L10, M1, M3, M6, M9). M1 feels that Google search results prioritise the published version over the green IR version for journal articles:

“... it's also us versus publishers in the realm of Google. Google is gonna pick the one with the most web optimization web normalization, actually by money. So their linked object supersedes our linked object in the Google list” (M1)

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<sup>37</sup> <https://scholar.google.com/intl/en/scholar/inclusion.html#indexing>

<sup>38</sup> <https://trove.nla.gov.au/partners/partner-services/adding-collections-trove/systems-we-work>

<sup>39</sup> <https://unpaywall.org/sources>

<sup>40</sup> <https://www.worldcat.org/>

M2 wants to improve integration between systems “It's more just about, you know, what's the workflow? ... how do you actually integrate all those things” (M2). Other integration challenges mentioned included showing IR records in academic profiles, displaying citation counts, and harvesting datasets from third-party repositories. One repository manager has found it challenging to enable consistent funding scheme identifiers across their IR and RMS. Another repository manager does not have ORCIDs in their IR.

## Workflows

Two workflows were highlighted by library leaders and repository managers as challenging – researcher deposit and library curation of metadata. Researchers depositing their research outputs in the IR was noted as a challenging workflow (L5, L7, L8, L12). One library leader suggested that metadata for collections should be by the researcher, rather than the library:

“The only person who can really do the metadata is probably the person who won't, who created or owned them, and library trying to do it ... it's not helpful.” (L8)

Three library leaders considered that the perspective of researchers in the deposit workflow was challenging (L5, L7, L8, L12). L5 noted that their researchers are expected to add complex metadata to their IR “We've got like a [> 20] page manual explaining all the fields like, it's just ridiculous” (L5). L7 feels that the workflow to deposit to the IR is extra work and difficult for researchers:

“If we are selling it as you put it in here because we want you to and it's good for the university ... you know I don't think it ever made any sense to any academics because it didn't fit into their workflow. In fact it was extra work ... trying to convince academics to put their stuff in there was a losing battle” (L7)

L7 also feels that their IR workflows aren't encouraging researchers to deposit:

“We don't have good workflows in that sense that you know people think ohh yes I'm about to publish a paper I've gotta make sure I put it into [IR] you know we don't have that way of thinking” (L7)

However, L12 feels that getting researchers to upload a copy of a research output was more difficult than metadata:

“Getting academics to engage and upload their content is tricky, so we can get the metadata really easy, but we can't necessarily get the actual the content.” (L12)

The second workflow raised as challenging was library curation of metadata (L2, L6, L8, M1, M4, M9), including minting of DOIs, curation backlogs and copyright compliance. Currently minting a DOI for data “takes literally weeks for someone to mint a DOI at this stage, which is just not acceptable”. M9 also feels that the minting of DOIs is “not as automated as we had hoped it would be” (M9). In Australia, the ARDC DataCite consortium provides many universities with DOI minting. One repository manager wants to mint DOIs responsibly, because DOIs for research outputs are “a commitment to keep this thing alive forever” (M4). M1 wants to be “... a responsible practitioner of DOI minting” (M1). M1 suggests that universities that mint large numbers of DOIs beyond their allowed capacity, could eventually “no longer be part of the consortium and then they can no longer really afford the service” (M1).

For one participant, their curation backlog increases when researchers are reminded to deposit in IR “our backlog ... when an e-mail goes out to all staff and says make sure you

have publications are in there, and suddenly ... that blows out” (L2). In addition, L2 finds the copyright compliance part of curation to be “one of the most time-consuming parts of that mediation” (L2).

### **Functionality**

Library leaders and repository managers find IRs lacking in some areas of functionality. Specific areas where participants would like better or additional functionality from vendors included link checking, controlled vocabularies to enable linked data, configuration of organisational groups, collection management and metadata, more granularity in rights management, and better statistics for both researchers and IR administrators about research output access and downloads.

One repository manager wants their IR to have the ability to make specific metadata and files private, while other metadata and files within the same research output are publicly available. For example, currently they “can't have administrative notes ... can't have private research statements if we want to capture them at the point of submission”. Another technical challenge in IRs is maintaining DOIs, for example ensuring that DOIs correctly link to the research output after migrating to a new IR.

### **Customisation**

Two repository managers and two library leaders shared how the customisation they have already made to their IRs has turned into a challenge for the future. They feel that the level of customisation they have made makes their current IR difficult to maintain and upgrade, with extra work involved in writing documentation to reflect customisation: “you're just making more testing every time you upgrade, you're just making more documentation that isn't the vendors documentation”. Looking to the future, one library leader feels that their level of IR customisation and integration with other platforms “makes it hard to sort of decouple it and do anything different”. One repository manager will be actively avoiding customising their current IR:

“... really resisted this because it's a maintenance problem. That's a sustainability problem. And so we've been really careful about minimizing the amount of tweaking of products that we do to make it exactly the way we would want it to work.”

### **Fit for purpose**

Four library leaders and one repository manager feel that their current IR does not meet their needs: “we haven't been able to get [IR] to do the things we wanted it to do”. Some are considering a new IR, for example one library leader feels their IR is “pretty legacy and quite old”, and another feels their “platform is clunky in the extreme. It's old”. Two other library leaders have already moved to a new IR because their previous IR did not meet their needs. One repository manager feels that upgrading their current IR could involve the same effort as getting a different IR.

## 5.2 Challenges in engaging researchers with the IR

Engaging researchers with IRs is challenging (L8, L9, L11, L12, M9), particularly data submission (M5, L11).

“there's very low visibility of the existing repositories, a very low understanding of what research data management is about, let alone research output” (L11)

Library leaders perceive that some researchers are confused about what the IR is (L6, L8). One library leader feels that their IR is not obvious to researchers “because it's sort of integrated” (L6). Another library leader has been asked by researchers if their university actually has an IR (L8):

“they'll read [something] that says we're supposed to put things in the institutional repository and they'll say, do we have one of those? Shouldn't [university] have one of these, but yes, we do” (L8)

Three university libraries that run more than one IR also find it challenging to explain to researchers which research output types go in which IR:

“One of our problems as an institution is explaining when things should go into [first IR] and when things should go into [second IR]”

Education about open access in general and IRs is seen as an area where more training is needed for the library profession:

“I think we need to have things like Open Access and institutional repositories feature heavily in our training courses for our profession because there's no training being done at all” (M6)

## 5.3 Challenging research output types

Research data is acknowledged as a challenge for IRs (L1, L3, L5, M1, M2, M4, M5, M6, M9), with low uptake of data submission reported by some (M4, M5, M9, L3, L5). Two feel that their IRs and infrastructure do not handle data well (L3, L5). NTRs are considered a challenge for IRs (M2, M9, L1, L4, L5, L7). For future plans of library leaders and repository managers to improve research data services and better support of NTRs, see section 6 ‘Future plans for IRs’. Grey literature is also a challenging research output type for some (M2, M6), and one repository manager shared that some researchers are not happy with how their grey literature research outputs appear in the IR (M6).

## 5.4 Challenges with strategy, resources and funding

Some library leaders shared how they face challenges in establishing the role of the IR in their institution's research strategy (L6, L9, M2). Two library leaders feel that the IR should be part of an institution wide approach to open research (L6, L9), rather than “working in little silos” (L6). The importance of having an institutional strategy was echoed by M4: “I think there are all sorts of pathways to Open Access and repositories I think can continue to be a very big part of an institution strategy” (M4). Other challenges reported by repository managers were storage (M1): “[M1 university] is grappling with filling up storage” (M1), and adequate resources (M4, M10). M4 shared the challenge of balancing needs with available resources:

“... we're just trying to be pragmatic, I guess and balance all those things as best we can in an environment that is pretty constrained in terms of resources, like everybody else” (M4)

For M10, scheduling system updates can be challenging:

“... even a small change can take quite a while because if it's got so many competing sort of priorities. So that is a bit of a challenge” (M10)

Two of the library leaders interviewed do not have funding to make improvements to or replace their IRs.

Challenges in working with Research Office were noted by two library leaders, due to a lack of ownership of workflows. One library leader found that working with their Research Office was “a little bit of challenge because you know they want very specific things from the data and yet they aren't the process or system owners”. Another library leader feels that the library and research office responsibilities were unclear for ERA:

“ ... we check the metadata, they check the quality of the metadata. So they're thinking that we've just done a whole end to end lifecycle process and it is a bit unclear who is responsible for what”.

## 6 Future Plans for IRs

### **What are library leaders and repository managers planning for their IRs?**

- Expansion of research output types collected to include more open educational resources and learning objects, research data, software, reports, data visualisations, registration of clinical trials, websites, news articles. More focus on what researchers want in the IR.
- Expansion of metadata about research outputs
- Future improvements to IRs include new features, upgrades and changing platforms

Library leaders and repository managers were asked about future plans for their IR services.

### 6.1 Expansion of research output types collected

Many library leaders and repository managers expressed an interest in expanding the scope of the research output types collected in their IRs (L1, L2, L8, M4, M5, M6, M10). Future IR goals of M4 include improving discoverability and expanding the scope of their IR to make “what we’ve got better, more discoverable and, just more kind of useful” and “focus on the content that we are the publisher of” (M4). M5 would like to widen the scope of their IR to “all kinds of digital works that don’t have a home” (M5), beyond just ERA-reportable research outputs:

“I like this vision of our repository being something which holds an enormous amount as opposed to only things that are reportable for ERA, and the Open Access versions of those same publications” (M5)

Some library leaders want their IR to be for anything open (L1, L2, L8). L1 would like their IR to be “not just for research, it’s their repository for anything open” (L1), while L2’s IR already collects outputs from professional staff as well as academics due to their university’s “much broader ... definition of scholarship” (L2). L8 provided an example of a highly downloaded report as an example of the success of their IR:

“... that part of the repository is really going to grow ... the repository has resonance and ... we’ve been most successful in getting people to take it up” (L8)

For some repository managers, the future expansion of research output types in IRs has been influenced by an increased focus on the needs of researchers (M7, M9). M8 and M10 intend to work with specific discipline groups on how they can make the most of the IR, in “identifying where interesting work is” (M8), while M9 sees the ability to showcase research groups in their IR as a growth area.

### **Open educational resources and learning objects**

Open educational resources and learning objects are seen by many library leaders and repository managers as an area of future growth in their IR (L1, L3, M5, M9), although some are considering sharing OERs outside of their IR (L4, M10).

### **Research data**

Some library leaders and repository managers want to improve how research data is submitted and shared in their IRs (M2, M5, L1, L3). For example, L3 wants to focus on data sharing, and “improve the user experience to facilitate a much more university wide data sharing culture” (L3). L12 plans more high-level data curation across multiple datasets by

“work[ing] with researchers or disciplines to see how we could leverage [data curation] better” (L1 2). Two universities would like to improve the end-to-end workflow for research data submission (M1, M2, M9).

### **Software and code**

Workflow and metadata improvements specific to research software and code were in future plans for two repository managers (M1, M7). However, others feel that the IR is not the right place for code and software (M3, M4), because IRs are “not designed as a source code repository” (M3), and “you'd be better off putting it on GitHub” (M3).

### **Reports**

In the past, reports and working papers were not well collected for some because they were not ERA-reportable (M4, M6). In addition to ERA, the ARC also runs an Engagement and Impact Assessment, which “assesses how well researchers engage with end-users of research ... it also assesses how well universities are translating research into impacts beyond academia”.<sup>41</sup> M4 suggests that the engagement and impact agenda could contribute to the collection of reports and working papers that are not ERA-reportable: “... maybe in the past the Office for Research has been more interested in reportable outputs ... I think the impact agenda is kind of changing that” (M4). In one case, reports were not being added to the IR because some research groups “are using [research group website] to put up their own documents, but they don't necessarily send to us” (M1).

