Assessment Information

[CoreTrustSeal Requirements 2017–2019](#)

Repository: UCD Digital Library
Website: https://digital.ucd.ie
Certification Date: 01 June 2020

This repository is owned by: **University College Dublin**

UCD Digital Library

Notes Before Completing the Application

We have read and understood the notes concerning our application submission.

True

CORE TRUSTWORTHY DATA REPOSITORIES REQUIREMENTS

Background & General Guidance

Glossary of Terms

BACKGROUND INFORMATION

Context

R0. Please provide context for your repository.

Repository Type. Select all relevant types from:

Domain or subject-based repository, Library/Museum/Archives, Research project repository

Brief Description of Repository

UCD Digital Library is a sustainable, institutionally embedded digital repository for cultural heritage, digital scholarship and research data from within University College Dublin and from external partners.

Brief Description of the Repository's Designated Community.

UCD Digital Library's primary designated community, as identified in its mission statement, is "the University College Dublin community, as well as its collaborators and partners", with the general public identified and acknowledged as the secondary community. The known audience for its services is international and extraordinarily diverse.

The top countries from which users visited the UCD Digital Library within the previous 12 months include: Ireland (62.5%), United Kingdom (11.4%), United States of America (11%), Australia (2%), Spain (1.5%), Canada (1.3%), Germany (1%), France (1%), Italy (<1%), and India (<1%). A further 73 countries and territories are recorded as having 10 or more users visit the UCD Digital Library user interface.

Digital collections within the repository are tailored for a specific discipline as they are being curated and described, often using additional domain-specific descriptive standards, vocabularies, data visualizations, and by supplying the data in accepted and relevant data formats.

To date, the following communities have been targeted:

• Political and social history researchers
• Architectural historians and urban planners

- English language and literature researchers
- Irish language and literature researchers
- Irish folklore and ethnographic researchers
- Social and cultural anthropology researchers
- History of education, policing, nursing and medicine researchers
- Roman Classical scholars

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

Level of Curation Performed. Select all relevant types from:

C. Enhanced curation – e.g. conversion to new formats; enhancement of documentation

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

Comments

Reviewer Entry

Reviewer 1

Comments:

Reviewer 2

Comments:

Outsource Partners. If applicable, please list them.

As part of University College Dublin, the UCD Digital Library has wide variety of internal partners within UCD, including its main cultural heritage Data Providers:

• UCD Archives;

• UCD Special Collections;

• National Folklore Collection at UCD;

• UCD Library Research Services;

• UCD Library Outreach;

• UCD Library Administration;

• Library IT Services (LITS);

• UCD Corporate and Legal Affairs;

• UCD Research;

• UCD Research Ethics office;

• UCD Information Compliance Manager;

• UCD Data Protection Officer;

• Research IT at UCD IT Services.

The UCD Digital Library makes use of a range of external contractual and community services that support and add value. These are utilised at various points in the workflow. Where applicable, these are referenced on the technical infrastructure diagram, available through UCD Digital Library web page About section and directly at https://digital.ucd.ie/img/ucd/UCD_DL_architecture_general_2015-11-24.png.

With reference to the technical infrastructure diagram, at the WebApp, API, and Service layers:

• We are active contributors and members of the IIIF community;

• A data service provided by Cookie-Script.com enables GDPR cookie compliance;

• Location services by CARTO and Mapbox enable geo-spatial visualization of the digital collections;

At the Repository layer:

• We benefit from the support of the Fedora-Commons community;

• Services provided by DataCite and the California Digital Library (EZID) enable assignment of persistent identifiers (DOIs and ARKs, respectively);

• The services of ORCID are embedded in the metadata for researchers, when available.

At the Data Storage layer:

• Infrastructure services are supported within University College Dublin inter-departmentally;

• The main production-level storage in AWS (Amazon Web Services) is brokered through DNM Group (a private company contracted by UCD);

• UCD IT Services provide local Netapp SAN storage for production data backups, which are also replicated in Amazon S3 and archived in Amazon Glacier;

• Lyrasis DuraSpace (utilizing DuraCloud) provides complementary capacity for periodically assuring data integrity and providing an offsite mechanism for backup and recovery of data in case of a local disaster.

The relationship with the commercial vendors and services is contractual and is supported in each case by a specific Service Level Agreement associated with the contract. The technical services are described in more detail in connection with R15. Technical infrastructure.

We are involved in a number of aggregator and exhibition partnerships:
• Europeana, https://www.europeana.eu/en;
• Datacite, https://datacite.org/;
• re3data, https://www.re3data.org/repository/r3d100010742;
• ARTStor, https://library.artstor.org;
• nomisma.org, http://nomisma.org/id/ucd;
• Google Arts and Culture Platform, https://artsandculture.google.com/

We also benefit from the following Consortium Membership:
• Digital Preservation Coalition (DPC), https://www.dpconline.org/;
• Consortium of National & University Libraries (CONUL) (through UCD Library), http://www.conul.ie/;
• Irish Universities Association (IUA) (through UCD Library), https://www.iua.ie/;
• LIR HEAnet User Group for Libraries (through UCD Library), https://lirgroup.heanet.ie/.

Other Relevant Information.

The University College Dublin Digital Library (UCD Digital Library) was established with project funding from the Irish Higher Education Authority's (HEA) Programme for Research in Third-Level Institutions (PRTLI) between January 2005 and December 2009. A specific objective of the project was to demonstrate proof of concept for a Trusted Digital Repository for cultural heritage resources and for research associated with Irish cultural heritage, including historical and newly created qualitative data.

Originally identified as the "Irish Virtual Research Library and Archive," the IVRLA was inaugurated in 2005, and was administered and developed by the Library of University College Dublin (UCD Library). Once the external funding cycle had concluded, in January 2010, the IVRLA began a second phase of development as a sustainable, institutionally embedded research infrastructure supported by the UCD Library. The transition was enabled through a large-scale re-organisation of UCD Library that positioned repository and digital services support in a newly formed Research Services unit. During this second stage of development supporting technologies were updated and support for the

preservation remit of the IVRLA more fully developed. In May 2012 the IVRLA was rebranded and re-launched as the "UCD Digital Library".

The UCD Digital Library has a current staffing capacity of six people – two directors and four operational staff, who are funded as part of the UCD Library operational budget.

The holdings now stand at 96 digital collections, consisting of over 851,565 distinct digital objects, plus supporting metadata. The collections are from 28 separate partners and collaborators, including those external to University College Dublin, and some have been externally funded. UCD Digital Library holdings have also been exported to Europeana, ARTstor, nomisma.org, and DataCite.

The yearly online visitor rate has been increasing by 22% each year for the past two academic years (September to August) (calculated on 2019-10-24 using Google Analytics data).

UCD Digital Library tracks user metrics using Google Analytics and Matomo, and performance metrics using New Relic and other transactional logs. There is also a test instance of Altmetrics (see link in documentation) which is embedded in some of the collections to track digital object and collection level online impact. This quantitative data is used in regular reports to the Data Producers and UCD Library Management, which is, in turn, fed up to the University Management Team as part of an annual report from the University Librarian. Qualitative data is gathered through the email queries and requests for image re-use in publications, as well as collating references to digital collections within media coverage, stored in an in-house 'press cuttings file'.

The re3data records can be found at https://www.re3data.org/repository/r3d100010742

In addition to the outsourced partners and the external aggregator services listed above, UCD Digital Library is also an associate member of the Digital Preservation Coalition.
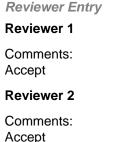
LINKS TO DOCUMENTATION

UCD Digital Library, About the UCD Digital Library & Repository: https://digital.ucd.ie/about/ (accessed 2019-10-24)

UCD Digital Library, Services: https://digital.ucd.ie/research/ (accessed 2019-10-24).

UCD Digital library re3data record: https://www.re3data.org/repository/r3d100010742 (accessed 2019-10-24).

Altmetrics example: Dublin Metropolitan Police (DMP) Prisoners' Books: https://doi.org/10.7925/drs1.ucdlib_43945

UCD Digital Library Technical Infrastructure: https://digital.ucd.ie/img/ucd/UCD_DL_architecture_general_2015-11-24.png

ORGANIZATIONAL INFRASTRUCTURE

I. Mission/Scope

R1. The repository has an explicit mission to provide access to and preserve data in its domain.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Response:

The UCD Digital Library mission statement is publicly available and reads: "The Mission of the UCD Digital Library is to capture, curate, and manage digital cultural resources and research outputs of the University College Dublin community as well as its collaborators and partners, to preserve and sustain the usability of these assets, and to enable their broad dissemination."

Its mission is enacted under the authority of University College Dublin, and realized through the supporting activities of the Research Services unit of UCD Library, as well as the technical infrastructure which it supports and develops. It is further supported by the UCD Library administration; with additional IT support provided by the Research IT division of UCD IT Services; and support for contractual, legal and regulatory concerns is provided by UCD Corporate and Legal Affairs.

The mission statement is also reflected in the mission statement and vision of UCD Library, which states its mission as

"To organise and support the University's information to inspire engagement and learning, to enable its use in promoting research and innovation, and to contribute to the preservation of Irish cultural heritage resources." This is further echoed in the vision statement, which posits itself as "A world class research library with a global reach, providing a welcoming and inclusive environment for learning, collaboration, knowledge creation and community. As partners in education and research and leaders in developing, managing and preserving library collections and providing information services, we will leverage technology and staff expertise to ensure the University's success in achievement of its mission and objectives."

LINKS TO DOCUMENTATION

UCD Digital Library, About the UCD Digital Library & Repository: https://digital.ucd.ie/about/ (accessed 2019-10-24).

UCD Digital Library, Services: https://digital.ucd.ie/research/ (accessed 2019-10-24).

UCD Library, Mission and Vision Statements: https://www.ucd.ie/library/contact/strategy/ (accessed 2019-10-24).

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

II. Licenses

R2. The repository maintains all applicable licenses covering data access and use and monitors compliance.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository

Response:

UCD Library and its constituent units function as an administrative unit of University College Dublin. Agreements for deposit of data are therefore made between Depositors and University College Dublin. The content published on the UCD Digital Library platform are digital surrogates representing authentic copies of analogue and digital originals, and their use is governed by the terms and conditions prescribed by the parent repository or required by its extant deposit agreements, collection procedures or acquisition policies.

Conditions of use of the material are determined by the Depositor and articulated in rights statements embedded in MODS metadata. These statements may include a waiver of rights by the Data Producer under the Creative Commons CC0 license; they may also include an explicit Creative Commons end-user license. Where restrictions are imposed under the license agreement, the terms of use are described explicitly in statements in the descriptive metadata that are exposed to users. In addition, all digital objects include a rights metadata file asset; these documents instantiate rights information in machine-readable format that can be mapped to repository security policies to enable online access management.

As most data residing within the UCD Digital Library is made available on an Open Access basis, with license agreements in the descriptive metadata, Data Consumers are not generally asked to complete an end-user license. For the small number of digital objects to which access is restricted, users are asked to complete a registration form that requests access to resources; upon approval, users details are added to local Access Control Lists which enables access to the specified content.

Copyright of all the descriptive and other metadata elements, including their arrangement and presentation, rests, unless otherwise stated, with the UCD Digital Library, in particular, and University College Dublin, in general. Metadata is licensed under the CC BY-SA 4.0 license.

In addition, a general Terms and Conditions of Use webpage (https://digital.ucd.ie/terms/) provides further information that applies to use of the data within the repository, and General Data Protection Regulation (GDPR) compliance, particularly in relation to usage statistics and cookie use.

Non-conformance to the terms of use could result in action being taken at the discretion of the Data Depositor with an ownership interest, and may include legal action against the user.

Data Producers are responsible for compliance with any pertinent legal regulations in the area where the data is collected, whether within the Republic of Ireland or elsewhere. Depositors agree to this requirement and accept responsibility for compliance in concluding the Memorandum of Understanding drawn up for each external Data Depositor, in alignment with the UCD Digital Library Collection Development Policy.

LINKS TO DOCUMENTATION

UCD Digital Library, Terms and Conditions of Use: https://digital.ucd.ie/terms/ (accessed 2019-10-18).

UCD Digital Library, Publications (Collection Development Policy): https://digital.ucd.ie/publications/ (accessed 2019-10-24).

UCD Digital Library, Memorandum of Understanding for external Data Depositors: https://digital.ucd.ie/docs/UCDDL_MoU_template_2015.pdf (accessed 2019-10-24).

Copyright and Other Intellectual Property Law Provisions Act 2019: http://www.irishstatutebook.ie/eli/2019/act/19/enacted/en/html (accessed 2019-10-24).

Data Protection is regulated via the Irish Data Protection Act 2018 http://www.irishstatutebook.ie/eli/2018/act/7/enacted/en/html (accessed 2019-10-24).

Creative Commons Licenses: https://creativecommons.org/ (accessed 2019-10-24).

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

III. Continuity of access

R3. The repository has a continuity plan to ensure ongoing access to and preservation of its holdings.

Compliance Level:

3 – The repository is in the implementation phase

Reviewer Entry

Reviewer 1

Comments:
3 – The repository is in the implementation phase

Reviewer 2

Comments:
3 – The repository is in the implementation phase

Response:

FUNDING

UCD Digital Library is a fully sustainable repository, embedded institutionally within UCD Library, and its parent, University College Dublin. UCD Digital Library is operationally funded through the normal activities of UCD Library, within the framework of the Irish higher education sector. The funding model for UCD Library, and University College Dublin is explored in more detail in R.5 Organizational Infrastructure, and includes exchequer funding, as well as research and Cultural Heritage grants, and monies raised through operational activities. The UCD Library's strategic plan (https://www.ucd.ie/library/contact/strategy) contains a written commitment to the long-term availability and preservation of digital Cultural Heritage and research collections. This strategic plan is an assurance to the internal and external Data Providers to UCD.

The institutional risk for the UCD Digital Library is considered low, notwithstanding the usual risks to University operations.

DATA

Responsibility for both access to and preservation of the collections on the UCD Digital Library platform rests with the UCD Digital Library in perpetuity, and is supported by its operational policies and procedures.

All data, including preservation files, metadata and surrogates, is replicated across the various storage and backup solutions. All Data Providers, both internal and external to UCD, also maintain a copy of their own data and are encouraged to factor their data into collection retention policies and disaster plans. UCD Digital Library is not the sole custodian of the data.

Digital objects in UCD Digital Library are assigned DOI or ARK persistent identifiers to ensure long-term findability and to facilitate the ability to cite the data in published research.

IT INFRASTRUCTURE

UCD Digital Library services supported by UCD ITS have Service Level Agreements in place, guaranteeing a level of continuity of service and recovery. The services also fall under the auspices of the UCD ITS Disaster Recovery Policy. https://www.ucd.ie/itservices/t4media/IT%20Services%20Disaster%20Recovery%20Policy-1.pdf

UCD Digital Library services provided by external vendors also fall under the relevant Service Level Agreements.

All storage solutions for the UCD Digital Library have built-in redundancy and recovery solutions, as per the contractual agreements.

COMPLETE CESSATION OF ACTIVITY

Insofar as UCD Digital Library is an integral service of the Library of University College Dublin, and is a key infrastructure serving the University's strategic objectives, as outlined within the UCD Strategy 2020-2024 plan, a cessation of operations is not deemed likely. In the unlikely case that unforeseen circumstances cause the cessation of operations, UCD Library administration would seek, in the first order, to re-position the operations of UCD Digital Library within an appropriate, alternative administrative unit of the University, thereby maintaining all aspects of ownership of assets or formal agreements with external depositors.

Should an internal relocation of the service not be possible, UCD Library would seek to relocate UCD's data assets to a suitable third-party repository. As this possible outcome is not perceived to be a near-future situation, formal agreements to support this change in curatorial responsibility have not been reached but could include other Cultural Heritage institutions or indeed, a commercial partner. It would also seek permission of external Data Providers whose data has been deposited with UCD Digital Library to transfer these data to the same new repository, or would otherwise make available all data and metadata representing that party's holdings directly to them, as assured within the Memorandum of Understanding signed by all external Data Providers.

LINKS TO DOCUMENTATION

UCD Library, Mission and Vision Statements: https://www.ucd.ie/library/contact/strategy/ (accessed 2019-10-24).

UCD ITS Disaster Recovery Policy.
https://www.ucd.ie/itservices/t4media/IT%20Services%20Disaster%20Recovery%20Policy-1.pdf (accessed 2019-10-24).

Reviewer Entry

Reviewer 1

Comments:
In the future, it is expected that a formal agreement will be reached with a third party repository to take over and ensure the ongoing access and preservation of UCD Digital Library holdings in case of a cessation of activity at UCD.

Reviewer 2

Comments:
Accept

IV. Confidentiality/Ethics

R4. The repository ensures, to the extent possible, that data are created, curated, accessed, and used in compliance with disciplinary and ethical norms.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository

Response:

As most data residing within the UCD Digital Library does not include personal and/or sensitive data under the protection of the General Data Protection Regulation (GDPR), it is made available on an Open Access basis, and data consumers are not asked to complete an end user license. Such data is made available under the appropriate intellectual property rights legislation and is assigned reuse licenses or is made available as Public Domain material. This material is adequately described under R2. Licenses.

Where data does contain personal and/or sensitive data, the Data Depositors are responsible for compliance with any pertinent legal regulations in the area where the data is collected, whether within the Republic of Ireland or elsewhere. Depositors agree to this requirement and accept responsibility for compliance in concluding the Memorandum of Understanding for external Data Depositors, with collections only being accepted if aligned with the Collection Development Policy.