### **NTROs**

NTROs are considered a challenge for IRs (M2, M9, L1, L4, L5, L7), and some universities want to improve workflows and the representation of NTROs in their IRs (L3, L4, L7). The IR user interface is considered important for the display of NTROs (L3, L7, M10), so that the NTRO creators can provide “that really good experience of viewing it” (L7). The goal of L3 for NTROs is “providing a much more rich user experience to engage with those objects” (L3).

### **Journal articles**

Opinions on the future presence of journal articles differed across library leaders. One library leader questioned the current scholarly communication system: “why do we still rely on that traditional journal publishing to disseminate knowledge if the point is to disseminate knowledge” (L1 2). They suggested that researchers could publish direct to repositories rather than via journals, “what the best mechanism is for getting their knowledge disseminated and giving them options that might use the repository rather than go down that traditional journal route” (L1 2). This longer-term goal of leaving journals “will only work if we get that engagement with academics” (L1 2). However, another library leader (L3) feels that green OA is becoming less of a priority for repositories:

“I think that the repository's critical role in the institution is changing really, really dramatically and rapidly. And that notion of sort of green OA ... it's just quite redundant these days” (L3)

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<sup>41</sup> <https://www.arc.gov.au/evaluating-research/ei-assessment>

## Other research output types

Other research output types being considered for collection in the future are data visualisations (M8), registration of clinical trials (M1), websites (M4) and news articles (M6, M9).

### 6.2 Expansion of metadata about research outputs

Some repository managers and library leaders are planning to improve and enhance the metadata they collect and present about research outputs in their IRs: “we'd really like to be ... value adding rather than just collecting” (M4). M4 would like to highlight First People's research in their IR, and L12 wants better description of Indigenous knowledge in their IR. M4 and M9 want to highlight within their IR how their research outputs meet the UN's SDGs. Another growth area for IRs is engagement metadata, because “the engagement type information and prizes and awards ... gets used quite strategically to highlight our top researchers” (M9).

### 6.3 Improvements to the IR

#### Digital preservation

As noted in section 4.7 ‘Digital preservation’, many universities have not had the resources to proactively undertake digital preservation of their IRs. Digital preservation is in the future plans of some universities (M6, M7, L12). L12 would like a better understanding of retention and disposal of data: “it's not just the data curation, it's understanding retention and disposal and publishing ... when to keep, when to dispose?” (L12).

#### Discoverability

L1 plans to focus on discoverability of research data: “that's where we wanna advocate. That's where our strength is” (L1). One repository manager plans to increase linked PIDs between research outputs in the IR:

“... (by) linking everything together across the research lifecycle. You know, you can see the grant that funded the data set that was produced on this piece of equipment ... and just that kind of really clear linkage, both for reporting purposes to see the ROI on those big pieces of strategic infrastructure, but also reproducibility”

Improving licencing guidance for research outputs is part of M10's plans for their IR: “I think there's a lot of confusion about what people can do with the content that's open” (M10).

#### IR workflows

Improvement in researcher, copyright and harvesting workflows is in the future plans for some repository managers (M2, M6, M8, M10). M2 wants to improve workflows from a researcher perspective:

“I think we've got everything we need in terms of repositories. I mean, it might not be perfect, but I think it's all there. It's more just about ... what's the workflow?” (M2)

M6 wants to “automate as much as possible” (M6), and M10 wants to improve copyright clearance workflows. M7 is hoping that increased harvesting of research outputs from the RMS will increase their IR content, and reduce the effort required in getting researchers to deposit to the IR:

“We know there's a huge amount of repository content elsewhere outside of our infrastructure. That's what we hope will really bridge that gap is we'll just bringing in

from elsewhere or link it to somewhere else instead of chasing our researchers for it necessarily.” (M7)

### **Integration**

Two library leaders are planning to improve how their IR integrates with existing university systems (L11, L12). L11 is planning more integration: “try and integrate a lot of disparate systems and platforms, and that includes library management systems and repositories” (L11). Some university libraries are planning on upgrading or changing their current IR (M6, M10, L6, L10). One library leader feels their IR should be easy to use by researchers: “I think that's what we need to aim for, not the all-star repository” (L7).

## 7 Thoughts on Open Research

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### **What do library leaders and repository managers think about open research?**

- IRs enable universities to share the work of their researchers openly
- Indexing is a key part of making the contents of the IR discoverable
- IR should be a part of a university wide open research strategy
- Many libraries fund open initiatives, some want to invest more, some cannot

Library leaders and repository managers were asked how their IR(s) support open scholarship.

### 7.1 The role of IRs in open research

IRs enable universities to share the work of their researchers openly (M1, M5, M9, M10), “whether it be a journal article, whether it be a data set or a report that they've produced” (M9). The IR provides a workaround for paywalled research outputs (M10), and “is just the only way that we can make [university] authored material Open Access” (M10). Making research publicly accessible even if it is not the final version of a research output can involve a lot of work (M1): “... we are taking every single research object that we can find and then working quite hard to figure out what version of open we can find for it” (M1). IRs can support open research by having a “low barrier ... [for] open data” (M2), and IRs can be “a core part of the university strategy in in Open Access and open learning” (M3).

Indexing is a key part of making the contents of the IR discoverable so that research outputs are findable by as many people as possible in as many places as possible (M7):

“... it's really about making sure that whatever infrastructure we have is as accessible as possible to researchers where they are in their communities and their disciplines and where they're searching for things ... [there is a] huge amount of work in the discovery side of things, indexing, making sure things can be found in those places, so Google Scholar and all the other major indexes” (M7)

One library leader emphasised how the IR should be part of a university wide open research strategy: “... the repository can't stand alone. It needs to be within the fold of an open research strategy in the agenda of the institution” (L9). Open research is also seen as having a role in supporting partnerships with industry (L9, L12), and “make really important research discoverable, accessible and usable for industry partners who may otherwise be paywalled” (L9). Open science can be an opportunity for IRs (M5): “open data and open science and people are buying into it. The more they're aware of those things and they're normalized, the more repositories might flourish” (M5).

### 7.2 Library support for open initiatives

Library leaders were asked about their support of open initiatives. Many libraries are currently supporting some open initiatives, or have in the past (L3, L4, L5, L6, L8, L12, M7). Some of these libraries would like to invest even more in open initiatives (L3, L8):

“... initiatives that have the opportunity to really disrupt scholarly communication and publishing. I think it's a university conversation that has to happen. You know it's not something that I think the library should or can make a decision on. It's actually something that we do really need to facilitate a university wide conversation and

make sure that everyone from the [Vice-Chancellor role] down are really clear on our principles for deciding on where we invest. (L3)

One library leader cautions that their potential support for open initiatives could be reduced due to R&P agreements: “the more we spend on Read and Publish, the less we're going to have available for this kind of thing” (L10). Two library leaders have limited budget for funding open initiatives (L1, L9).

## 8 Perceptions of Third-party Repositories

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### **What do library leaders and repository managers think about third-party repositories?**

- third-party repositories are better than IRs for some researchers and research outputs
- Some IRs are harvesting metadata from third-party repositories about research outputs affiliated with their institution
- Concerned about potential commercialisation of third-party repositories

Library leaders and repository managers were asked about third-party repositories – if they recommend or support them, and what role they play in sharing research.

### 8.1 Perceptions of third-party repositories

Library leaders and repository managers were asked to share their thoughts on why researchers are using third-party repositories. Some participants accept that researchers are using third-party repositories (M1, M5), and in many cases library leaders and repository managers feel they are appropriate places for researchers to share their work (L3, M2, M8, M9, M11):

“... it's really about going where the researchers are rather than trying to impose that sort of central solution on them, which just doesn't work” (M8)

Third-party repositories are where some researchers communicate with their peers: “it's where they hang, it's where their colleagues are. It's where they have their dialogue and exchange and that's their go to place” (M9). third-party repositories are considered an appropriate place to share preprints by M7, and they see the role of the IR as focusing on “the interoperability and the linking to make sure that you can get all the other things associated with it” (M7).

A lack of trust in IRs was cited as a reason for researchers at their university to choose third-party repositories, “because of the mistrust of the institution and because we've had no clear IT or even a statement on data storage” (L1). This lack of trust from a researcher perspective is explored further in section 13.6 ‘Researcher trust in repositories’.

Familiarity was seen as a factor in researchers choice of using third-party repositories, because “people will still go and pick whatever thing they prefer because they know it and they've had an account for 10 years” (M1). Two participants (L5, M9) feel that the “clunky” (M9) data submission workflow in their IR may be driving researchers to third-party repositories.

While M9 feels it would be “interesting to explore” researcher reasons for using third-party repositories, M9 does not currently have “the resources to do that deep level of analysis” (M9). One repository manager feels that more third-party repositories are on the horizon, and that “the landscape is only going to become more complex” (M8). See also section 3.5 ‘Advice provided to researchers about third-party repositories’ about the advice found on university websites.

## 8.2 Harvesting metadata from third-party repositories

Even though third-party repositories can be “more appropriate” (L3) than an IR, the IR is perceived to still have a role “think about the repository as a place where all of this gets linked together” (M8). Some IRs already capture metadata about research outputs affiliated to their institution, and some library leaders and repository managers would like their IR to perform more harvesting of metadata from third-party repositories (M1, M2, M8, L3, L8, L10). One benefit of harvesting from third-party repositories is that researcher profiles can be updated from an IR, but researchers “don't really have to do anything” (M8) to show a full picture of research outputs.

## 8.3 Disincentives of third-party repositories

However, some urge caution in using third-party repositories, including their potential commercialisation (M1, M2, L11, L12). M1 is concerned that publishers will aim to further profit from research outputs:

“... publishers have a lot of money and are inserting themselves into this space ... they recognize the monetary and interest value of having a DOI minting service ... I would not be surprised if in five years the publishers have gone so aggressively at independents the same way they're trying to assert themselves over the top of the space of universities anyway. Who knows what it's like when they you know do market takeover” (M1)

L12 feels that research data is safer in an IR than in a third-party repository:

“... the monetization of the whole research process really bothers me ... even if they claim independence now, there's no guarantee that down the road that could be sold for money ... I feel in the research data space that if we can retain it within the university system, then that in the long run is a much better option for us, for us and for our research community than to release it to somewhere where we have zero control and where it most likely will be repackaged up and sold back to us down the track” (L12)

M2 and M9 are concerned that researchers may feel that they need to pay for data curation and hosting, even though “the longevity or the openness of the data ... may not be 100%” (M2). M9 feels this is an area where the Library can educate researchers: “what we're really telling them not to do is pay a publisher to store their data set and to really challenge that if that's what the publisher is insisting on ... don't fall for that” (M9).

## 9 Perceptions of Read & Publish Agreements

### **What do library leaders and repository managers think about Read & Publish agreements (R&Ps)?**

- R&Ps reflect well on the library and encourage conversations about open research
- R&Ps could affect the collection scope of IRs to include more unique research outputs
- R&Ps are complex to explain to researchers
- Some library leaders and repository managers need more time to see the impact of R&Ps

CAUL has negotiated Read & Publish agreements (R&Ps) on behalf of Australian university libraries,<sup>42</sup> with many agreements starting in 2022. Library leaders and repository managers were asked during focus groups and interviews if they think R&Ps will have an effect on IRs. Some were positive about R&Ps, some had concerns, and others feel that they need more time to decide.

### 9.1 Impact of R&Ps

Some library leaders and repository managers feel that R&Ps are positive because they reflect well on the library and encourage conversations about open research (L1, L3, L4, L11, L12, M4). L1 feels that R&P “the impact for us has been really positive because they see the library has done all of this work to save APCs” (L1), and L11 sees R&Ps as “a fabulous development” (L11). R&Ps have influenced wider discussions about open research (L4, L12), and “helped us with some of that open kind of scholarship and open publishing kind of drive” (L4). L12 has also noted a positive response to R&Ps, and is using this to encourage conversations about open research:

“We have found many more doors have opened as a consequence of the Read and Publish deals ... than we've had in the last decade ... We're using it ... to try and have those meaningful conversations so that people build an understanding of the complexity of the landscape and all of the possible options” (L12)

R&Ps could have an effect on the collection scope of IRs in the future. M4 feels that having R&Ps in place could encourage their IR to be more focussed on research outputs that are unique to their university, such as NTROs (M4):

“... transformative agreements will change quite a lot of things ... and we're already seeing that here in a positive way ... For our repository I suspect it means shifting our focus to the non-traditional research outputs and things that are uniquely of our organization that no one else it's gonna be responsible for.” (M4)

Some library leaders and repository managers have suggested that the R&Ps could shift the focus of IRs away from green OA content (M9, L3, L9):

“... it's interesting that we're sort of sticking with the green OA repositories a lot more than the international ones, and it's gonna be really interesting to see with these transformative agreements and publish and read if that will continue into the future, if there will be a bit of a shift to more of this sort of research activity-based use, and data ...” (M9)

<sup>42</sup> <https://caul.libguides.com/read-and-publish/home>

## 9.2 Negative aspects of R&Ps

However, library leaders and repository managers found some negative aspects to R&Ps (L5, L8, L12, M4). R&Ps can be complex to explain to researchers (L5, L12) because the payment of an APC “depends on a whole lot of factors which has made it really difficult to kind of sell” (L5). R&Ps have added more complexity to OA publishing: “we’ve made a complex landscape just a little bit more complex, but worth their while if they’ll invest the time to find out” (L12). Two library leaders have observed that some R&P journals are changing from hybrid to gold (L5, L8), and L5 feels that the “goal posts are being changed ... by the publishers” (L5). M4 cautions university leaders that R&Ps should not be seen as replacing IRs:

“Possibly at the UL level some people think I won’t need a repository sometime because read and publish agreement is going to solve all my problems ... I think that’s kind of a failure on the part of some university leaders to take their repository and make it critical university infrastructure and a critical service and support of research outcomes.” (M4)

Other library leaders and repository managers feel that more time is needed before they can form an opinion on the impact of R&Ps (L4, M2, M6, M7, M9, M10), and L2 is interested to see if R&Ps affect the time of year when researchers publish.

## 10 Suggestions for Universities Looking for a New IR

The suggestions in this section are inspired by the experiences of library leader and repository manager participants in this project.

	Suggestion	Participant experiences
<b>Planning</b>		
Make the library a stakeholder	The library should be a stakeholder when planning any new research systems.	Section 4.1.1 'How is the IR valued'
Consult researchers	Consult researchers about their IR needs, especially creative practice researchers as they have different IR needs.	Section 4.3 'Support services'
<b>Infrastructure and integration</b>		
Consider hosted IRs	Consider the benefits of a hosted IR – less infrastructure management, no upgrades to manage, minimal downtime and can free up staff	Section 4.8 'IR platform experiences' ('Benefits of hosted IRs')
Check IR integration	Integration between IRs and other systems can be complex – ask potential IR vendors for case studies of other universities that have achieved integration with your combination of systems (especially your RMS).	Section 5.1 'Technical challenges of IRs' ('Integration')
Prioritise indexing of the IR	People will access the IR via search results in Google and Google Scholar – consider that the IR might not be accessed from its homepage.	Section 4.5 'The IR is not a destination' Section 5.1 'Technical challenges of IRs' ('Integration') Section 7.1 'The role of IRs in open research'
<b>Functionality</b>		
Futureproof the IR with connected PIDs	Think about the ideal metadata using connected PIDs to enhance the findability of research outputs – check that a potential IR can support integration of ORCID, funding schemes and equipment identifiers.	Section 6.3 'Improvements to the IR' ('Discoverability')
Carefully consider IR customisation	Customisation can cause IRs to be difficult to maintain and upgrade in the future – consider minimal customisation of the IR.	Section 5.1 'Technical challenges of IRs' ('Customisation')
Check if IR supports granularity of metadata and file privacy	Check that a potential IR supports privacy of specific metadata and files within one research output. For examples: 1. the ability to make different files public or private in a research output (such as a private research statement in a creative practice research output); 2. the ability to make administrative note metadata private.	Section 5.1 'Technical challenges of IRs' ('Functionality')

## 11 Suggestions for IR Vendors

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The suggestions in this section for IR vendors are inspired by the challenges encountered, and future plans of library leader and repository manager participants in this project. Specific IR platforms have not been included in any data analysis or quotes as they could be identifying to participants.

### 11.1 Discoverability and connected PIDs

Participants in this project want to improve discoverability in their IRs using linked PIDs (see ‘Discoverability’ in section 6.3 ‘Improvements to the IR’). They are already experiencing pain points in their IRs in using funding scheme PIDs, and ORCID integration (see ‘Functionality’ in section 5.1 ‘Technical challenges of IRs’).

Planning is ongoing by the Confederation of Open Access Repositories (COAR) in defining the characteristics of next generation repositories.<sup>43</sup> COAR’s Notify Project will focus on development and adoption of a standard for linked data notifications for research outputs in repositories.<sup>44</sup> IRs are not just valuable to the institution that hosts them, they can be a “repository as a node in a broader network”.<sup>45</sup>

A recent report about persistent identifiers in the Australian research landscape recommended that infrastructure providers “should integrate a suite of five priority PIDs: ORCIDs for people, ROR for institutions, RAIDs for projects, DOIs for research outputs, and DOIs for grants.”<sup>46</sup>

### 11.2 IR integration with other systems

IR integration with other systems was identified by participants as an area for improvement in addition to being already challenging (see ‘Integration’ in section 5.1 ‘Technical challenges of IRs’ and ‘Integration’ in section 6.3 ‘Improvements to the IR’).

### 11.3 IR functionality

Library leader and repository manager participants identified multiple areas of functionality of IRs which they find challenging (see ‘Functionality’ in section 5.1 ‘Technical challenges of IRs’). Some participants would also like to improve the metadata they provide about research outputs (see section 6.2 ‘Expansion of metadata about research outputs’).

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<sup>43</sup> <https://www.coar-repositories.org/news-updates/what-we-do/next-generation-repositories/>

<sup>44</sup> <https://www.coar-repositories.org/notify/>

<sup>45</sup> p274, <https://doi.org/10.1515/bfp-2022-0005>

<sup>46</sup> p2, ‘Incentives to invest in identifiers: A cost-benefit analysis of persistent identifiers in Australian research systems’ <https://doi.org/10.5281/zenodo.7100578>

## 12 Future Important Conversations

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Participants of the three library leader focus groups raised potential topics for future conversations including the role of publishers, and a national approach to IRs and OA.

*Participant codes have been omitted in this section.*

One library leader feels that many topics relevant to repositories are not being talked about: "... there's a lot there [that] we're not exploring I think". Another library leader suggests that now is the right time to have conversations about IRs and OA: "I think this time is a catalyst for really thinking deeply about, you know, where are we at now and where to next".

### 12.1 Future conversations about academic journal publishers

Perceptions of R&Ps were explored in section 9 'Perceptions of Read & Publish Agreements'. One library leader feels there has not been enough discussion of the impact of R&Ps:

"[R&Ps are] going to have a very deep impact on what we do in libraries and that's the conversation we're not having. So I think it is going to have an impact, whether or not we can manage the conversations to ensure that impact is not too negative is another thing"

The R&Ps currently negotiated are mostly with big academic journal publishers. One library leader questions what will happen for smaller publishers that are not included in R&Ps, and if there could be a role for IRs: "what are we doing about them? Is that where the repository comes to shine ...". Another library leader questions the continued reliance on publishers to share knowledge:

"I think the conversation that we haven't had with academics really is what needs to change in scholarly communication. And why do we still rely on that traditional journal publishing to disseminate knowledge if the point is to disseminate knowledge. And I think that's where the power might be, is thinking about what the best mechanism is for getting their knowledge disseminated and giving them options that might use the repository rather than go down that traditional journal route."

A further consideration according to another library leader, is the content held in other institutions IRs: "how much notice are we taking of what material is in other people's repositories in terms of our decision making and our subscriptions, we're not really talking about that either".

## 12.2 National approach to IRs and OA

In 2021, the Australian Chief Scientist Cathy Foley announced the need for an “Open Access Strategy for Australia”.<sup>47</sup> A proposed “Australian Model for Open Access” has already been shared, with a further detailed plan expected.<sup>48</sup> Some library leaders spoke about the impact of the Chief Scientist’s interest in Open Access:

“... there is a very dominant conversation about Open Access and open research at the moment as a consequence of the Chief Scientist’s positioning of Open Access, and we’re trying to use that to generate more conversation, I suppose, and more dialogue across the university”

The same library leader questions how the implementation of a national transformative agreement would impact IRs:

“The one other thing that I think that is interesting to think about is the role of the repositories. If we were to go down that Chief Scientist’s plan or the original plan of a fully transformative agreement, you know, with the all the big publishers, what would that mean for repositories?”

The idea of a national research repository for Australia was also suggested by one library leader: “... we don’t have necessarily a federated approach across the region ... is that the right way forward or not ... what is the investment in a number of individual repositories across the nation”. Another library leader was doubtful that “one giant infrastructure” would work for IRs. Two library leaders feel that there are still broader conversations to have about OA and open research, especially the scope of research outputs:

“I think part of the question is, what are we talking about here in terms of the types of research outputs that we want to host in the repositories. Is the day of the article over, is it more for the non-traditional outputs? Is it more for data?”

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<sup>47</sup> <https://www.chiefscientist.gov.au/news-and-media/unlocking-academic-library-open-access>

<sup>48</sup> [https://oa2020.org/wp-content/uploads/POSTER\\_12\\_OpenAccessForAustralia\\_poster\\_DrCathyFoley.pdf](https://oa2020.org/wp-content/uploads/POSTER_12_OpenAccessForAustralia_poster_DrCathyFoley.pdf)

## 13 Researcher Perspectives

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### **What do researchers think about the role of repositories in sharing their research outputs?**

- Researchers interviewed are using third-party general repositories, disciplinary repositories, and code repositories
- Reasons for using third-party general repositories include ease of use, ability to upload a wide range of research output types, ability to get DOIs
- Reasons for using third-party code repositories include code change management, and integration with existing code workflows
- Reasons for using disciplinary repositories include findability by peers, and the ability to get DOIs
- Negatives of sharing data and code on third-party repositories include lack of findability of data, concern about commercial repositories, and too many versions of research outputs
- Researchers interviewed are aware of the importance of digital preservation
- Researchers interviewed are interested in sharing research output types such as reports, educational materials, conference publications and presentations, and research notes

The following topics were explored during interviews with researchers: third-party repositories, and the drivers and barriers for using repositories. Each of the three researchers were from different study areas at Curtin University. The study areas of the three researchers have not been included in this report, as they could identify the participants.

See Appendix A 'Methodology' for more details about data collection with researchers (Group 3). The deidentified transcripts of researcher interviews, and the researcher interview question guide are available at <https://doi.org/10.25917/4ATF-F968>.

### 13.1 Researchers use of third-party repositories

Researchers were asked about their use of third-party repositories, why they choose them, and if there are any barriers to using them.

#### **Types of ROs in third-party party repositories**

R1, R2 and R3 have shared data in general repositories. All three researchers interviewed have shared their code in a code repository, while R1 and R2 have also saved code to a general repository. R2 also shares conference presentations in a general repository. All three researchers have used disciplinary repositories for their relevant research area to share papers, including preprints and accepted manuscripts.

#### **Reasons for using general repositories**

Researchers were asked about their reasons for using general repositories, and recounted many positive features including making their research outputs "available to people for a decent amount of time" (R3), "visible to other people" (R2). R3 feels that the general repository they use is "not going anywhere" (R3).

R2 feels that the general repository that they use has flexible metadata options for many different research outputs, and "almost anything I think of, I can enter onto [general repository 1] as part of the metadata structure, which is quite useful" (R2). This general repository makes it "easy to upload" and is free (R2), and their team also uses it as "it's easy to keep everything in one place" (R2). R3 suggests to collaborators that they also use the general repository of their choice, "unless data was available already somewhere else" (R3).