Access to collections that contain personal and/or sensitive data is restricted, and users wishing to use this data are asked to complete a registration form requesting access to the resources. Approval is governed by the Data Depositor, and if granted, user details are added to local Access Control Lists, managed by UCD Digital Library. Users are invited to return to the UCD Digital Library, where they can then login to the resource, using one of the authentication routes, such as: Edugate, Google OAuth and OpenID Connect. User logins are non-transferrable.

The Irish Data Protection Commissioner provides guidelines for Personal Data Security Breach Code of Practice applicable to all Data Providers. It is the responsibility of the Data Provider, as indicated in the Memorandum of Understanding, to assure that in approving access to data that appropriate steps have been taken to protect the rights of individuals. End-users of data are advised of specific terms of use of restricted resources in the registration form that must be completed to access such materials.

Non-conformance to terms of use, which apply to these restricted access resources, would result in termination of access to such resources; additional actions to be taken would be left to the discretion of the Data Depositor of the resources in question, and may include legal action against the user.

Both the Access Control Lists and the restricted material are stored on secure servers, further described under R15. Technical Infrastructure and R.16 Security.

Staff involved with transactions with Data Providers and Data Consumers are oriented to issues relative to the nature of both qualitative and quantitative survey and other demographic and ethnographic data, as well as anonymised microdata, and conditions governing their use. This is achieved through a variety of available general in-house training options, and face-to-face meetings, on topics such as GDPR and ethics, with training by the UCD Centre for Ethics in Public Life, and the Office of the Data Protection Officer (UCD). External training has been undertaken online (by webinar and through MOOCs), as well as in-person, in the areas of copyright, GDPR, and ethics, facilitated by the national training branches of LIR HEAnet User Group for Libraries, The Academic and National Library Training Cooperative (ANLTC), the Library Association of Ireland (LAI), Archives and Records Association, Ireland (ARA), and the Digital Repository of Ireland.

LINKS TO DOCUMENTATION

UCD Digital Library, Terms and Conditions of Use: https://digital.ucd.ie/terms/ (accessed 2019-10-18)

UCD Digital Library, Publications (Collection Development Policy): https://digital.ucd.ie/publications/ (accessed 2019-10-24).

UCD Digital Library, Memorandum of Understanding for external Data Depositors: https://digital.ucd.ie/docs/UCDDL_MoU_template_2015.pdf (accessed 2019-10-24).

Personal Data Security Breach Code of Practice: https://www.dataprotection.ie/sites/default/files/uploads/2019-08/190812%20GDPR%20Breach%20Notification%20Quick%20Guide.pdf (accessed 2019-10-24).

Data Protection is regulated via the Irish Data Protection Act 2018 http://www.irishstatutebook.ie/eli/2018/act/7/enacted/en/html (accessed 2019-10-24).

UCD GDPR resource: https://www.ucd.ie/gdpr/about/gdpr/

LIR HEAnet User Group for Libraries, https://lirgroup.heanet.ie/

The Academic and National Library Training Cooperative (ANLTC), now the CONUL Training and Development sub-committee, http://www.conul.ie/training-development/

Digital Repository of Ireland (DRI), https://www.dri.ie/

Reviewer Entry
Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

V. Organizational infrastructure

R5. The repository has adequate funding and sufficient numbers of qualified staff managed through a clear system of governance to effectively carry out the mission.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository

Response:

UCD Digital Library is administered by UCD Library, part of University College Dublin (UCD). UCD is a member of the National University of Ireland (NUI), a federal university that serves the interests of the member institutions by providing services to them and to their graduates, as well as undertaking activities related to scholarship, the advancement of higher education and the cultural and intellectual life of Ireland. The National University of Ireland currently comprises four Constituent Universities, and a range of other member institutions.

UCD was founded in 1854, is currently ranked within the top 1% of higher education institutions world-wide. UCD is also Ireland's largest and most globally engaged university with over 30,000 students drawn from over 139 countries. UCD receives funding as academic fees from the Department of Education and Skills, as well as state grants, research grants, commercial interests, and other associated income. The budget cycle runs yearly from October to September, although the University does engage in longer term cycles of 3 or 5 years, as required and in response to the economic landscape.

UCD Library is governed by Academic Affairs, headed by the University Registrar, and is overseen by the Library Strategy Group. UCD Library is funded by the University through the Registrar's office, as well as through operational activities and

awarded research and Cultural Heritage grants.The UCD Library budget cycle aligns with the University cycle.

UCD Library administers UCD Digital Library, as well as some of its partnering Cultural Heritage repositories, such as UCD Special Collections, UCD Archives, and the National Folklore Collection, UCD (which has been inscribed in the UNESCO Memory of the World Register).

UCD Digital Library is funded through the annual operational budget of UCD Library, which is apportioned from the operational budget of University College Dublin, as described above. In addition to the operational budget from UCD Library, UCD Digital Library also receives occasional research grants to support specified activities, such as external digitisation. Operational costs include staff salaries, training, equipment and software, storage and preservation, affiliation membership, and certification.

The UCD Digital Library is directed by the University Librarian and the Head of Research Services. The operational team is overseen by the Digital Library Manager, and is also comprised of the Metadata Librarian, Digital Services Programmer, and Digital Library Assistant. Three members of the operational team are full-time (Digital Library Manager, Metadata Librarian, and Digital Services Programmer), with the Digital Library Assistant working 80% of their time on the UCD Digital Library. All four members are permanent.

All six members of the UCD Digital Library comprise the membership of the various operational sub-groups, including the Digital Library Steering Committee, which oversees strategic matters in relation to the UCD Digital Library; as well as the Digital Library Metadata Sub-Group; the Digital Library Technical Sub-Group; and the Digital Library Geospatial Information Sub-Group. External members and expertise are brought in, as needed.

The range of expertise and experience by the various members of the UCD Digital Library is extensive. All six members are qualified library and information professionals; with the Digital Library Manager holding a specialist degree in Digital Libraries; and the Digital Library Programmer holding multiple technology degrees. Current operational staff members have project, information and data management skills, regulatory and legal compliance skills, digitisation and descriptive metadata skills, IT and programming skills, as well as customer relations skills. Further information about the team can be found on the About page (https://digital.ucd.ie/about/).

Continuing Professional Development (CPD) is actively encouraged, and the UCD Digital Library team regularly attends training and discipline specific conferences, for example:
• Preservation and Archiving Special Interest Group (PASIG) - a vendor-neutral forum on how to put preservation and archiving into practice
• Open Repositories - a practitioner based conference that brings together people from higher education, government, libraries, archives and museums to explore the challenges faced by preservation and access communities
• International Digital Curation Conference (IDCC) - an event for the digital curation community and data practitioners across all disciplines and domains to discuss policy and practice, including data preservation
• International Association of Sound and Audiovisual Archives (IASA) - annual conference for audio-visual archivists covering the care, access and long-term preservation of sound and moving image collections (UCD Digital Library has

growing collections of AV material)

• International Image Interoperability Framework (IIIF) conference and events - a technical conference aimed at a wide range of participants including digital image repository managers, content curators, software developers, cultural heritage institutions, software firms, and other organizations working with digital images and audio/visual materials. UCD Digital Library utilises IIIF and is an active member of the IIIF community.

• Digital Humanities at Oxford Summer School (DHOxSS) - offers training in the Digital Humanities and related fields, including topics relevant to data curation such as linked data, TEI, data analysis, machine learning, and digital cultural heritage

Training is possible through dedicated conference allowances for the Digital Library Manager, Metadata Librarian, and Digital Services Programmer, and the UCD Library training budget for the Digital Library Assistant.

LINKS TO DOCUMENTATION

National University of Ireland: http://www.nui.ie/about/ (accessed 2019-10-24).

UCD Special Collections: https://www.ucd.ie/specialcollections/ (accessed 2019-10-24).

National Folklore Collection: https://www.ucd.ie/folklore/ (accessed 2019-10-24).

UCD Archives: https://www.ucd.ie/archives/ (accessed 2019-10-24).

UCD Digital Library team, Administrative Information: https://digital.ucd.ie/about/ (accessed 2019-10-24).

Preservation and Archiving Special Interest Group (PASIG): https://preservationandarchivingsig.org/ (accessed 2020-04-17).

Open Repositories: https://www.openrepositories.org/ (accessed 2020-04-17).

International Digital Curation Conference (IDCC): http://www.dcc.ac.uk/events/international-digital-curation-conference-idcc (accessed 2020-04-17).

International Association of Sound and Audiovisual Archives (IASA): https://www.iasa-web.org/conferences (accessed 2020-04-17).

International Image Interoperability Framework (IIIF): https://iiif.io/event/ (accessed 2020-04-17).

Digital Humanities at Oxford Summer School (DHOxSS): https://www.dhoxss.net/ (accessed 2020-04-17).