Being able to get DOIs for their research outputs is "one of the main reasons" R2 chose a general repository. Two of the researchers interviewed want their paper to be cited, rather than the data (R1 and R3). For this reason, the ability to get a DOI for a dataset is not as important to R3. However, they think a DOI for data would be "very useful" if they had "data for some reason [and] you don't get a paper out of that data" (R3).

Sometimes researchers are required by journal publishers to make supplementary material available alongside a journal article. e.g. code and data supporting a paper. R1 recounted where they used a specific general repository for code because the publisher's "whole system was set up so that if you did it, your life was like significantly easier" (R1). R2 has had experience of being able to choose a repository from "several options" suggested by a journal publisher, and was also forced to use "this one repository because that's the one that the journal uses" (R2). R3 has "been trying to move away from just putting the supplementary material ... with the journal" (R3) and has chosen to use a general repository instead. R3 recounted their experience where a journal and author were unable to retrieve supplementary material for an article published a few years ago, and feel that "supplementary material just doesn't stick around necessarily for very long" (R3).

### **Reasons for using code repositories**

All three researchers interviewed (R1, R2 and R3) have shared their code in a code repository, while R1 and R2 have also saved code to a general repository. The third-party code repository features valued by researchers included tracking of code changes (R2) and easy collaboration (R1 and R2). For R1 the code repository they use achieves more than just sharing the code as a research output because it's already integrated with their workflows: "it probably helps share very specifically the code and the process but then also provides like the environment that people can use" (R1).

### **Reasons for using third-party disciplinary repositories**

All three researchers have used disciplinary repositories for their relevant research area to share papers, including preprints and accepted manuscripts. Their reasons for using disciplinary repositories are that research outputs are findable by others (R1, R2 and R3), they can get DOIs for preprints (R1), trust their research outputs will be digitally preserved long-term (R1 and R3), and the disciplinary repositories are free and easy to use (R2).

Additional benefits of disciplinary repositories include "getting research out earlier" (R1), and being able to temporarily close access to research outputs if required during peer review (R1). R3 points out that sharing research outputs on disciplinary repositories does require "time ... formatting it and uploading it", but also "know that's not wasted and ... gonna be around in the ... foreseeable future" (R3).

### **Negatives of sharing data and code on third-party repositories**

Some negatives were reported by participants in using third-party repositories: concerns about being identifiable in peer review processes, that people don't search for data in the repositories they use, file size upload limits, the commercialisation of repositories, and creating too many versions. R1 had a previous experience where their open research would have made them identifiable in a journal submission blind peer review, and had to "turn things off" (R1) in a disciplinary repository to temporarily hide their data and code. While R3 saves data and code to general and code repositories, they "don't think that people use [general repository 1] for actually searching for datasets" (R3). For R3, sharing open data and code in repositories is "not necessary for the discoverability ... it's more just for the access to it and

keeping it ... available in in the long term" (R3). Some repositories have a maximum file size upload limit, but this had not yet prevented R3 in using a general repository for data.

R1 is concerned that some general repositories create too many DOIs for different versions of one research output: "in some cases it may be very important to say have a DOI for every version of a piece of software ... but I think in many cases actually having one identifier and one clear original source is better. And obviously that also helps for things like citations and all of that. So you're not having this like weird distribution of your information" (R1). R1 also feels that having multiple versions could also have the effect of increased maintenance on their part if "people like file issues on both and all of that will start getting complex" (R1).

### 13.2 Researcher perception of digital preservation

R1 and R3 are aware of the importance of digital preservation, and have experienced not being able to find papers, theses, and supplementary papers because of deadlinks and missing items. R1 avoids using commercial third-party repositories because they do not trust that their research outputs will be preserved: "if their business model fails, it's unclear what will actually happen to your work" (R1). R3 does not trust journals to preserve their supplementary material as it "doesn't stick around necessarily for very long" (R3). Regarding Curtin University's commitment to digital preservation of data, R3 feels "there's not much visibility on how long that's going to be around for" (R3). R1 reports regularly finding deadlinks when looking for papers and theses from other universities, because "that old system is no longer supported as it was" (R1).

### 13.3 Open research practices

The three researchers interviewed (R1, R2 and R3) try to share their research outputs openly where possible: "I like ... open science. It just makes sense that I'd open it up or find some for minimum viable shared version of it that I can share at the end" (R1) and "we try our best to share whatever we can" (R2); "we want to be as transparent as possible with our data and our methods" (R3).

However, sharing research openly can have a "cost associated with getting things ready to be open and you know uploading and double checking everything" (R1). R1's solution is to "do the bare minimum that's required to be useful and then wait until someone needs help and then improve it because otherwise it's just not necessary at that time efficient" (R1).

### 13.4 Curtin University specific systems

#### Using Curtin systems - espace (and Elements)

Curtin University's institutional repository is called espace (running DSpace), and researchers deposit to espace via the RMS Elements. R2 finds it difficult to keep up to date with adding their research outputs to espace "because there's so many things to put into, I end up forgetting to put things in one place and other" (R2). They would like more integration between espace and where their research outputs are published: "it would be nice if there's, you know, things are really well connected and easy to transfer things in between" (R2). In espace, R2 would like to see more details on who is downloading their research outputs, and easier social media sharing to "get some kind of visibility" (R2).

### Awareness of Curtin research data pub service

One researcher was aware of the Curtin University research data publication service<sup>49</sup> but had chosen not to use it (R3), one interviewee was "vaguely aware" of the service (R1), and one was aware of the service but not the "functionalities that are available and how easy they are to use" (R2). In the future, R1 would consider backing up code on a Curtin code service to be "robust" (R1), in addition to using their current code repository. They would also consider using Curtin's data publication service if they wanted to share a "really big data set" (R1).

### 13.5 What else would researchers like to share?

Researchers were asked if there were other research output types that they would like to share but had not had the opportunity to. Researchers would be interested in sharing research output types such as reports (R1), educational materials (R1, R2 and R3), conference publications and presentations (R2), research notes (R3) and standalone data that is not associated with a paper (R3).

While R1 would like to share and get DOIs for educational materials they have created, they are unsure of which components of their educational materials they should share and get DOIs for:

"It's sort of like what is it that people are actually citing and should I have a paper associated with ... citing the slides or citing going to the [educational event]. And if I upload [educational materials], do I do one for each time I run it and slightly adjust it ... what am I actually giving the DOI for" (R1)

R1 would also like to share reports, but is not sure if reports are in scope for Curtin systems:

"This is a huge one. There's like reports [identifying] where it's quite academic but it's also not the same standard as a journal article [identifying]. It's not clear to me the best way to [share] and get a DOI [identifying] ... And then it's difficult to know exactly when I should consider just uploading it to a Curtin system." (R1)

Two barriers for R2 in sharing their educational materials are time and copyright concerns. Time is a barrier for R2: "... time to actually do it and also time to find out how it can be done might be the main reasons ..." (R2), and they are "not too sure about copyright ... and how that can be managed. (R2).

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<sup>49</sup> <https://www.curtin.edu.au/library/about/research-data-collection/>

### 13.6 Researcher trust in repositories

Researcher participants were not asked questions about their trust in Curtin repositories or third-party repositories. However, two researchers (R1, R3) raised trust as being an important factor in their choice of where to share their data. Both R1 and R3 expressed a lack of trust that Curtin systems will digitally preserve data in the long term. R1 feels that third-party repositories are more likely to preserve their research outputs:

“I would, you know, just being honest, have some trust issues that a university would in the long term be thinking about say 50 years down the track maintaining their institutional archives to the same degree of usability and index, indexability and all of that as perhaps these third-party ones might.” (R1)

R3 feels that Curtin services might not be continued in the future, and this directly influenced their decision to use a third-party repository for data:

“Curtin has shown in the past that yeah, they can be quite quick at cutting services that you know at some point some manager will think oh it's not very useful. It's costing us money and just cut that ... But yeah, that's the main reason that why I turned to [general repository 1] instead of Curtin Library personally.” (R3)

## 1 4 Discussion

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This project explored the role of IRs in sharing academic research via interviews and a desk review. Interviews were held with twelve library leaders, ten repository managers and three Curtin University researchers. The Australian IR landscape was documented by looking at the public websites of 39 CAUL Australian universities.

The Australian IR desk review found that institutional Figshare and DSpace are the most prevalent IRs, with smaller numbers of Pure and EPrints. Many other IR platforms are found at between 1 and 3 universities: Digital Commons/bepress, Esploro, Vital, Islandora/Drupal 7, EQUELLA, Haplo/Cayuse Repository, Oni, Primo and Dryad (institutional access). Some universities run multiple IRs – 23 universities are running 1 IR, 14 universities are running 2 IRs and 2 universities run 3 IRs. The most commonly found RMS platforms are Elements and Pure (see section 3 ‘Snapshot of Australian university IRs’).

IRs enable universities to share the work of their researchers openly, and can be an integral part of a university wide open research strategy. Many libraries already fund open initiatives, some want to invest more, but some cannot. The support of open initiatives is important to financially sustain and protect non-commercial open infrastructure and services.<sup>50</sup> Some university libraries have strong high-level support for their IRs and feel that their IRs are positively valued (see sections 7 ‘Thoughts on open research’ and 4.1.1 ‘How is the IR valued’). The number of staff providing support for IRs varies widely across the universities included in this research project – from 1 FTE to over 10 FTE (see section 4.1 ‘Repository support staff’).

Many of the library leaders and repository managers find running their IRs challenging. The pain points include the integration between the IR and RMS, and the indexing of the IR. Integration was noted as a challenge for Australian IRs in previous CAUL research.<sup>51</sup> Indexing is a key part of making the contents of the IR discoverable more widely, and its importance was previously highlighted for Australian IRs.<sup>52</sup> Researcher deposit and library curation of metadata are challenging workflows, and engaging researchers can be difficult due to low awareness of the IR. A lack of engagement from researchers due to difficult workflows was also noted in CAULs 2017 Repository Survey Report.<sup>53</sup> Digital preservation activities are not formalised, similar to findings in previous CAUL research.<sup>54</sup> Non-traditional research outputs are particularly challenging, but at least one repository platform Cayuse (formerly Haplo) is aiming to cater for practice research.<sup>55</sup> Some universities are already considering a new IR because their current IR does not meet their needs (see section 5 ‘Challenges faced by IRs’).

The IRs discussed with participants varied widely in their collection scope, deposit mediation and curation. At least one university has moved from collecting only ERA-reportable research outputs to collecting anything that researchers want to deposit (see ‘Scope of research output types’ in section 4.2 ‘Functions of the IR’). Other universities have future plans

<sup>50</sup> <https://scoss.org/help-sustain-open-infra/>

<sup>51</sup> p17, <https://www.caul.edu.au/sites/default/files/documents/fair-access/repositories2019program-report.pdf>

<sup>52</sup> p48, <https://www.caul.edu.au/sites/default/files/documents/fair-access/repositories2019program-report.pdf>

<sup>53</sup> p5, <http://www.caul.edu.au/news/research-publications-repository-survey-report-2017>

<sup>54</sup> p18, <https://www.caul.edu.au/sites/default/files/documents/fair-access/repositories2019program-report.pdf>

<sup>55</sup> <http://doi.org/10.1629/uksg.582>

to expand the research output types they collect (section 6.1 ‘Expansion of research output types collected’). This increased collection scope can showcase the strengths of universities. Some universities are moving from mediated deposit and curation, to instant DOIs and unmediated instant publication (see section 4.2 ‘Functions of the IR’). One university wants to add further value to research outputs with metadata about connected PIDs (see ‘Discoverability’ in section 6.3 ‘Improvements to the IR’). Other universities want the ability to highlight First People’s research in their IR, and show how their research outputs meet the UN’s SDGs (see section 6.2 ‘Expansion of metadata about research outputs’).