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

VI. Expert guidance

R6. The repository adopts mechanism(s) to secure ongoing expert guidance and feedback (either inhouse or external, including scientific guidance, if relevant).

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository

Response:

UCD Digital Library is developed and supported by UCD Library, a core service provider based at University College Dublin. It is supported by a dedicated, permanent cohort of staff in the UCD Library Research Services unit with expertise in all areas of the workflow, as detailed in R5. Organizational infrastructure.

The Digital Services Steering Committee oversees strategic matters in relation to the UCD Digital Library, while the Digital Library Operational Team is responsible for operational developments. Additionally, a number of subgroups advise on specific topics such as metadata, technical developments, and geospatial information. The Digital Library also draws on the expertise of our main source repositories (UCD Archives, UCD Special Collections, and the National Folklore Collection, UCD), as well as academic champions and discipline specific academics. For example, dedicated workshops are held with a panel of domain experts (in-house and external) when highly specialised collections are acquired.

The services of experts are available through University offices, including:

• UCD IT Services

- UCD Research office
- UCD Research Ethics office
- UCD Legal office
- UCD Information Compliance Manager
- UCD Data Protection Officer

Within Ireland, UCD Digital Library can avail of the expertise of several organisations including Consortium of National & University Libraries (CONUL), Digital Preservation in Ireland Group, Council of National Cultural Institutions (CNCI), Library Association of Ireland (LAI), Repository Network Ireland (RNI), Archives and Records Association (ARA), IFI Irish Film Archive, and RTÉ Archives.

UCD Digital Library also benefits from UCD Library's associate membership of the Digital Preservation Coalition. The UCD Digital Library uses a variety of channels of communication with expert groups including mailing lists, online fora, networking events, conferences, and attendance at training events.

The creation of a permanent scientific advisory group may be beneficial to UCD Digital Library. A number of factors preclude this step right now, namely the size of the collections, the changing nature of the data collected in the UCD Digital Library, as well as the fast-paced developmental nature of digital library technical infrastructure. The UCD Digital Library Steering and Operational Group will continue to seek expertise far and wide as required, and as the landscape for cultural heritage and research data changes, this will be reviewed in line with the wider UCD Library and University College Dublin strategic plans.

UCD Digital Library uses diverse channels of communication with its Designated Community. Promotional activities are undertaken by UCD Library Administration, Outreach, Client Services and Research Services staff to assure knowledge and understanding of its services. These activities include dissemination of information on UCD web sites, topical promotional activities, and training classes supported by the Library's Client Services and Research Services units. The UCD Digital Library is also represented in social media sites such as Twitter. UCD Library is a member of the Google Cultural Institute's Arts and Culture platform and publicises selected collections through online exhibitions made available there (https://artsandculture.google.com/partner/ucd-library).

Users are directed to formal communication channels as listed on our 'Contact us' page. Any feedback received from the Designated Community is assessed and acted upon where necessary. UCD Digital Library actively elicits formal feedback following major releases of the UCD Digital Library user interface, through processes such as focus groups, online surveys, and user experience testing. Other formal feedback will be sought in the near future around the use of the collections and other user engagement activities. UCD Digital Library also liaises closely with our repositories at all stages of the workflow and feedback from depositors is incorporated into our policies and procedures. Change management requests from the Designated Community or depositors are managed using Atlassian Jira for issue tracking.

LINKS TO DOCUMENTATION

UCD Digital Library, Services: https://digital.ucd.ie/contact/ (accessed 2019-10-24).

University College Dublin: https://www.ucd.ie/ (accessed 2019-10-24).

UCD Library: http://www.ucd.ie/library/ (accessed 2019-10-24).

UCD Archives: https://www.ucd.ie/archives/ (accessed 2019-10-24).

UCD Special Collections: http://www.ucd.ie/specialcollections/ (accessed 2019-10-24).

National Folklore Collection, UCD: https://www.ucd.ie/folklore/en/ (accessed 2019-10-24).

Digital Curation Centre: http://www.dcc.ac.uk/ (accessed 2019-10-24).

Consortium of National & University Libraries (CONUL): http://www.conul.ie/ (accessed 2019-10-24).

Council of National Cultural Institutions (CNCI): https://www.chg.gov.ie/arts/culture/cultural-institutions/c-n-c-i/ (accessed 2019-10-24).

Library Association of Ireland (LAI): https://www.libraryassociation.ie/ (accessed 2019-10-24).

Archives and Records Association (ARA): https://www.archives.org.uk/ (accessed 2019-10-24).

IFI Irish Film Archive: https://ifi.ie/archive (accessed 2019-10-24).

RTÉ Archives: https://www.rte.ie/ (accessed 2019-10-24).

DIGITAL OBJECT MANAGEMENT

VII. Data integrity and authenticity

R7. The repository guarantees the integrity and authenticity of the data.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry
Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository

Response:

The Memorandum of Understanding for external Data Depositors indicates that data be delivered with MD5 checksum values and a file manifest from clients outside of University College Dublin so that integrity and completeness can be verified upon receipt. All original data received from UCD and non-UCD clients are stored on Network Attached Storage, situated on a private subnet, and is tracked using the locally developed Ingest, Metadata and Administrative Database (IMAD), as per the Data Management Policy maintained in a locally accessible Confluence wiki; it is further verified during workflow processes and archived in secure storage managed by a Fedora Commons repository. The repository manages all original and derivative forms of the data and data documentation upon ingest.

The Fedora Commons repository implements a versioning framework that (1) maintains an audit trail identifying changes to the state of stored objects and (2) calculates checksum hash values for all data objects within the repository. All changes to file assets make use of this versioning framework.

DuraCloud (https://www.duracloud.org/) provides storage, backup, infrastructure, and preservation management services, such as verification of file fixity, preservation event tracking, and replication across multiple locations. DuraCloud's automatic health-checking service verifies the integrity of the repository's files. When a file is uploaded, DuraCloud calculates its checksum and periodically recalculates it to determine if any changes have occurred. If a change is detected, the system identifies the file in the secondary storage location. If the second file is healthy, DuraCloud replaces the corrupted file with a healthy version and notifies the repository. If both copies are corrupt, the system emails the repository so staff can upload a replacement copy.

With cultural heritage materials, data changes often relate to the structural organisation of the objects rather than versions of the data itself. Such changes have occurred, and will inevitably recur, when analogue collections have been digitised in distinct phases or when related collections have been integrated. In such cases care is taken to preserve repository identifiers for data objects so as not to undermine permanency of URL references. The repository also has capacity for

description and storage of multiple versions of a dataset or data object.

Provenance data is recorded in descriptive metadata, i.e., holding repository and any known prior owner/custodians of the data are identified. Additional provenance information pertaining to the state of the data are also recorded as provenance metadata, generally comprising a record of preservation events that apply to the data (for example, creation of derivative files in new formats to facilitate data use); preservation events are identified with reference to the PREMIS Data Dictionary and instantiated in XML conformant to the PREMIS schema. An audit trail is also maintained within the Fedora Commons repository and is expressed within the FOXML metadata schema; this audit trail captures all transactional events associated with an Archival Information Package (AIP) and accepts annotations to qualify these transactions.

Links to metadata are provided through the UCD Digital Library web interface (https://digital.ucd.ie/) and are expressed as menu links when descriptive records are displayed. The UCD Digital Library Web API also exposes metadata via content negotiation in a range of formats (DC, MODS, various RDF serialisations of descriptive metadata); RDF serialisations of metadata include links to external datasets (as Linked Data references).

UCD Digital Library does not conduct an identity check on the depositors or data producers. This is because depositors to date have been exclusively cultural heritage repositories at the host institution, University College Dublin, or partner organisations that are well known to the repository administrators.

UCD Digital Library is currently undertaking a scheduled systematic and thorough review of all data management and preservation strategies and procedures which is expected to be completed in Summer 2020.

LINKS TO DOCUMENTATION

UCD Digital Library, Memorandum of Understanding for external Data Depositors, https://digital.ucd.ie/docs/UCDDL_MoU_template_2015.pdf (accessed 2019-10-15).

UCD Digital Library, Technical Information, "Metadata Standards & Practices": https://digital.ucd.ie/about/#about-documentation (accessed 2019-10-15).

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

VIII. Appraisal

R8. The repository accepts data and metadata based on defined criteria to ensure relevance and understandability for data users.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Response:

UCD Digital Library has published extensive documentation outlining all procedures and requirements for the creation and deposit of digital collections for publication on its digital platform.

UCD Digital Library's Collection Development policy, setting out the criteria for selection, is available at: https://digital.ucd.ie/publications/

For all files supplied by external Data Producers—data and documentation—UCD Digital Library requests that the depositor indicate filename, file format, a checksum hash value, and a description of the file contents. This is considered to be the file manifest. See the Memorandum of Understanding for external Data Depositors (MOU) template: https://digital.ucd.ie/docs/UCDDL_MoU_template_2015.pdf.