Different factors have contributed towards this changing role of the IR. For many universities, the RMS that pulls from multiple sources is now the source of truth for publication metadata rather than the IR (see section 4.4 ‘IR integration with other systems’). One university feels that the engagement and impact agenda could increase the scope of research output types collected to be more than ERA-reportable, especially reports and working papers (see ‘Reports’ in section 6.1 ‘Expansion of research output types collected’). The move to hosted IRs has enabled some universities to focus more on the value and service of the IR rather than infrastructure management (see ‘Benefits of hosted IRs’ in section 4.8 ‘IR platform experiences’). Potential benefits of cloud hosted services for universities and libraries include the capacity to scale, less investment in physical hardware and lower energy usage.<sup>56</sup>

The use by researchers of third-party repositories is already being acknowledged by some universities. The advice provided on university websites includes suggesting specific generalist and disciplinary third-party repositories, and requesting that researchers provide metadata to their library when they use third-party repositories (see section 3.5 ‘Advice provided to researchers about third-party repositories’). Some library leaders and repository managers feel that third-party repositories are better than IRs for some researchers and research outputs. At some universities, IRs are already harvesting metadata from third-party repositories about research outputs affiliated with their institution. Concerns that third-party repositories might be commercialised in the future were also expressed (see section 8 ‘Perceptions of third-party repositories’).

Most library leaders and repository managers were positive about Read & Publish agreements, and feel that R&Ps reflect well on the library and encourage conversations about open research. In addition, R&Ps could affect the collection scope of IRs to include more unique research outputs. However, R&Ps can be complex to explain to researchers. Some library leaders and repository managers feel that they need more time to see the impact of R&Ps (see section 9 ‘Perceptions of Read & Publish agreements’).

The challenges encountered by library leaders and repository managers were used to create a list of suggestions for universities looking for a new IR, so that the IR community can benefit from their experiences. This list includes suggestions in the areas of planning, functionality, and infrastructure and integration (see sections 10 ‘Suggestions for universities looking for a new IR’). A section specifically for IR vendors includes suggestions for future development such as more linked PIDs and better integration with other systems (see section 11 ‘Suggestions for IR vendors’).

A recurring topic during interviews was that more community conversations are needed about repositories and scholarly communication. Topics for future conversations included the

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<sup>56</sup> <https://digitalpreservation-blog.lib.cam.ac.uk/open-source-and-cloud-for-managing-digital-collection-materials-e2a46621e228>

role of publishers, and a national approach to IRs and OA. This conversations could build on existing momentum around open research (see section 12 ‘Future important conversations’).

Researcher perspectives on repositories were provided by three Curtin researchers who are already making their research open via third-party general repositories, disciplinary repositories, and code repositories. They are choosing to use these repositories rather than IRs – for different reasons depending on the type of third-party repository. The researchers interviewed are aware of the importance of digital preservation, and are interested in sharing other research output types such as reports, educational materials, conference publications and presentations, and research notes (see section 13 ‘Researcher perspectives’).

## 15 Conclusion

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Curtin University Library wanted to find out more about how other universities support their researchers in using repositories for their research outputs. 12 library leaders and 10 repository managers who plan and manage repositories were interviewed, across 17 Australian universities. 3 Curtin University researchers who use third-party repositories were also interviewed. This report presented the findings of this research, and a desk review of the institutional repositories (IRs) of 39 Australian universities. The findings of this project will also be used to identify opportunities to support Curtin University researchers in sharing their research outputs in repositories.

Despite numerous challenges, Australian IRs continue to enable the research outputs of their universities to be shared openly and widely. The engagement of the Australian IR community with this research project is a testament to their commitment to open research.

### 15.1 Acknowledgements

Thank you to the following people:

- The 25 participants who generously gave their time, and shared perspectives and experiences in interviews. This project would not have been possible without you!
- Project idea – Amanda Bellenger, formerly of Curtin University Library who conceived this project
- Project funder – Curtin University Library
- Project team – Janice Chan, Julie Clift and Professor Lucy Montgomery

## Appendix A – Methodology

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This section includes details on recruitment, data collection and data analysis. It has been extracted from the research proposal and project plan.

### Research methodology

The research methodology used was an interpretivist paradigm, where each person experiences reality in an individual way. The interpretivist researcher's role is to explore the 'beliefs, feelings and interpretations of research participants' (Williamson, 2017b, p. 10)<sup>57</sup>. The specific interpretivist paradigm used in this study was personal constructivism, which holds the belief that each person constructs reality in a different way (Williamson, 2017b, p. 12). Remaining open to the realities of participants is essential to ensure the objectivity of this research (Williamson, 2017b, p. 15). This paradigm was used in data collection, where the semi-structured interviews and focus groups used open-ended questions. In thematic analysis, the interpretivist paradigm was also used, and an inductive approach was used to generate themes from the interview data and reflect the experiences of the participants, rather than deductive thematic analysis which uses a predefined framework (Clarke et al., 2015, p. 225).<sup>58</sup>

### Data collection

Three data collection streams comprised this research project:

- Group 1 - Focus groups with Australian university library leaders
- Group 2 - Interviews with Australian repository managers
- Group 3 - Interviews with Curtin University researchers

#### Data collection – Group 1

Focus groups with Australian university library leaders explored their views on strategic directions for IR services, their perceptions of third-party repositories, and the role of repositories in open scholarship. Focus groups are well-suited to generating discussion and ideas within a group, and was chosen here to maximise discussion about the future directions of repositories. Some library leaders commented during focus groups that this forum was useful to find out what other libraries are doing. The number of questions was limited to provide all participants with an opportunity to speak about their views and perceptions, and future plans for repositories (Williamson, 2017a, pp. 394–395)<sup>59</sup>. The focus groups were recorded in Microsoft Teams, with consent provided by participants beforehand (Williamson, 2017a, p. 392).

#### Data collection – Group 2

One-on-one interviews with repository managers at other Australian Universities explored the views of repository managers in Australian universities on IR services, strategic directions for IRs, and third-party repositories. Semi-structured interviews are considered useful

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<sup>57</sup> Williamson, K. (2017b). Research concepts. In K. Williamson & G. Johanson (Eds.), *Research methods: Information, systems, and contexts* (2nd ed., pp. 3–25). Chandos Publishing.

<sup>58</sup> Clarke, V., Braun, V., & Hayfield, N. (2015). Thematic analysis. In *Qualitative psychology: A practical guide to research methods* (3rd ed., pp. 222–248). SAGE Publications.

<sup>59</sup> Williamson, K. (2017a). Questionnaires, individual interviews and focus group interviews. In K. Williamson & G. Johanson (Eds.), *Research methods: Information, systems, and contexts* (2nd ed., pp. 379–403). Elsevier Science & Technology. <https://ebookcentral.proquest.com/lib/curtin/detail.action?docID=5161869>

for the study of motivation, and interpreting from the participant’s perspective (Qu & Dumay, 2011, p. 246)<sup>60</sup>, thus supporting the research question and sub-questions. Interviews were recorded in Microsoft Teams, with consent provided by participants before the interview.

### Data collection – Group 3

One researcher from each of three study areas at Curtin University was interviewed to find out more about their IR service needs. The study areas of the three participants have not been included as they may identify the participants. Curtin University has five study areas: Centre for Aboriginal Studies; Faculty of Business and Law; Faculty of Health Sciences; Faculty of Humanities; Faculty of Science and Engineering. Semi-structured interviews are considered useful for the study of motivation, and interpreting from the participant’s perspective (Qu & Dumay, 2011, p. 246), thus supporting the research question and sub-questions. Interviews were recorded in Microsoft Teams, with consent provided by participants before the interview.

### Sampling & recruitment

#### Sampling & recruitment – Group 1

Purposive sampling was used to identify potential focus group participants from Australian university library leaders, where that university has an institutional repository. For this project library leaders was defined as a University Librarian, Director of Library, or a similar position. All participants were 18 years old and above. The publicly available list of the Council of Australian University Librarians (CAUL) Members was used to obtain contact email addresses.<sup>61</sup> Publicly available information such as university websites and repository-related conference presentations was used to select potential participants. Participants were also suggested by Curtin University Library team leaders.

An email was sent from Niamh Quigley’s Curtin University staff email account to invite individuals to participate in this research. Where a library leader accepted, they were offered a choice of online focus group via Microsoft Teams. The target number of library leader participants was 12. Three focus groups were run with a total number of 12 participants:

Focus group	Date	Duration	Participants
Focus group 1	Monday 1 August	53 minutes	L3 L1 L2
Focus group 2	Wednesday 10 August	1 hr 9 minutes	L7 L4 L8 L6 L5
Focus group 3	Monday 15 August	1 hr 11 minutes	L9 L11 L10 L12

<sup>60</sup> Qu, S. Q., & Dumay, J. (2011). The qualitative research interview. *Qualitative Research in Accounting & Management*, 8(3), 238–264. <https://doi.org/10.1108/11766091111162070>

<sup>61</sup> <https://www.caul.edu.au/about-caul/members>

The following topics were explored during focus groups with Australian university library leaders: IR services, strategic directions for IRs, and third-party repositories. The library leader focus group question guide is available at <https://doi.org/10.25917/4ATF-F968>.

### **Sampling & recruitment – Group 2**

Purposive sampling was used to identify potential interview participants from Australian universities who manage institutional repositories. All participants were 18 years old and above. Publicly available information such as university websites and repository-related conference presentations was used to select potential participants. Participants were also suggested by Curtin University Library team leaders.

An email was sent from Niamh Quigley's Curtin University staff email account to invite individuals to participate in this research. When a repository manager accepted, a suitable time was arranged for an interview via Microsoft Teams. Interviews ranged in duration from 40 to 58 minutes in duration. The target number of participants was 6 to 8 interviews with repository managers. 10 interviews were conducted, some with two people interviewed together.

The following topics were explored during interviews with Australian university repository managers: the views of repository managers in Australian universities on IR services, strategic directions for IRs, and third-party repositories. The repository manager interview question guide is available at <https://doi.org/10.25917/4ATF-F968>.

### **Sampling & recruitment – Group 3**

The target number of participants was five interviews with researchers with one researcher from each study area: Centre for Aboriginal Studies; Faculty of Business and Law; Faculty of Health Sciences; Faculty of Humanities; Faculty of Science and Engineering.

Purposive sampling was used to identify potential interview participants who have already saved their research outputs in repositories. Publicly available information on researcher profiles on Curtin's institutional repository, Curtin's data server (<https://ddfe.curtin.edu.au/>) and third-party repositories was used to select potential participants. Participants were suggested by Curtin University Library team leaders. All participants were 18 years old and above.

An email was sent from Niamh Quigley's Curtin University staff email account to invite individuals to participate in this research. Where a researcher accepted, a suitable time was arranged for an interview via Microsoft Teams. Interview duration ranged from 29 minutes to 48 minutes in duration. Researchers from 3 different study areas accepted, but Niamh Quigley was unable to recruit a researcher to interview from the other 2 study areas. The following topics were explored during interviews with researchers: third-party repositories; drivers and barriers for using repositories.

The deidentified transcripts of researcher interviews, and the researcher interview question guide are available at <https://doi.org/10.25917/4ATF-F968>.

#### Interview preparation

### **Interview preparation – Group 1**

Preparation before focus groups included online research and a literature review to find out as much as possible about the institutional repository infrastructure and services for each university participating in this research. However, some of this information was not

available on public-facing websites, and focus groups were a suitable method to explore institutional repository services and future plans.

### **Interview preparation – Group 2**

Preparation before interviews included online research and a literature review to find out as much as possible about the institutional repository infrastructure and services for each university participating in this research. However, some of this information is not available on public-facing websites, and interviewing was a suitable method to explore both current institutional repository infrastructure, services, and future plans.

### **Interview preparation – Group 3**

The interview preparation included a general online search for research outputs of each participant, including publicly available ORCID, Zenodo, Figshare, Dryad, Humanities Commons CORE, and Research Data Australia.

### **Consent**

#### **Consent – Group 1**

Consent for online focus groups was a digitally signed form before the focus group begins. Consent forms included the following:

- Consent for recording of the focus groups via Microsoft Teams built-in video recording
- Consent to an auto-generated transcript via Microsoft Teams built-in transcription
- Consent to the use of de-identified quotations in any publications arising from the research

#### **Consent – Group 2**

Consent for online interviews with Australian repository managers was a digitally signed form before the interview begins. Consent forms included the following:

- Consent for recording of the interviews via Microsoft Teams built-in video recording
- Consent to an auto-generated transcript via Microsoft Teams built-in transcription
- Consent to the use of de-identified quotations in any publications arising from the research

#### **Consent – Group 3**

Consent for online interviews with Curtin University researchers was a digitally signed form before the interview begins. Consent forms included the following:

- Consent for recording of the interviews via Microsoft Teams built-in video recording
- Consent to an auto-generated transcript via Microsoft Teams built-in transcription
- Consent to the use of de-identified quotations in any publications arising from the research
- Consent for the use of de-identified quotations in a publicly available data set

This consent form can be viewed in Appendix A of the researcher transcripts in <https://doi.org/10.25917/4atf-f968> (see Repositories\_Researcher\_Transcripts\_v1.docx)

## Data Analysis

Thematic analysis is used to identify, analyse and report patterns in data (Braun & Clarke, 2006, p. 79)<sup>62</sup>, and is particularly well suited to the analysis of people's opinions, perceptions, behaviours, and experiences (Braun & Clarke, 2019, p. 17)<sup>63</sup>. This involves reviewing the data (familiarisation), then creating codes and categories to note similarities, differences, and themes. The six-phase analysis process suggested by Braun and Clarke (2006, p. 87) was followed to represent participants' views on the research topic:

1. Data familiarisation
2. Code generation
3. Finding themes
4. Reviewing themes
5. Refining themes
6. Creating a report.

MaxQDA software was used for qualitative data analysis in this project, where a code represents an interesting or notable piece of information in an interview transcript. 909 data segments (or quotes) were added to 836 codes. The codes were grouped to answer the research questions, and themes were generated by adding codes to MaxQDA sets.

### Data analysis – Group 1

The data collected was 3 video recordings of focus groups. The Microsoft Teams auto-transcription was used as a starting point for transcribing the video recordings into text by Niamh Quigley. Data familiarisation (Phase 1 of thematic analysis) began while transcribing each video, and notes and code ideas were recorded (Braun & Clarke, 2006, p. 87). Throughout thematic analysis, an inductive approach was applied, where the themes were directly related to the data rather than the questions (Braun & Clarke, 2006, p. 83).

An inductive approach was used for code generation (Phase 2) where data of interest was coded without using an existing coding frame (Braun & Clarke, 2006, p. 83). Once all of the data was coded, they were sorted into themes (Phase 3), and 'the relationship between codes, between themes, and between different levels of theme' was considered (Braun & Clarke, 2006, p. 89). Themes were then reviewed and reworked (Phase 4) (Braun & Clarke, 2006, p. 91).

Transcripts were re-read in order to review the themes identified (Braun & Clarke, 2006, p. 91). Finally, analysis was completed and fully written up (Phase 6) as a 'concise, coherent, logical, non-repetitive and interesting account of the story the data tell' (Braun & Clarke, 2006, p. 92).

### Data analysis – Group 2

The data collected was recordings of 10 interviews with repository managers. See the previous section 'Data analysis – Group 1' for a description of data analysis. Data analysis of library leaders and repository manager transcripts was combined, because similar questions were asked of participants.

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<sup>62</sup> Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp0630a>

<sup>63</sup> Braun, V., & Clarke, V. (2019). *Answers to frequently asked questions about thematic analysis*. The University of Auckland. <https://cdn.auckland.ac.nz/assets/psych/about/our-research/documents/Answers%20to%20frequently%20asked%20questions%20about%20thematic%20analysis%20April%202019.pdf>

### Data analysis – Group 3

The data collected was recordings of 3 interviews with Curtin University researchers. See the previous section 'Data analysis – Group 1' for a description of data analysis.

### Research Data Management

This project complied with the Australian Code for the Responsible Conduct of Research (National Health and Medical Research Council, 2018)<sup>64</sup> and Curtin University's Research Data and Primary Materials Policy (Curtin University, 2021)<sup>65</sup>. A research data management plan was created, and digital recordings were backed up before data analysis.

The three interview guides were shared as open data (<https://doi.org/10.25917/4atf-f968>). The Group 3 participants (researchers) all consented to making their deidentified interview transcripts available as open data (<https://doi.org/10.25917/4atf-f968>). Focus group and interview transcripts from Groups 1 and 2 have not been shared as open data.

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<sup>64</sup> National Health and Medical Research Council. (2018). *Australian code for the responsible conduct of research 2018*. <https://nhmrc.gov.au/about-us/publications/australian-code-responsible-conduct-research-2018>

<sup>65</sup> Curtin University. (2021). *Research data and primary materials policy*. [https://policies.curtin.edu.au/local/docs/policy/Research\\_Data\\_and\\_Primary\\_Materials\\_Policy.pdf](https://policies.curtin.edu.au/local/docs/policy/Research_Data_and_Primary_Materials_Policy.pdf)

## Appendix B – Desk Review of Australian Universities

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### Notes on sources

- The scope of this desk review is Australian universities that are members of CAUL, and the names of the 39 universities in this desk review were gathered from the CAUL Members list in July 2022.<sup>1</sup>
- All information has been taken from public websites in July and August 2022, and could be incorrect or out-of-date as it was not verified with each institution. Sources included university websites including HTML page source metadata for repository software and versions. Repositories holding special collections or staff-only content were not included in the scope of this desk review.
- This review was conducted separately to interviews and focus groups in this research project, and does not include any information from participants.
- This review is presented as a snapshot of institutional repositories in Australian universities and will not be updated or maintained.

The font size in the university IRs table is intentionally small to fit all information in. Use the zoom function in your document viewer to make it more readable.

### Key to table

Heading	Information collected
University	Name of university
IRs	IR(s) at this university
Research outputs collected	Which research outputs are collected in each IR
IR Software	Software platform used for IR (mix of local and vendor hosted)
Research management software (RMS)	The software used for research output management
Deposit method	How researchers add research outputs to the IR
Mention third-party repositories	Does the university website mention third-party repositories as alternates to IRs for sharing research outputs
DOIs	Does the university website provide advice on minting DOIs
Research collection policy	Is there guidance on which research output types the repository accepts – in a policy/webpage
Guidance on sharing data and software	Is there guidance on how and where data or software can be shared i.e. more detailed than a statement saying it <i>should</i> be shared
Open access policy	Does the university have an open access policy

## Curtin Library Repositories Project – Research Report

### Desk review of Australian universities

University	IRs	Research outputs collected	IR Software	Research man. system	Deposit method	Mention third-party repositories	DOIs	Research collection policy	Guidance on sharing data and software	Open access policy
<b>Australian Catholic University</b>	<a href="#">Research Bank</a>	Journal articles, book chapters, conference papers, datasets	Haplo/Cayuse Repository	Research Master (ORION)	Via Research Master <sup>2</sup>	Suggests depositing 'research datasets in an institutional or disciplinary repository	For data, ebooks, reports and HDR theses <sup>3</sup>	None found	Data <sup>4</sup>	Open Access for ACU Research <sup>5</sup>
<b>Australian National University</b>	<a href="#">Open Research</a>  <a href="#">ANU Data Commons</a>	Journal articles, book chapters, conference papers, theses, grey literature, NTROs and datasets <sup>6</sup>  Data	DSpace 5.8  Unknown	Unknown (ARIES - ANU Research Information Enterprise System); Pure for College of Asia and the Pacific <sup>7</sup>	Via DSpace <sup>8</sup>	Not found	For data in ANU Data Commons <sup>9</sup>	Open Access Research Procedure <sup>10</sup>	Data <sup>11</sup>	Open Access Policy <sup>12</sup>
<b>Bond University</b>	<a href="#">Bond University Research Portal</a>	Research outputs, datasets, and the description of student theses <sup>13</sup> IR contains over 40 types of research outputs <sup>14</sup>	Pure	Pure	Via Pure <sup>15</sup>	Suggests Australian discipline-specific and Dryad and Figshare <sup>16</sup>	For datasets in Pure <sup>17</sup>	None found	Research Data Management and Sharing Policy <sup>18</sup> ; Research data management toolkit <sup>19</sup>	Open Access Policy <sup>20</sup>
<b>Charles Darwin University</b>	<a href="#">Charles Darwin University's Research Webportal</a>	IR contains over 40 types of research outputs <sup>21</sup>	Pure	Pure	Unknown, assumed via Pure	Not found	For datasets, grey literature and NTROs <sup>22</sup>	Not found	Unknown <sup>23</sup>	Open Access Policy <sup>24</sup>
<b>Charles Sturt University</b>	<a href="#">CRO - Charles Sturt University Research Output</a>	IR contains over 40 types of research outputs <sup>25</sup>	Pure	Pure	Via Pure <sup>26</sup>	None found	For some datasets in Pure <sup>27</sup>	CRO Guidelines <sup>28</sup>	Research Data Management Policy <sup>29</sup>	Included in CRO Guidelines <sup>30</sup>
<b>Central Queensland University</b>	<a href="#">aCQUIRE</a>	IR contains 14 types of research outputs <sup>31</sup>	Figshare	Elements	Via Elements <sup>32</sup>	Suggests third-party repositories for finding data <sup>33</sup>	For datasets, software and grey literature <sup>34</sup>	None found	Data <sup>35</sup>	Open Access for Research Outputs Policy <sup>36</sup>
<b>Curtin University</b>	<a href="#">espace</a>  Research Data Collection (data and software) <sup>37</sup>	Journal articles, books and book chapters, conference papers, theses, NTROs <sup>38</sup>  Data	DSpace 5.5  None – webpages & server	Elements	Via Elements  Data via form <sup>39</sup>	Suggested for NTROs not eligible for ERA <sup>40</sup> and included in Data Publication workshops for researchers	For data including software, <sup>41</sup> and reports <sup>42</sup>	Guide to espace <sup>43</sup> Guidance for data <sup>44</sup>	Data and software <sup>45</sup>	Open Access Guidance Document <sup>46</sup>

## Curtin Library Repositories Project – Research Report

University	IRs	Research outputs collected	IR Software	Research man. system	Deposit method	Mention third-party repositories	DOIs	Research collection policy	Guidance on sharing data and software	Open access policy
Deakin University	<a href="#">Deakin Research Online</a>	Reportable research including journal articles, conference papers, books and book chapters, creative works; and non-reportable research including working papers and presentations; theses; dataset metadata <sup>47</sup>	Figshare	Elements	Via Elements <sup>48</sup>	Suggests third-party repositories <sup>49</sup>	For data <sup>50</sup>	Yes <sup>51</sup>	Data <sup>52</sup>	None found
	<a href="#">Deakin Data Portal</a>	Data	Unknown							
Edith Cowan University	<a href="#">Research Online</a>	ERA research outputs plus preprints, unrefereed research lit, published patents, datasets <sup>53</sup>	Digital Commons /bepress	Unknown (Research Activity System)	Via Research Activity System and email <sup>54</sup>	Links to publisher articles which recommend specialist & generalist repositories including Dryad, Figshare, Harvard Dataverse, OSF and Zenodo <sup>55</sup>	Data <sup>56</sup>	As FAQ <sup>57</sup>	Data publishing at ECU <sup>58</sup>	None found
Federation University Australia	<a href="#">Federation ResearchOnline</a>	Open access publications and theses	Vital	IRMA <sup>60</sup>	Via email <sup>61</sup>	Suggests discipline-specific repositories for 'large and complex data sets' <sup>63</sup>	For research data and NTROs via Figshare <sup>64</sup>	Not found	Data <sup>65</sup>	Not found
	<a href="#">Federation.figshare</a>	Research data and NTROs <sup>59</sup>	Figshare		Via Figshare <sup>62</sup>					
Flinders University	<a href="#">ResearchNow/Research@Flinders</a>	Pubs & research outputs <sup>66</sup>	Pure	Pure <sup>67</sup>	Via Pure <sup>68</sup>	Not found	For data in ROADS	Not found	Data <sup>70</sup>	Not found <sup>71</sup>
	<a href="#">Flinders ROADS (Repository of Open Access DataSets)</a>	Data	Figshare		Via Figshare <sup>69</sup>					
	<a href="#">Flinders Academic Commons</a>	<i>Previous repository, now archived</i>	DSpace 5.8							