For data deposited by external data producers, a quality assurance protocol for receipt of data is followed, including:

• Verification of contents from the file manifest: that all are present, all conform to the declared file format and can be opened in associated software applications, and all can be verified via checksum values.
• If the data provider is unable to deposit data in the preferred formats, an effort will be made to derive files in preferred formats where the source file format can be reliably converted. In all cases data in their original format are preserved in the repository; all data format migrations are considered preservation events and details of migration processes, inputs and outputs are recorded in PREMIS preservation metadata.
• Issues that may affect consumer's re-use or understandability of data deposited are noted in the descriptive metadata.

For all data, including that created through in-house production workflows, automated processes extract technical metadata and record all preservation events, providing additional means of validating data formats and assuring quality.

As per the Collection Development Policy, all deposited collections must be accompanied by comprehensive metadata. Existing metadata is assessed during the acquisition process to ensure it meets minimum metadata requirements, as described in the MOU. If additional metadata is required to ensure data reusability, a plan is developed to create that metadata in collaboration with the data depositor. For collections where no metadata exists, a metadata template and guidelines are provided to the data depositor for completion prior to deposit. If sufficient metadata cannot be obtained or created to allow the data to be understood by the designated community, the collection cannot be accepted. The standard metadata templates for each type of collection can be tailored, in consultation with the data depositor, to ensure a collection can be fully understood and re-used by others. As part of workflow metadata is normalized and augmented where required to ensure it meets metadata standards and is sufficient for long term preservation.

The repository provides a list of "Preferred Formats for Data" in Technical Information (https://digital.ucd.ie/about/). These guidelines apply to data produced through internal workflow processes, as well as to data acquired from external Data Producers. The preferred format list is reviewed regularly in light of changes in technology, the requirements of our Designated Community, or in the case of new formats being deposited. Revisions to the list are only made following research into the new formats and checks on emerging best practices in digital archiving.

Format quality checks and validation are completed during the Digital Asset Curation and Ingest stages of the workflow. All digital files are run through a series of workflow steps to ensure fixity and file type correctness, and these steps are repeated throughout the entire archiving process, as well as being a routine part of the digital preservation process.

UCD Digital Library works with data depositors to encourage the adoption of preferred formats for preservation at the point of data creation. If a data provider is unable to deposit data in the preferred formats, an effort will be made to derive files in preferred formats where the source file format can be reliably converted. If the source file cannot be converted to a file format that meets recognised best practice, and the data meets all other criteria for selection, the deposit copy is stored and reviewed periodically to ascertain if a preservation format has emerged.

LINKS TO DOCUMENTATION

UCD Digital Library, Collection Development Policy: https://digital.ucd.ie/publications/ (accessed 2019-10-24).

UCD Digital Library, Memorandum of Understanding for external Data Depositors: https://digital.ucd.ie/docs/UCDDL_MoU_template_2015.pdf (accessed 2019-10-24).

UCD Digital Library, Generic Metadata Template: https://libguides.ucd.ie/ld.php?content_id=31599711 and Guidelines for Completing the Template https://libguides.ucd.ie/ld.php?content_id=31599712 (accessed 2019-10-24). Standard template for minimum description level for the Digital Library. Customised versions are available for specific types of material or individual collection.

UCD Digital Library, Technical Information, "Preferred Formats for Data" in:

https://digital.ucd.ie/about/#about-documentation (accessed 2019-10-24). Detailed listing of preferred data formats.

IX. Documented storage procedures

R9. The repository applies documented processes and procedures in managing archival storage of the data.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Response:

Preservation is among the core functions identified in the UCD Digital Library's mission statement. Preservation best practices have been implemented in compliance with the principles of the OAIS Reference Model. This includes the practical implementation of data acquisition workflows and processing of Submission Information Packages (SIP), creation of Archival Information Packages (AIP) (including creation of technical metadata, and PREMIS-compliant preservation metadata).

The UCD Digital Library Preservation Policy is available at: https://digital.ucd.ie/publications/. See also the UCD Digital Library Data Acquisition Protocol: http://digital.ucd.ie/docs/UCDDL_data_acq_protocol_v01.pdf.

Data received is stored and processed on Network Attached Storage (NAS) media that is accessible only from local UCD subnets through the point of receipt or creation of Submission Information Packages (SIPs). Access to deposit copies of data is restricted to only those staff members working on a given collection. Prior to Ingest, all data is tracked using the Ingest, Metadata and Administrative Database (IMAD). Automated ingest processes move SIPs into the Archival Information Packages that comprise complex digital objects within a Fedora Commons repository. The digital collection lifecycle is controlled through a structured workflow, with extensive detailed procedural documentation available through the internal UCD Digital Library wiki, as detailed in R12. Workflows.

A comprehensive strategy for data redundancy, verification, and recovery has been implemented. In 2019, UCD Digital Library continued to focus on data redundancy and recovery by integrating and deploying Amazon S3 storage as a secure and robust cloud storage provider for the Fedora Commons repository content. DuraCloud (https://www.duracloud.org/) serves to automatically back up and preserve both data stored on the NAS device and production repository content that is maintained in a Fedora Commons repository. Amazon S3 storage is employed to hold a primary backup copy of content that is then archived to Amazon Glacier. Automatic synchronisation of content exists between primary and secondary storage and automatic file recovery is maintained between both backup copies. All storage services brokered by DuraSpace are from EU Safe Harbour certified service providers. These services further provide regular data integrity checks based on MD5 checksum hash values.

The majority of resources within the UCD Digital Library are available on an Open Access basis. In the case of materials to which access is restricted, in accordance with Data Depositors' requirements, an access control mechanism is currently in place. Authentication is permitted via Edugate (https://www.heanet.ie/services/identity-access/edugate), the authentication federation for the Irish higher education sector. Google OAuth and OpenID Connect authentication is also enabled, with ORCID ID integration also under development.

UCD Digital Library is currently undertaking a scheduled systematic and thorough review of data management and preservation strategies and procedures which is expected to be completed in Summer 2020.

LINKS TO DOCUMENTATION

UCD Digital Library, Data Acquisition Protocol: https://digital.ucd.ie/docs/UCDDL_data_acq_protocol_v01.pdf (accessed 2019-10-24). General procedural guideline for receipt and processing of data.

UCD Digital Library, Preservation, UCD Digital Library Preservation Policy: https://digital.ucd.ie/publications/ (accessed 2019-10-24).

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

X. Preservation plan

R10. The repository assumes responsibility for long-term preservation and manages this function in a planned and documented way.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository

Response:

Preservation is among the core functions identified in the UCD Digital Library's mission statement, and is supported by, and outlined in, the UCD Digital Library Preservation Policy. The Memorandum of Understanding for external Data Depositors clearly details the transfer of custody and indicates that UCD Digital Library will be responsible for the long-term preservation of the deposited collection. This document also outlines the activities of acquisition and digitisation, specifically how the UCD Digital Library gains rights to copy, transform, store and provide access to the items.

Preservation best practices have been implemented in compliance with the principles of the OAIS Reference Model. This encompasses the practical implementation of data acquisition workflows and processing of Submission Information Packages (SIP), creation of Archival Information Packages (AIP) (including creation of technical metadata, and PREMIS-compliant preservation metadata).

Provisions have been made to guard against format obsolescence in several ways. Data providers are asked to submit data only in widely accepted preservation standard formats. In cases where this is not possible, ubiquitous, well-documented formats that are amenable to format transformation are accepted. These formats are identified in a publicly accessible list of "Preferred Formats for Data" in Technical Information (https://digital.ucd.ie/about/).

Descriptive metadata in OAIS-compliant Dublin Core and MODS formats, or EAD for archival collections, are created or received by UCD Digital Library for all digital assets and also contribute to the long-term durability of digital resources.

Technical and preservation metadata are also captured using software tools identified from best practices in the digital preservation community, along with metadata representation formats for serialization of these metadata (namely, PREMIS for tracking of preservation events; METS to represent structural metadata, etc.).

Preservation planning is fundamental to the continued success of UCD Digital Library. UCD Digital Library is currently undertaking a scheduled systematic and thorough review of data management and preservation strategies and procedures, which is expected to be completed in Summer 2020. Revisions to preservation policies will form a significant element of this work, with particular emphasis placed upon issues in the technological, fiscal, legislative and institutional environments to mitigate the risks of change to the accessibility of our digital records.

A full outline of the UCD Digital Library levels of Digital Preservation are detailed in the Preservation Plan.

A full list of supported metadata formats can be found at the UCD Digital Library web site, see "Metadata Standards & Practices" in Technical Information (https://digital.ucd.ie/)

LINKS TO DOCUMENTATION

UCD Digital Library, Memorandum of Understanding for external Data Depositors:
https://digital.ucd.ie/docs/UCDDL_MoU_template_2015.pdf (accessed 2019-10-25)

UCD Digital Library, Technical Information, "Preferred Formats": https://digital.ucd.ie/about/ (accessed 2019-10-24).