## Curtin Library Repositories Project – Research Report

University	IRs	Research outputs collected	IR Software	Research man. system	Deposit method	Mention third-party repositories	DOIs	Research collection policy	Guidance on sharing data and software	Open access policy
<b>Griffith University</b>	<a href="#">Griffith Research Online (GRO)</a>	Journal articles, books, HDR PhD, creative practice, grey lit, data	DSpace 6.3	Elements 6.3	Via Elements <sup>73</sup>	Link to r3data <sup>75</sup>	For research data, creative works, theses, and non-traditional literature <sup>77</sup>	Yes <sup>78</sup>	Data <sup>79</sup> and software <sup>80</sup>	Open Research Statement <sup>81</sup>
	<a href="#">Creative Works</a>	ERA eligible creative works <sup>72</sup>	Figshare		Via Figshare <sup>74</sup>	Suggests Figshare, Dryad, Zenodo and Australian Data Archive (for data and code) <sup>76</sup>				
<b>James Cook University</b>	<a href="#">ResearchOnline@JCU</a>	Articles, book chapters, books, reports, conference items, theses, patents, creative works, NTRO portfolios	EPrints 3.3.15	Unknown	Via EPrints <sup>82</sup>	Can create metadata record for data in other repositories <sup>83</sup>	For data <sup>84</sup>	Yes <sup>85</sup>	Data <sup>86</sup>	Open Scholarship Policy <sup>87</sup>
	<a href="#">Research Data JCU</a>	Data	Unknown							
<b>La Trobe University</b>	<a href="#">OPAL</a>	ERA-eligible, NTROs, reports, conference papers, education resources, data and theses	Figshare	Elements	Via Elements <sup>88</sup>	Not found	Data – Direct deposit into OPAL <sup>89</sup>	OPAL Guidelines <sup>90</sup>	Data – Direct deposit into OPAL <sup>91</sup> None found on software, but 3 in OPAL	None found
	<a href="#">La Trobe Research Online</a>	Previous repository	Vital							
<b>Macquarie University</b>	<a href="#">Macquarie University Research Portal</a>	IR contains over 40 types of research outputs <sup>92</sup>	Pure	Pure	Via Pure <sup>93</sup>	Recommends domain-specific repositories 'where one is available' <sup>95</sup>	For data and grey literature <sup>96</sup>	Not found	Data <sup>97</sup> Mentions software <sup>98</sup>	Open access policy <sup>99</sup>
	<a href="#">Macquarie University Research Data Repository</a>	Data and theses	Figshare		Via Figshare <sup>94</sup>					
<b>Monash University</b>	<a href="#">myResearch (Monash University Research Portal)</a>	Publications, conference papers, research activity (but not viewable publicly)	Pure	Pure	Via Pure <sup>100</sup>	Mention of Figshare.com <sup>102</sup>	Data and NTROs via Bridges <sup>103</sup>	Guide <sup>104</sup>	Can link GitHub to Bridges <sup>105</sup>	None found
	<a href="#">Bridges</a>	Data, NTROs, theses	Figshare		Via Figshare <sup>101</sup>					

## Curtin Library Repositories Project – Research Report

University	IRs	Research outputs collected	IR Software	Research man. system	Deposit method	Mention third-party repositories	DOIs	Research collection policy	Guidance on sharing data and software	Open access policy
<b>Murdoch University</b>	<a href="#">Murdoch University Research Repository</a>	Research publications, conference papers and items, technical reports, working papers, creative outputs, websites, and theses <sup>106</sup>	EPrints	IRMA	Via email <sup>107</sup>	Will add metadata to IR if data is in domain-specific repository <sup>108</sup>	Unknown	About <sup>109</sup> Repository policies <sup>110</sup>	Data <sup>111</sup>	None found
<b>Queensland University of Technology</b>	<a href="#">QUT ePrints</a>	Journal articles, books, book chapters, conference papers, NTROs, working papers and theses <sup>112</sup>	EPrints	Pure <sup>113</sup>	Via Pure <sup>114</sup>	Unknown	Unknown	About <sup>115</sup>	Share data via <a href="#">QUT Research Data Finder</a> Share software via <a href="#">QUT Software Finder</a> <sup>116</sup>	Open access policy <sup>117</sup>
<b>RMIT</b>	<a href="#">Research Repository</a>  <a href="#">RMIT Figshare</a>	Books, Book chapters, Commissioned Reports, Conference Papers, Creative Works, Journal Articles, Masters by Research theses, Doctor of Philosophy (PhD) theses and Professional Doctorate theses <sup>118</sup>  Non-traditional research outputs such as creative works, figures, datasets, media, code, papers, theses, posters, presentations, and file sets <sup>119</sup>	Esploro (early adopters) <sup>120</sup>  Figshare	unknown	Via Researcher Portal or via email <sup>121</sup>  Via Figshare <sup>122</sup>	Code <sup>123</sup>	Via Figshare <sup>124</sup>	FAQ <sup>125</sup>	Data in Figshare <sup>126</sup> Open code <sup>127</sup>	None found
<b>Southern Cross University</b>	<a href="#">Southern Cross Research Portal</a>	Journal articles, books, book chapters, conference papers, reports and 15 other types <sup>128</sup>	Esploro	Unknown	Unknown	Will add metadata to IR if data is in domain-specific repository <sup>129</sup>	Data <sup>130</sup>	Not found	Data <sup>131</sup>	Open access policy <sup>132</sup>
<b>Swinburne University of Technology</b>	<a href="#">Swinburne Research Bank</a>	Research outputs, Swinburne conference proceedings, theses and others <sup>133</sup>	EQUELLA	Unknown	Via online form <sup>134</sup>	None found	DOIs for some datasets in IR <sup>135</sup>	In About webpage <sup>136</sup>	Research data webpages only accessible to Swinburne staff <sup>137</sup>	None found

## Curtin Library Repositories Project – Research Report

University	IRs	Research outputs collected	IR Software	Research man. system	Deposit method	Mention third-party repositories	DOIs	Research collection policy	Guidance on sharing data and software	Open access policy
University of Adelaide	<a href="#">Adelaide Research &amp; Scholarship (AR&amp;S)</a>	Mandated research outputs <sup>138</sup>	DSpace 6.3	Elements (Aurora)	Via Elements <sup>139</sup>	None found	Via Figshare	In help guide <sup>141</sup>	Data yes <sup>142</sup> No guidance for software, but some in Figshare <sup>143</sup>	Yes <sup>144</sup>
	<a href="#">Figshare</a>	figures, datasets, software/code, images, videos, posters and presentations	Figshare		Via Figshare <sup>140</sup>					
University of Canberra	<a href="#">Research Portal</a>	Books, book chapters, journal articles, conference papers, creative works, refereed designs, theses, other <sup>145</sup>	Pure	Pure	Via Pure <sup>146</sup>	Yes <sup>147</sup>  Uses Elsevier's Data Monitor to locate affiliated data & software in third-party repositories <sup>148</sup>	For grey literature, software and data <sup>149</sup>	Repository Support webpage <sup>150</sup>	Data and software <sup>151</sup>	None found
University of Melbourne	<a href="#">Minerva</a>	Journal articles, conference papers, books, book chapters, theses, research reports, creative works and data <sup>152</sup>	DSpace 7	Elements	Via Elements or email <sup>154</sup>	Yes – for storing data and software <sup>156</sup>	For supp. materials and non-traditional outputs inc. code and data via Figshare <sup>157</sup>	Digital Collections FAQ <sup>158</sup>	Data and software <sup>159</sup>	Principles for Open Access to Research Outputs <sup>160</sup>
	<a href="#">Figshare</a>	Supplementary materials, non-traditional outputs including code, software, and datasets <sup>153</sup>	Figshare		Via Figshare <sup>155</sup>					
University of New England	<a href="#">Research UNE</a>	Research outputs, creative practice, NTROs, data, software and others	DSpace 6	DSpace CRIS-6.1.0 <sup>161</sup>	Via DSpace/DSpace CRIS	None found	Yes for data, other research output types will be assessed <sup>162</sup>	Research UNE Deposit, Collection and Access Rule <sup>163</sup> and University of New England's Repository Guidelines <sup>164</sup>	Mandatory metadata for data <sup>165</sup>	None found

## Curtin Library Repositories Project – Research Report

University	IRs	Research outputs collected	IR Software	Research man. system	Deposit method	Mention third-party repositories	DOIs	Research collection policy	Guidance on sharing data and software	Open access policy
University of New South Wales	<a href="#">new UNSWorks platform</a>	Journal articles, books and book chapters, NTROs, published research data, code, software, and images found in UNSWorks <sup>167</sup>	DSpace 7	Unknown (Research Outputs System) <sup>168</sup>	Unknown <sup>169</sup>	Yes - data <sup>170</sup> and Data Publishing Guide <sup>171</sup>	Yes for data	None found	Yes in OA policy <sup>172</sup>	Yes <sup>173</sup>
	Dryad (institutional access) <sup>166</sup>	Data	Dryad							
University of Newcastle	<a href="#">NOVA</a>	Scholarly and research publications, theses and data <sup>174</sup>	Vital	Newcastle University Research Outputs (NURO) – possibly Elements <sup>175</sup>	Via email or form <sup>176</sup>	Data sharing suggestions include ADA and Dryad <sup>177</sup>	Data, software, reports, newsletters and more <sup>178</sup>	Unknown	Data <sup>179</sup>	Open access guideline <sup>180</sup>
University of Notre Dame Australia	<a href="#">ResearchOnline@ND</a>	Research outputs, theses, other outputs such as unpublished conference papers and edited books <sup>181</sup>	Digital Commons /bepress	Integrated Research Management Application <sup>182</sup>	Via IRMA <sup>183</sup>	Suggests sharing in IR or “similar platform” <sup>184</sup>	For data <sup>185</sup>	None found	Data <sup>186</sup>	None found
University of Queensland	<a href="#">UQ eSpace</a>	Wide <sup>187</sup> includes data	Custom in-house <sup>188 189</sup>	UQ eSpace (custom in-house) <sup>190</sup>	Via eSpace <sup>191</sup>	Yes - data <sup>192</sup>	For many research outputs <sup>193</sup>  DOI auto-generated when push dataset from <a href="#">UQRDM</a> to UQ eSpace	Yes <sup>194</sup>	Yes - data <sup>195</sup> Data deposit licence <sup>196</sup>	Yes <sup>197</sup>
University of South Australia	<a href="#">Research Outputs Repository</a>	Article, chapter, book, conference paper, patent, creative works, reports	Primo	Unknown <sup>199</sup>	Unknown (staff login required) <sup>200</sup>	None found	For data <sup>201</sup>	Unknown	Data <sup>202</sup>	Open access policy <sup>203</sup>
	<a href="#">UniSA Research Data Access Portal</a>	Research collections and datasets <sup>198</sup>	Unknown							

## Curtin Library Repositories Project – Research Report

University	IRs	Research outputs collected	IR Software	Research man. system	Deposit method	Mention third-party repositories	DOIs	Research collection policy	Guidance on sharing data and software	Open access policy
<b>University of Southern Queensland</b>	<a href="#">USQ ePrints</a>	'books and book chapters; journal, magazine and blog articles and webpages; conference and workshop presentations; papers, posters and slides; research, professional and project reports; software, patents and trademarks; creative works; research data records (metadata only)' and theses <sup>204</sup>	EPrints 3.3.16	Unknown	Unknown (staff login required) <sup>205</sup>	Unknown (eResearch support materials for USQ staff and students only) <sup>206</sup>	Unknown (eResearch support materials for USQ staff and students only) <sup>207</sup>	User guide <sup>208</sup>	Unknown (eResearch support materials for USQ staff and students only) <sup>209</sup>	None found
<b>University of Sydney</b>	<a href="#">Sydney eScholarship Repository</a>	Journal articles, theses, conference papers, books, book chapters, interviews, exhibitions, artwork, research reports, datasets, journals <sup>210</sup>	DSpace 6.3	Unknown	Via DSpace <sup>211</sup>	Suggests generalist and disciplinary repositories <sup>212</sup>	Data, software, theses, previous unpublished items <sup>213</sup>	Sydney eScholarship Guidelines <sup>214</sup>	Data publication guide <sup>215</sup> Can add metadata only records for data to IR <sup>216</sup>	Open Access Policy <sup>217</sup>
<b>University of Tasmania</b>	<a href="#">Open Access Repository (OAR)</a>  <a href="#">eCite RODA Server</a> (Research Output Digital Assets)  <a href="#">Research Data Portal</a> <sup>218</sup>	ERA-eligible research outputs, theses, grey literature <sup>219</sup>  ERA research outputs prior to 2017 <sup>220</sup>  Data	EPrints 3.3.14  Custom – Oracle  Unknown	Unknown (Web Access Research Portal)	Via WARP for ERA-eligible outputs, submitted by research output officers; <sup>221</sup> via EPrints for grey literature <sup>222</sup>	Researchers can use other repositories for data, but should save metadata to the Research Data Portal <sup>223</sup>	Research data, grey literature & NTROs <sup>224</sup>	LibGuide <sup>225</sup>	Data <sup>226</sup>	Open Access Procedure <sup>227</sup>
<b>University of Technology Sydney</b>	<a href="#">OPUS</a>  <a href="#">UTS Research Data Portal</a> (no recent datasets)	ERA types & other scholarly works <sup>228</sup>  Data	DSpace  Oni <sup>229</sup>	Elements	Via Elements <sup>230</sup>	OERs <sup>231</sup>  data <sup>232</sup>	Stash for data <sup>233</sup>	Guidance in LibGuide <sup>234</sup>	Data <sup>235</sup>	Yes <sup>236</sup>

## Curtin Library Repositories Project – Research Report

University	IRs	Research outputs collected	IR Software	Research man. system	Deposit method	Mention third-party repositories	DOIs	Research collection policy	Guidance on sharing data and software	Open access policy
<b>University of the Sunshine Coast</b>	<a href="#">USC Research Bank</a>	Over 60 research output types/subtypes <sup>237</sup>	Esploro	unknown	Via IR or email <sup>238</sup>	Not found	Data <sup>239</sup>	Guidance in LibGuide <sup>240</sup>	Data <sup>241</sup>	None found
<b>University of Western Australia</b>	<a href="#">UWA Profiles and Research Repository</a>	IR contains 50 types of research outputs <sup>242</sup>	Pure	Pure	Via IR, some auto-added <sup>243</sup>	Yes, and can import dataset metadata from other repositories to UWA IR <sup>244</sup>	Data <sup>245</sup>	None found	Yes <sup>246</sup>	None found
<b>University of Wollongong</b>	<a href="#">Research Online</a>	Journal articles, hosted journals, theses, data	Digital Commons /bepress	Elements	Via email to library <sup>247</sup>	Not found	Not found	Not found	Not found	Open Access Policy <sup>248</sup>
<b>Victoria University</b>	<a href="#">Victoria University Research Repository</a>	Journal articles, conference papers, books and book chapters, theses, working papers, reports, discussion papers, scholarly journals published by VU <sup>249</sup>	EPrints 3.4.0	Elements	Via Elements	Suggests that researchers find generalist and discipline-specific repositories <sup>250</sup>	For data and grey literature <sup>251</sup>	Research Repository Open Access Policy <sup>252</sup> and Procedure <sup>253</sup>	Data <sup>254</sup>	Research Repository Open Access Policy <sup>255</sup> and Procedure <sup>256</sup>
<b>Western Sydney University</b>	<a href="#">Western Sydney University ResearchDirect</a>	Research outputs, theses, conference papers, research data, patents and non-reportable published research outputs <sup>257</sup>	Islandora/Drupal 7	Unknown	Via form with library verification <sup>258</sup>	Suggests where to find accredited repositories <sup>259</sup>	For data, grey literature and WSU hosted conference proceedings <sup>260</sup>	ResearchDirect Guidelines <sup>261</sup>	Data <sup>262</sup>	None found

## Curtin Library Repositories Project – Research Report

- 1 <https://www.caul.edu.au/about-caul/members/all>
- 2 <https://library.acu.edu.au/research/publish/deposit-into-research-bank>
- 3 <https://library.acu.edu.au/research/publish/isbn-allocation-and-doi-minting>
- 4 <https://library.acu.edu.au/research/research-data-management-toolkit/publish-and-archive/publish-your-data>
- 5 <https://policies.acu.edu.au/library/open-access-for-acu-research>
- 6 <https://openresearch.anu.edu.au/contribute-your-research>
- 7 <https://services.anu.edu.au/information-technology/software-systems/pure-research-management>
- 8 [https://openresearch.anu.edu.au/files/guidance/Submitting to Open Research repository 2021 1.pdf](https://openresearch.anu.edu.au/files/guidance/Submitting%20to%20Open%20Research%20repository%202021%201.pdf)
- 9 [https://openresearch.anu.edu.au/files/guidance/Submitting to Data Commons repository.pdf](https://openresearch.anu.edu.au/files/guidance/Submitting%20to%20Data%20Commons%20repository.pdf)
- 10 [https://policies.anu.edu.au/ppi/document/ANUP\\_008803](https://policies.anu.edu.au/ppi/document/ANUP_008803)
- 11 <https://anulib.anu.edu.au/research-learn/research-data-management>
- 12 [https://policies.anu.edu.au/ppi/document/ANUP\\_008802](https://policies.anu.edu.au/ppi/document/ANUP_008802)
- 13 <https://library.bond.edu.au/help-support/scholarly-publishing-open-access>
- 14 <https://research.bond.edu.au/en/publications/>
- 15 <https://library.bond.edu.au/files/963/USP104.pdf>
- 16 <https://bond.libguides.com/research-data-management/research-data-management-toolkit/sharing-data>
- 17 <https://research.bond.edu.au/en/datasets/>
- 18 <https://bond.edu.au/files/2529/TLR512.pdf>
- 19 <https://bond.libguides.com/research-data-management>
- 20 <https://library.bond.edu.au/files/963/USP104.pdf>
- 21 <https://researchers.cdu.edu.au/en/publications/>
- 22 <https://libguides.cdu.edu.au/c.php?g=946290&p=6860833>
- 23 <https://charlesdarwinuni.sharepoint.com/sites/ORICDUConnectContentPages/SitePages/Research-Data-Management.aspx>
- 24 <https://policies.cdu.edu.au/view-current.php?id=96>
- 25 <https://researchoutput.csu.edu.au/en/publications/>
- 26 <https://research.csu.edu.au/performance/csu-research-output-cro/guidelines>
- 27 <https://researchoutput.csu.edu.au/en/datasets/>
- 28 <https://research.csu.edu.au/performance/csu-research-output-cro/guidelines>
- 29 <https://policy.csu.edu.au/view-current.php?id=00328>
- 30 <https://research.csu.edu.au/performance/csu-research-output-cro/guidelines>
- 31 <https://acquire.cqu.edu.au/search>
- 32 <https://libguides.library.cqu.edu.au/aCQUIRe>
- 33 <https://www.cqu.edu.au/eresearch/data-services/australian-and-international-data-portals>
- 34 <https://libguides.library.cqu.edu.au/c.php?g=761037&p=5456900>
- 35 <https://libguides.library.cqu.edu.au/c.php?g=761037&p=5456900> and
- 36 <https://libguides.library.cqu.edu.au/c.php?g=927758&p=6701932>
- 37 [https://www.cqu.edu.au/\\_data/assets/pdf\\_file/0020/240473/Open-Access-for-Research-Outputs-Policy.pdf](https://www.cqu.edu.au/_data/assets/pdf_file/0020/240473/Open-Access-for-Research-Outputs-Policy.pdf)
- 37 [Data and software are stored on Curtin's DDFE server \(with metadata in RDA\) https://www.curtin.edu.au/library/about/research-data-collection/](https://www.curtin.edu.au/library/about/research-data-collection/)
- 38 <https://libguides.library.curtin.edu.au/c.php?g=843592&p=6154513>
- 39 <https://www.curtin.edu.au/library/about/research-data-collection/>
- 40 <https://libguides.library.curtin.edu.au/c.php?g=941541&p=6816645>
- 41 <https://libguides.library.curtin.edu.au/c.php?g=941541&p=6816645> (see Research Data tab)
- 42 <https://libguides.library.curtin.edu.au/c.php?g=941541&p=6827384>
- 43 <https://libguides.library.curtin.edu.au/c.php?g=843592&p=6154513>
- 44 <https://www.curtin.edu.au/library/about/research-data-collection/>
- 45 <https://libguides.library.curtin.edu.au/c.php?g=202401&p=1333346> and
- 46 <https://libguides.library.curtin.edu.au/c.php?g=941541&p=6816645>
- 46 <https://library.curtin.edu.au/wp-content/uploads/2017/06/Open-access-guidance-document.pdf>
- 47 <https://www.deakin.edu.au/library/dro/depositing-research>
- 48 <https://www.deakin.edu.au/library/dro/depositing-research>
- 49 <https://www.deakin.edu.au/library/research/manage-data/share/where-should-i-publish-my-data>
- 50 <https://www.deakin.edu.au/library/research/manage-data/share/where-should-i-publish-my-data>
- 51 <https://policy.deakin.edu.au/download.php?id=212&version=1>
- 52 <https://www.deakin.edu.au/library/research/manage-data/share/where-should-i-publish-my-data>
- 53 <https://ro.ecu.edu.au/faq.html#faq-5>
- 54 <https://ro.ecu.edu.au/faq.html#faq-7>
- 55 <https://ecu.au.libguides.com/research-data-management/publish-data>
- 56 <https://ecu.au.libguides.com/research-data-management/publish-data>
- 57 <https://ro.ecu.edu.au/faq.html#faq-5>
- 58 <https://ecu.au.libguides.com/research-data-management/publish-data>
- 59 <https://libguides.federation.edu.au/c.php?g=816723&p=5829222>
- 60 <https://federation.edu.au/research/internal/research-data-and-tools/irma>
- 61 <https://researchonline.federation.edu.au/vital/access/manager/Index>
- 62 <https://libguides.federation.edu.au/c.php?g=816723&p=5965085>
- 63 <https://libguides.federation.edu.au/c.php?g=816723&p=5965085>
- 64 <https://libguides.federation.edu.au/c.php?g=816723&p=5829222>
- 65 <https://libguides.federation.edu.au/c.php?g=816723&p=5829221>
- 66 <https://library.flinders.edu.au/open/platforms>
- 67 <https://staff.flinders.edu.au/content/dam/staff/research/researchnow/ResearchNow%20Overview.pdf>
- 68 <https://staff.flinders.edu.au/content/dam/staff/research/researchnow/ResearchNow%20Overview.pdf>
- 69 <https://help.figshare.com/article/how-to-upload-and-publish-your-data>
- 70 <https://help.figshare.com/section/user-guides>
- 71 <https://www.flinders.edu.au/policies#research>

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