UCD Digital Library Preservation Policy: https://digital.ucd.ie/publications/ (accessed 2019-10-24).

UCD Digital Library Data Acquisition Protocol: https://digital.ucd.ie/docs/UCDDL_data_acq_protocol_v01.pdf (accessed 2019-10-24).

UCD Digital Library, Technical information, "Metadata Standards & Practices": https://digital.ucd.ie/about/ (accessed 2019-10-24).

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

XI. Data quality

R11. The repository has appropriate expertise to address technical data and metadata quality and ensures that sufficient information is available for end users to make quality-related evaluations.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Response:

The primary contributors of content to the UCD Digital Library are members of the University College Dublin community, broadly defined, and includes diverse cultural heritage repositories that are administered at unit-level across the University, as well as research groups and individual researchers.

Additional depositors include organisations external to the University that enter into service arrangements, the conditions of which are described in a Memorandum of Understanding between the Depositor and University College Dublin. All external depositors of data must sign the memorandum of understanding (MoU) with University College Dublin; a copy of the current template for the MoU is available at https://digital.ucd.ie/docs/UCDDL_MoU_template_2015.pdf. The MoU clarifies the responsibilities of the Data Producer with regard to acceptable formats and the descriptive and administrative metadata required to enable Data Consumers to understand and assess the data. UCD Digital Library works closely with depositors to ensure metadata quality (see details in R8. Appraisal).

UCD's cultural heritage repositories work cooperatively with UCD Library with regard to agreed quality standards for production workflows.

Accepted data formats are identified in the "Information for Depositors" at https://digital.ucd.ie/about/#about-depositors. Quality standards for locally digitised cultural heritage materials for data providers internal to UCD are managed in a locally accessible Confluence wiki.

For UCD research groups and individual researchers data is accepted that complies with the listing of data formats in the "Information for Depositors" documentation. This documentation also outlines the metadata requirements to ensure sufficient information is provided by Data Depositors for data to be identified and its usage parameters to be understood

by Data Consumers. Descriptive and administrative metadata received from Data Providers is reviewed for quality and represented in metadata formats appropriate to the type of data. A full listing of supported metadata formats is provided under "Metadata Standards & Practices" in the Technical Information at https://digital.ucd.ie/about/#about-documentation. Metadata policies and in-house profiles of supported metadata standards are maintained in the locally accessible wiki. The workflow documents in the wiki include a cataloguing manual which documents procedures for the creation, augmentation, and standardisation of descriptive metadata.

All metadata created in-house or deposited is carefully reviewed by the metadata librarian and is automatically validated against the relevant metadata schema as an integral part of the workflow.

UCD's cultural heritage repositories have regular input into the ongoing development and revision of data and metadata quality. For external Data Depositors, the Evaluation stage at the end of the workflow process provides an opportunity to review and comment on metadata and data quality.

Should other members of the Designated Community or Data Consumers wish to comment on or ask questions related to the data, such comments can be submitted via email. All change requests relating to data and metadata are, in the first instance, submitted to the Data Provider for verification. Once approved, change requests relating to the metadata are logged and tracked using issue tracking software.

Citations to related works are included in the metadata when supplied by the depositor or deemed appropriate by the cataloguer. Related works may be print or online – where a related work is online a link to the work is included in the metadata.

LINKS TO DOCUMENTATION

UCD Digital Library, About the UCD Digital Library & Repository: https://digital.ucd.ie/about/ (accessed 2019-10-24).

UCD Digital Library, Information for Depositors: https://digital.ucd.ie/about/#about-depositors (accessed 2019-10-24).

UCD Digital Library, Technical information, "Metadata Standards &
Practices": https://digital.ucd.ie/about/#about-documentation (accessed 2019-10-24).

UCD Digital Library, Memorandum of Understanding for external Data Depositors,
https://digital.ucd.ie/docs/UCDDL_MoU_template_2015.pdf (accessed 2019-10-24). Template for Memoranda of Understanding between University College Dublin and Data Depositors external to the University.

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

XII. Workflows

R12. Archiving takes place according to defined workflows from ingest to dissemination.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Response:

Development of documentation of policies and procedures has been a high priority of the UCD Digital Library since its inception in 2005 as the Irish Virtual Research Library and Archive. Comprehensive documentation is maintained to describe and support workflow practices under the following headings:

• Repository policies
• Descriptive metadata
• Batch workflow software tools
• Repository technical architecture

Documentation of workflow processes relating to the creation of Archival Information Packages (AIP) is maintained in a local wiki. This documentation details each of the main stages in the workflow required to create, describe and ingest new collections into the UCD Digital Library:

• Profiling
• Digital Asset Curation
• Cataloguing
• Copyright
• Ingest

- Quality Review
- Publicity
- Evaluation

A document giving an overview of each of these workflow stages is provided for depositors and is available online at http://libguides.ucd.ie/ld.php?content_id=31599716.

During the Profiling stage potential collections are appraised based on the criteria outlined in UCD Digital Library's Collection Development policy: https://digital.ucd.ie/publications/. An integral part of this appraisal process is consideration of the impact on the workflow that each new collection may have. A collection profile document is completed for each potential collection to evaluate potential issues at each stage of the workflow. Adjustments to the workflow are considered, if necessary, to accommodate the individual characteristics of a new collection. These evaluations, alongside consideration of the Collection Development policy criteria, inform the decision on whether or not a potential collection is accepted. Data that does not fall within the Collection Development policy criteria or has too high an impact on workflows is not accepted. The selection decision and reasons for that decision are communicated to the data depositor, and every effort is made to suggest a more suitable archive.

Appraisal of new collections and data types is undertaken during Digital Library Operational Team meetings and may be referred to the Digital Services Steering Committee for sanction. Any new practices or adjustments to procedures are recorded in the local wiki. As each collection progresses through the workflow, a project diary is kept in the local wiki detailing issues encountered and the thought processes around solutions to these issues.

During the Evaluation stage of the workflow any issues and change requests related to a collection are reviewed, and changes to the overall workflow may be agreed. Any updates to the workflow procedures are recorded in the local wiki. Change management of the overall workflow is also managed through regular scheduled Operational Team meetings and specialist subgroup meetings., and the implementation of change requests is managed and tracked using issue tracking software.

Depositors and users are informed of repository practices and policies via the "About the UCD Digital Library & Repository" section of the website, which details the technical aspects of the Digital Library, including metadata practices, technical infrastructure, and regulatory compliance. Other documentation can be found in the Publications webpage, which includes additional policy and guidance information, as well as in the comprehensive Help webpage.

Further details regarding data processing are available to depositors in the Memorandum of Understanding: https://digital.ucd.ie/docs/UCDDL_MoU_template_2015.pdf and in the Data Acquisition Protocol: https://digital.ucd.ie/docs/UCDDL_data_acq_protocol_v01.pdf.

The repository holds heterogeneous data types whose formats are reflected in the listing of "Preferred Formats for Data" in Technical Information: http://digital.ucd.ie/about/#about-documentation. The workflow procedures have been developed

to accommodate all named data. The workflow documentation on the local wiki records the procedures to be applied to each data type at each stage of the workflow. As new data types are proposed for inclusion in the repository staff undertake research on the best preservation practices relating to that data type including research into data attributes and an assessment of the desirability of reformatting to an equivalent but more ubiquitous format. New practices and any adjustment to workflow procedures are documented within the local wiki.

The Data Producer holds responsibility for assuring anonymity of subjects in datasets lodged with the repository, or of identifying access control requirements for qualitative datasets (such as photographs and ethnographies) in which subject identity may be apparent. In such cases where access restrictions are required, Data Consumers wishing to use this data are asked to complete a registration form requesting access to the resources. Approval is governed by the Data Depositor, and if granted, user details are added to local Access Control Lists, managed by UCD Digital Library. Data Consumers are invited to return to the UCD Digital Library, where they can then login to the resource, using one of the authentication routes such as: Edugate, Google OAuth and OpenID Connect. User logins are non-transferrable.

In order to facilitate restricted content, several dissemination workflows are available within the repository. These depend on various factors, such as the asset file format and the level of security associated with the objects. While all metadata in UCD Digital Library is openly available, the Data Depositor can set access restrictions as part of the ingest stage of the workflow. Supported asset file formats which have access surrogates automatically created on ingest can be configured to only allow download and viewing of this surrogate version. This may be desirable where the Data Depositor only wishes to allow access to a lower resolution version of their asset, or where it is necessary to strip metadata embedded in the asset file before dissemination. In the case where an asset file may have two versions with different security requirements, e.g. an original and redacted or anonymised version, then the original can be ingested as a 'preservation-only' asset, and it will never be disseminated via the repository.

LINKS TO DOCUMENTATION

UCD Digital Library Workflow Overview: https://libguides.ucd.ie/ld.php?content_id=31599716 (accessed 2019-10-25). Overview for depositors of each stage in the Digital Library workflow.

UCD Digital Library, About the UCD Digital Library & Repository: https://digital.ucd.ie/about/ (accessed 2019-10-25)

UCD Digital Library, Memorandum of Understanding for external Data Depositors: https://digital.ucd.ie/docs/UCDDL_MoU_template_2015.pdf (accessed 2019-10-25)

UCD Digital Library, Data Acquisition Protocol: https://digital.ucd.ie/docs/UCDDL_data_acq_protocol_v01.pdf (accessed 2019-10-25)

UCD Digital Library, Help Topics: https://digital.ucd.ie/help/ (accessed 2019-10-25)

UCD Digital Library, Publications: https://digital.ucd.ie/publications/ (accessed 2019-10-25)

UCD Digital Library, Collection Development Policy: https://digital.ucd.ie/publications/ (accessed 2019-10-25).

UCD Digital Library, Technical Information, "Preferred Formats for Data" in:
https://digital.ucd.ie/about/#about-documentation (accessed 2019-10-25). Detailed listing of preferred data formats.

XIII. Data discovery and identification

R13. The repository enables users to discover the data and refer to them in a persistent way through proper citation.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Response:

UCD Digital Library offers discoverability of digital records through a wide variety of interfaces:

• A metadata search interface is available via the UCD Digital Library web site and is based upon the Apache Solr full-text search engine, offering Data Consumers the ability to search via basic, Boolean, and faceted options; Solr's search functionality is also made available via an OpenSearch interface.

• An OAI-PMH Service Provider exposes OAI-PMH sets in machine-readable OAIS-compliant Dublin Core, MODS, and (when available) DataCite formats.

• RDF manifestations of descriptive metadata are made available via a SPARQL endpoint; this service is based on the Virtuoso Universal Service software.

Data is provided in formats widely used across a range of cultural heritage, academic and research communities. These formats are identified in the "Preferred Formats for Data" documentation in Technical Information (https://digital.ucd.ie/about/#about-documentation).

Digital resources may be referenced via persistent identifier URLs. These include DataCite Digital Object Identifiers (DOIs), and Archival Resource Keys (ARKs). UCD Library subscribes to the Datacite DOI service (see https://www.datacite.org/) to enable assignment of these identifiers.

Suggested citations and statements of attribution are provided for all digital objects maintained in UCD Digital Library.

Various means are provided for the export of metadata and download of digital assets. Descriptive metadata can be exported in formats native to the repository (OAIS-compliant Dublin Core; MODS; various RDF serialisations) and in standard citation formats (RIS, BibTeX, RefWorks). Provision is made via the Web API for download of image file assets for visual resources, PDF and other document formats, etc.

UCD Digital Library has implemented the International Image Interoperability Framework (IIIF) for the presentation, integration and manipulation of digital images. UCD Digital Library has recently collaborated with Europeana to establish a mechanism for harvesting metadata pertaining to IIIF-compliant resources from cultural heritage organisations. The approach implements resourceSync and Sitemap extensions for images and video to create a sitemap suitable for web-crawling robots. This permits harvesting agents such as Europeana to negotiate heterogeneous collections or resources that include media other than images, such as media not yet covered by the IIIF Presentation API, or other object types. A significant number of UCD Digital Collections are now also available in Europeana.

The re3data records can be found at https://www.re3data.org/repository/r3d100010742

LINKS TO DOCUMENTATION

UCD Digital Library, Technical Information, "Preferred Formats for Data,"
in: https://digital.ucd.ie/about/#about-documentation (accessed 2015-02-05). Detailed listing of preferred data formats.

Datacite DOI service: http://www.datacite.org/ (accessed 2019-10-15)

UCD Digital Library OAI-PMH endpoint: http://libucd5.ucd.ie/oaiprovider/ (accessed 2019-10-15)

UCD Digital Library SPARQL endpoint: http://data.ucd.ie:8890/sparql (accessed 2019-10-15)

UCD Digital Library OpenSearch documentation: https://digital.ucd.ie/research/#opensearch-api; OpenSearch Description Document: https://digital.ucd.ie/api/search/opensearchdescription.xml (accessed 2019-10-15)

UCD Digital Library Data Services APIs: https://digital.ucd.ie/research/#services-api (accessed 2019-10-15)

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

XIV. Data reuse

R14. The repository enables reuse of the data over time, ensuring that appropriate metadata are available to support the understanding and use of the data.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository

Response:

As per the Collection Development Policy all deposited collections must be accompanied by comprehensive metadata.

DESCRIPTIVE AND ADMINISTRATIVE METADATA

UCD Digital Library manages a bespoke system for the management of descriptive and administrative metadata, called the Ingest, Metadata, and Administration Database (IMAD). For data produced in-house, IMAD represents a starting point in the workflow that interfaces with other data capture systems and workflow tools.

For data deposited by external providers, workflows may follow two separate courses:

(1) when metadata is supplied in tabular format, a mapping to IMAD data elements can be made and metadata ingested to IMAD in order to integrate with preferred workflow processes. In this case, the various sections of the Memorandum of Understanding that they co-signed are mapped to descriptive and administrative metadata required:

• Information about responsible parties (named entities)
• Title and description/abstract, references, and topics
• File identification and description
• Methodology
• Temporal coverage
• Geographic coverage

(2) In other cases data and metadata may be received in formats calling for a bespoke workflow to produce metadata in the base formats required for a particular data type.

Existing metadata is assessed during the acquisition process to ensure it meets minimum metadata requirements as described in the MOU. If additional metadata is required to ensure data reusability a plan is developed to create that metadata in collaboration with the data depositor.

For collections where no metadata exists, a metadata template and guidelines are provided to the data depositor for completion prior to deposit. An example of the Generic Metadata Template is available at https://libguides.ucd.ie/ld.php?content_id=31599711 and the Guidelines for Completing the Template at: https://libguides.ucd.ie/ld.php?content_id=31599712

For all data ingested into the repository, metadata elements for descriptive metadata are represented in MODS and OAI-compliant Dublin Core metadata. All research data are further documented using the DataCite metadata schema, and are assigned DataCite DOIs. For collections of cultural heritage data, the EAD (Encoded Archival Description) 2002 schema is commonly used to describe archival or hierarchically structured collections of objects. For survey data, metadata elements for descriptive metadata comply with the Data Documentation Initiative (DDI) metadata framework. Other discipline specific metadata schemas have been deployed on the request of the depositors, and these files coexist with the MODS and DC records in the repository.

Metadata for objects held within the UCD Digital Library's data repository are exposed through a OAI-PMH Provider

service for potential reuse outside of the repository; metadata is available in OAI-complaint Dublin Core XML, MODS XML, and where applicable DataCite XML formats. The OAI-PMH endpoint is available at https://libucd.ucd.ie/oaiprovider/.

Descriptive metadata for all research data registered with DataCite can be requested by Data Consumers in Dublin Core, MODS, and DataCite formats via the UCD Digital Library's OAI-PMH provider service; a Linked Data API also enables download of descriptive and administrative metadata in a variety of RDF serialisations. See: "Data Services APIs" (https://digital.ucd.ie/research/#services-api).

OTHER METADATA

Additional bespoke tools implemented in perl are available to extract technical metadata and to capture provenance metadata for preservation purposes.

Technical metadata is defined for local purposes as the technical attributes of file assets stored in the repository that are necessary for identification and potential migration to new formats should the current preferred format become deprecated. Technical metadata is specific to file formats; wherever possible technical metadata is captured using a range of data preservation tools and formatted in accordance with pertinent XML schemas. These formats and schemas are listed on the UCD Digital Library web site in Technical Information (https://digital.ucd.ie/about/#about-documentation).

Preservation metadata is captured throughout the course of the workflow process - from receipt or production of data to repository ingest - as well as subsequent actions taken on data. Preservation events are identified and described in compliance with the PREMIS Data Dictionary for Preservation Metadata (v. 2.2) and the PREMIS schema (v. 2.2); see: https://www.loc.gov/standards/premis/. Preservation events as well as PREMIS object metadata (for resource identification) are serialised as XML files within a METS (https://www.loc.gov/standards/mets/) wrapper, enabling association of preservation events with individual files assets that comprise complex digital objects.

DATA FORMATS

The repository provides a list of "Preferred Formats for Data" in Technical Information (https://digital.ucd.ie/about/#about-documentation).

The preferred format list is reviewed regularly in light of changes in technology, the requirements of our Designated Community, or in the case of new formats being deposited. Revisions to the list are only made following research into the new formats and checks on emerging best practices in digital archiving.

FUTURE MIGRATION PLANS

The Digital Library Technical Sub-Group maintains a listing of "Preferred Formats for Data" that represent documentation of international best practices with regard to data format and file persistence. At whichever time file assets made available to data consumers through the UCD Digital Library become obsolete, or which become unusable by ubiquitous software

tools available to the designated community, the listing of recommended file formats would be updated and the corresponding file assets made available for general use by data consumers would be updated.

While there has not yet been occasion to update or replace files as described above, UCD Digital Library maintains a library of software utilities that perform batch functions on data within the repository, including functions to add, update or delete file assets within the repository. A software tool to execute a format migration could therefore be easily developed from existing software to accommodate a potential future data migration project. In such a case, the original file assets would be retained, while the updated, non-obsolescent file asset would be added to the digital object.

UNDERSTANDABILITY OF THE DATA

All objects in the Digital Library are accompanied by comprehensive descriptive metadata to aid reusability. Existing metadata from the data creator is assessed during the acquisition process to ensure it meets minimum metadata requirements. As part of workflow metadata is normalized and augmented where required to ensure the data is understandable by the designated community. If sufficient metadata cannot be obtained or created to allow the data to be understood by the designated community, the collection cannot be accepted.

For complex objects where the relationship of individual file components is integral to making the file assets understandable or usable, structural metadata is also provided. Structural metadata may consist of a METS structure map that specifies sequence and relationship of file assets comprising a complex digital object; the structure map is also used to record semantic information pertinent to object structure. For statistical data types structural metadata is recorded in the form of codebooks and other text documentation; these metadata are typically delivered in text or spreadsheet format by Data Providers and made available for download by Data Consumers.

LINKS TO DOCUMENTATION

UCD Digital Library, Collection Development Policy: https://digital.ucd.ie/publications/ (accessed 2019-10-24).

UCD Digital Library, Memorandum of Understanding for external Data Depositors:
https://digital.ucd.ie/docs/UCDDL_MoU_template_2015.pdf (accessed 2019-10-24).
Template for Memoranda of Understanding between University College Dublin and Data Depositors external to the University.

UCD Digital Library, Generic Metadata Template: https://libguides.ucd.ie/ld.php?content_id=31599711 and Guidelines for Completing the Template https://libguides.ucd.ie/ld.php?content_id=31599712 (accessed 2019-10-24). Standard template for minimum description level for the Digital Library. Customised versions are available for specific types of material or individual collection.

UCD Digital Library OAI-PMH endpoint: http://libucd5.ucd.ie/oaiprovider/ (accessed 2019-10-15)

UCD Digital Library, Data Services APIs: https://digital.ucd.ie/research/#services-api (accessed 2019-10-24). A Linked Data API enables download of metadata in a variety of RDF serialisations.

UCD Digital Library, Technical Information, "Metadata Standards" and "Preferred Formats for Data," in: https://digital.ucd.ie/about/#about-documentation (accessed 2019-10-24). Detailed listing of metadata standards and preferred data formats.

TECHNOLOGY

XV. Technical infrastructure

R15. The repository functions on well-supported operating systems and other core infrastructural software and is using hardware and software technologies appropriate to the services it provides to its Designated Community.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Response:

UCD Digital Library's technical and organisational development, described at https://digital.ucd.ie/about/ , is guided by the principles of the Open Archival Information System Reference Model (ISO 14721:2003). Compliance to the OAIS model is visualised in Technical Information at https://digital.ucd.ie/about/#about-documentation , under "Systems".

Planning is also informed by additional best practices frameworks that relate to digital preservation and that focus on specific aspects of data curation and management of the data life cycle. These include the Digital Preservation Coalition (DPC) preservation handbook, the Digital Curation Centre's Curation Lifecycle Model, DigitalPreservationEurope's PLATTER: Planning Tool for Trusted Digital Repositories, and the Trusted Digital Repository Checklist (TDR; ISO 16363).

UCD Digital Library is supported organisationally within UCD Library, a permanent administrative structure of the University, with operational governance provided locally by a committee framework within UCD Library and organisationally by the University Management Team's Library Strategy Group, with representatives of all major administrative and academic divisions of the University.

The technical implementation of the OAIS model identifies Submission Information Packages (SIPs) as the data as received from Data Producers or as created through in-house production processes. Data comprising the SIP are subject to workflow processes that validate data and add additional metadata of various kinds to create the Archival Information Package (AIP), which is instantiated using the Fedora Object Model and Fedora Object Model XML (FOXML), in which form it is ingested to the data repository. Dissemination Information Packages (DIPs) are conceived flexibly. Descriptive metadata is made available in native OAIS-compliant Dublin Core and MODS XML formats as well as formatted views of metadata made available through a responsive web site. The Web API provides download functionality for data objects, which may be made available in the original format and/or in derivative formats (e.g., JPEG derivatives from original TIFF image files; CSV format for original Excel data).

UCD Digital Library has a work plan that identifies a technical development roadmap for the period 2019-2022; documentation is maintained on an internal Confluence wiki. Further technical developments planned include deployment of tools developed to support the mission of UCD Digital Library, namely: ongoing enhancement of tools to support data preservation, particularly validation of integrity of file assets stored in the Fedora Commons repository; research and development around 3D and audio-visual material implemented in the International Image Interoperability Framework (IIIF), and development of a technical roadmap for transition to the newly released Fedora Commons version 5.X repository software.

An up-to-date software catalogue is maintained within an internal Confluence wiki. UCD Digital Library employs open-source, community-supported software whenever possible. Additional technical documentation is available from the repository on request.

LINKS TO DOCUMENTATION

UCD Digital Library, About the UCD Digital Library & Repository: https://digital.ucd.ie/about/ (accessed 2019-10-15): Mission Statement and other information regarding the UCD Digital Library, comprising Administrative Information,

Technical Information, and Information for Depositors.

UCD Digital Library, Technical Information, "Metadata Standards & Practices":
https://digital.ucd.ie/about/#about-documentation (accessed 2019-10-25). A listing of metadata formats supported by the UCD Digital Library.

UCD Digital Library, Technical Information, "Systems": https://digital.ucd.ie/about/#about-documentation . Statement of compliance to principles of the OAIS Reference Model. (accessed 2019-10-25)

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

XVI. Security

R16. The technical infrastructure of the repository provides for protection of the facility and its data, products, services, and users.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository

Response:

Security and risk management is carried out on an ongoing basis in close cooperation with the UCD IT Services department. As part of this process, server and data backups, media monitoring and hardware refreshment processes take place.

The soon to be published, UCD IT Security Framework outlines how UCD IT Services regulates the protection of infrastructure, data and services of all campus entities, including UCD Digital Library. This contains the classification of data, services and network segments, network issues (WLAN, DMZ, Firewall), backup and storage, antivirus, encryption, user management, hardware, etc.

UCD IT Services and UCD Library each maintain disaster response plans which detail the procedures and arrangements in place to provide suitable recovery and failover of essential services in the event of unplanned outages. Nagios is used for real-time virtual server, storage and network monitoring.

The UCD Digital Library technology infrastructure resides on virtual machines within the production environment managed by UCD IT Services (https://www.ucd.ie/itservices/aboutus/customercharter/). This is backed up daily and is treated as a Priority 2 Level according to IT Services Customer Charter.

The Digital Services Programmer has direct access to the virtual server management infrastructure and can perform many administrative tasks in emergency situations should UCD IT Services be unavailable or focusing on other priorities.

To protect the data, the following backup and access control procedures are in place to guarantee the (physical) safety of the digital archive holdings:

1) Physical protection measures:

a. The UCD Computing Centre and server rooms are secured against unauthorized access by means of an electronic access control system.
b. Smoke and water detectors are in place; temperatures in the computing center are monitored.

2) Redundant data storage in different locations:

All production repository data is stored in Amazon S3 cloud storage. Daily incremental and complete backups of virtual server infrastructure are maintained to onsite disk. In addition, frequent backups to offsite tape libraries.

3) UCD Digital Library maintains original digitised copies of data on network attached storage and long term preservation copies in Duracloud storage (Amazon S3 and Amazon Glacier).

4) Access Control Lists are maintained to manage access to restricted access collections. Access to these collections must be approved by the collection depositor, permission is granted for a limited timeframe (usually up to one year) and requires logging in via an approved OAuth client (e.g. HEAnet Edugate, Google, ORCID).

LINKS TO DOCUMENTATION

AWS S3 Security

https://aws.amazon.com/security/

UCD IT Services Disaster Recovery Policy

https://www.ucd.ie/itservices/t4media/IT%20Services%20Disaster%20Recovery%20Policy.pdf

UCD IT Services, Customer Charter: https://www.ucd.ie/itservices/aboutus/customercharter/

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

APPLICANT FEEDBACK

Comments/feedback

These requirements are not seen as final, and we value your input to improve the core certification procedure. To this end, please leave any comments you wish to make on both the quality of the Catalogue and its relevance to your organization, as well as any other related thoughts.

Response:

Reviewer Entry

Reviewer 1

Comments:

Reviewer 2

Comments: