Learning By Example: Connecting Data Competencies with the Texas Data Repository

Laying the Foundation for Research Data Services: Session 3
Today’s speakers

Kristi Park
Executive Director,
Texas Digital Library

Santi Thompson
Head of Digital Research Services,
University of Houston Libraries

Peace Williamson
Director for Research Data Services,
University of Texas at Arlington Libraries
Laying the Foundation for Research Data Services

Session 1. Getting Started with the Texas Data Repository and Data Competencies
   ◦ Recording: http://hdl.handle.net/2249.1/79231

Session 2. Teaching Data: Developing Data Instruction Using a Multi-Level Competency Model
   ◦ Recording: http://hdl.handle.net/2249.1/79234
Draft - Data Literacy Competencies 2.0

1. Data Awareness & Knowledge
2. Discovery & Acquisition of Data
3. Databases & Data Formats
4. Data Conversion & Interoperability
5. Data Organization & Management
6. Data Wrangling
7. Data Processing & Analysis
8. Data Quality & Documentation
9. Data Description
10. Ethics
11. Data Visualization & Representation
12. Data Sharing & Preservation
Draft - Data Literacy Competencies 2.0

1. Data Awareness & Knowledge
2. Discovery & Acquisition of Data
3. Databases & Data Formats
4. Data Conversion & Interoperability
5. Data Organization & Management
6. Data Wrangling

7. Data Processing & Analysis
8. Data Quality & Documentation
9. Data Description
10. Ethics
11. Data Visualization & Representation
12. Data Sharing & Preservation
Today’s Agenda:

Overview of TDR and the Research Data Management Lifecycle
Data competencies and TDR
- Sharing and Preserving
- Discovery/Download/re-use
- Citing (Ethics)
- Describing
- Versioning
Wrap up & Questions
Today’s Questions:

How might TDR be used in data literacy workshops (and other outreach activities) that are based on the data competencies?

How does the TDR help researchers fulfill their data management obligations as expressed through the competencies?
Texas Data Repository

Built in open-source Dataverse
Add, version, and share data
Free of confidential or sensitive information

Search the Texas Data Repository

Add Data
Explore Data Repository
Learn More
Get Help

Publish and Track Your Data, Discover and Reuse Others' Data!
The Research Data Management Lifecycle

Data Search / Reuse

Data Management Plan

Collection

Description

Analysis

Re-collection

Data Storage

Publication

Research Question

Archive

Texas Data Repository

University of Santa Cruz Library, "Research Data Management," http://guides.library.ucsc.edu/datamanagement/
The Research Data Management Lifecycle

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Sharing & Preservation

Texas Data Repository

University of Santa Cruz Library, "Research Data Management," http://guides.library.ucsc.edu/datamanagement/
### Data Sharing and Preservation

<table>
<thead>
<tr>
<th>Emerging</th>
<th>Intermediate</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Recognizes the benefits of data preservation</td>
<td>• Is able to distinguish between active data and stored data</td>
</tr>
<tr>
<td>• Recognizes the practices, values, and norms of (sub)discipline as they</td>
<td>• Understands basic definitions &amp; processes in data preservation</td>
</tr>
<tr>
<td>relate to sharing &amp; preserving data</td>
<td>• Recognizes benefits &amp; costs of preservation</td>
</tr>
<tr>
<td></td>
<td>• Develops understanding of which elements of a dataset are likely to have</td>
</tr>
<tr>
<td></td>
<td>future value for self and others</td>
</tr>
<tr>
<td></td>
<td>• Is able to determine when and how to backup data</td>
</tr>
</tbody>
</table>
### Active vs. Stored (Archived) Data

**Retrieved from:** [https://www.ncdc.noaa.gov/qclcd/QCLCD](https://www.ncdc.noaa.gov/qclcd/QCLCD)

---

#### QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)

NOAA, National Climatic Data Center

**Month:** 02/2017

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<th>Degree Days Base 65 Degrees</th>
<th>Sun</th>
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<td>28</td>
<td>80</td>
<td>69</td>
<td>75</td>
</tr>
</tbody>
</table>

#### Footnotes:
- Degrees Days
- Monthly
- Season to Date
- Total
- Departure
- Total
- Departure
- Heating
- Cooling

---

By NSF/Josh Ländis, employee 1999-2001 [Antarctic Photo Library, U.S. Antarctic Program] [Public domain], via [Wikimedia Commons](https://commons.wikimedia.org/wiki/)
Sharing and Preserving data

What are the benefits and challenges of sharing?

When and where should I archive data?
Why should I use a repository?

What materials should I archive?

What does a good long-term archiving solution look like?
Why share?

1. Supports the verification and replication of original results
2. Provides teaching resources
3. Reduces cost by avoiding duplicate data collection efforts
4. Enhances the visibility and overall impact of research projects
5. Preserves data for future use
6. Helps the broader community and individual researchers “do better research”

Methods of sharing & publication

- Uploading to a repository
- Submitting with an article
- Including as an appendix/supplement
- Making available on a public website
Why use a repository?

Digital content is fragile.

Websites (especially personal ones) are ephemeral.
  • No integrity checking
  • Likely not very visible to search engines
  • Require upkeep and technological dependencies
  • Links may not be persistent

Funding agencies expect it.

What to keep long-term?

Data that can’t be replicated (e.g. weather data)

Can be replicated but would be prohibitively expensive

Major discovery

High impact researcher

Raw and final, processed files but not intermediate files

Technical documentation is comprehensive and data is in a format that allows for ease of use and preservation

TDR as an archiving solution

Organizational trustworthiness
Persistent identifiers (DOIs)
Regular backups with replication
Fixity checking
Capture of important preservation metadata (file format, size, fixity information, rights information, and version information)
Rare de-accessioning, with tombstone record left behind
Data Sharing in TDR

Users have the option to:

1. Make data public (Open Data)
2. Publish, but restrict access to files
3. Share unpublished data with a group of collaborators
Data from excavations of the Late Roman farmhouse at San Biagio

Institute of Classical Archaeology, 2016, "Data from excavations of the Late Roman farmhouse at San Biagio".
doi:10.18738/T8/Q2/T68, Texas Data Repository Dataverse. DRAFT VERSION

Publish data
Researchers can restrict access to files in published datasets.

- The dataset record is public, but access to one or more data files is restricted.
- You can allow users to request access to restricted data files.
Researchers can also create unpublished collections of data and share them with a select group of collaborators.

collection level
dataset level
file level

**Note**

At this time, “collaborators” must have user accounts in the Texas Data Repository - i.e., they must be from a TDR-participating institution.
Easy sharing: Private URL

Create a private URL to share your dataset with those who don’t have TDR user accounts.

Edit ➤ Private URL

Click “Create Private URL”
The Research Data Management Lifecycle

Discovering, Downloading, and Reusing Data
## Discovery and Acquisition of Data

<table>
<thead>
<tr>
<th></th>
<th>Emerging</th>
<th>Intermediate</th>
<th>Expert</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>● Locates and utilizes disciplinary data sources and repositories</td>
<td>● Locates and utilizes disciplinary data sources and repositories</td>
<td>● Elements included in the Intermediate stage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Evaluates the quality of the data available from external sources</td>
<td>● Is proficient at integrating shared data with locally collected or generated data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Imports data and converts it when necessary so it can be used locally</td>
<td></td>
</tr>
</tbody>
</table>
Search the Texas Data Repository

Search...

FIND

Add Data

Explore Data Repository

Learn More

Get Help

Texas Digital Library
Search the Texas Data Repository

Search... FIND

Add Data

Explore Data Repository

Learn More

Get Help

Texas Digital Library
Share, publish, and archive your data. Find and cite data across all research fields.

Welcome to the Texas Data Repository, a statewide archive of research data from Texas Digital Library (TDL) member institutions.

QUICK LINKS
- Add data
- Explore data

LEARN MORE
- Go to the user guide.
- Contact a local university librarian for help.
<table>
<thead>
<tr>
<th>Title</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>testforduyin Dataverse (Dataverse.org)</td>
<td>Feb 7, 2017</td>
<td>UT Medical Branch Dataverse</td>
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<tr>
<td>Replication Data for metabolic flux measurements of <em>E. coli</em> molecular phenotype under different growth conditions* by Caglar et al.</td>
<td>Jan 27, 2017</td>
<td>WilkeLab Dataverse</td>
</tr>
<tr>
<td>Raw GC-MS data for metabolic flux measurements, generated by the Max Lab at Harvard and Idaho. The data files are meant to be analyzed with the Fasta program. The data are described in detail in this paper. M. U. Caglar, J. R. House, C. S. Barr, D. R. Boutz, S. M. Car...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WilkeLab Dataverse (University of Texas at Austin)</td>
<td>Jan 26, 2017</td>
<td>Data generated by the research group of Claus Wilke at UT Austin</td>
</tr>
<tr>
<td>Datasets for The Chora of Metaponto 3: Archaeological Field Survey—Bradano to Bassento</td>
<td>Dec 1, 2016</td>
<td>Metaponto Survey Dataverse</td>
</tr>
<tr>
<td>Pietro, Alberto, 2016, &quot;Datalooks for the Chora of Metaponto 3: Archaeological Field Survey—Bradano to Bassento&quot;, Texas Data Repository Dataverse, V4</td>
<td></td>
<td>The four-volume publication, The Chora of Metaponto 3: Archaeological Field Survey—Bradano to Bassento, presents approximately half of the results of ICA's systematic, intensive surface survey conducted within the territory (chora) of Metaponto. Nearly six hundred sites, ranging i...</td>
</tr>
<tr>
<td>Texas State University Dataverse (Texas State University)</td>
<td>Jul 5, 2016</td>
<td>This is a test of functionality of the TDL dataverse and associated features</td>
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<tr>
<td>The Neolithic Settlement at Capo Affire Dataverse (University of Texas at Austin)</td>
<td>May 26, 2016</td>
<td>The Chora of Croton Dataverse</td>
</tr>
<tr>
<td>ICA's excavation projects within the Chora of Croton included a remarkably well-preserved Neolithic settlement at Capo Affire. The first volume in the Chora of Croton series presents results of excavations conducted there between 1987 and 1990 by the late Jon Motter.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Houston Libraries Dataverse (University of Houston)</td>
<td>May 9, 2016</td>
<td>This is the repository for University of Houston Libraries and staff research datasets.</td>
</tr>
<tr>
<td>Spatial extents of ICA projects</td>
<td>May 9, 2016</td>
<td>Institute of Classical Archeology, 2016, &quot;Spatial extents of ICA projects&quot;, doi:10.18738/T2/EQ3S0U, Texas Research Data Repository Dataverse, V1</td>
</tr>
</tbody>
</table>

**Notes:**
- The data is from the Texas Data Repository, a digital library for data sharing.
- The records include details such as the title, date, and description of the datasets available.
- The datasets cover various topics, including archaeology, medicine, and research projects.
<table>
<thead>
<tr>
<th>File Name</th>
<th>File Type</th>
<th>Size</th>
<th>Date</th>
<th>Downloads</th>
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</thead>
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<tr>
<td>FF_BULK_14jan2016.xlsx</td>
<td>MS Excel (XLSX)</td>
<td>73.4 KB</td>
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<tr>
<td>FF_CONTEXTS_14jan2016.xlsx</td>
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<tr>
<td>FF_Database_metadata_14jan2016.pdf</td>
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<tr>
<td>FF_Database_TablesandModules_14jan2016.docx</td>
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<td>10.2 KB</td>
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<tr>
<td>FF_LLOTS_14jan2016.xlsx</td>
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<td>14.0 KB</td>
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<tr>
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<td>MS Excel (XLSX)</td>
<td>19.5 KB</td>
<td>May 2, 2016</td>
<td>2 Downloads</td>
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</tbody>
</table>

- **FF_BULK_14jan2016.xlsx**: "Bulk" finds recorded in post-excavation study. This list is a complete inventory of the material collected and later studied as part of the preparation for this publication.
- **FF_CONTEXTS_14jan2016.xlsx**: Groups of related material from the same finds spot or archaeological unit.
- **FF_Database_metadata_14jan2016.pdf**: Description of tables and relationships between them that are included in this dataset.
- **FF_Database_TablesandModules_14jan2016.docx**: General description of the content within each of the related tables in this dataset and the relationships between tables.
- **FF_LLOTS_14jan2016.xlsx**: This table contains the complete list of "LOTS", which correspond to the field-recorded units of observation. These are either individual finds or collections of finds from a single excavation unit. They are here related to "Contents" which are a post-excavation grouping of "Lots" based on study of field notes and related finds.
- **FF_RGPF_14jan2016.xlsx**: List of catalogued finds, selected from the "bulk" quantification table for detailed description in post-excavation study. The table provides the detailed catalogued method.
<table>
<thead>
<tr>
<th>Ethics</th>
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<tr>
<td><strong>Emerging</strong></td>
</tr>
<tr>
<td>● Develops understanding of attribution and reuse</td>
</tr>
<tr>
<td>● Practices citing data</td>
</tr>
<tr>
<td>● Develops mindfulness in data ownership and privacy</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Why Citing Data Matters
Data Citation Principles

Credit and Attribution
Unique Identification
Access
Persistence
Specificity and Verifiability

Replication Data for: Oblique photos of rock outcrops within the Stillwell anticline, west Texas

Surpless, Ben, 2016, "Replication Data for: Oblique photos of rock outcrops within the Stillwell anticline, west Texas", doi:10.18738/T8/DQPLIK, Texas Data Repository Dataverse, V1
The Research Data Management Lifecycle

1. Describing Data
2. Data Management Plan
3. Collection
4. Description
5. Re-collection
6. Data Storage
7. Analysis
8. Publication
9. Archive
10. Data Search / Reuse

Texas Data Repository
| Data Description |
|------------------|------------------|------------------|
| **Emerging**     | **Intermediate** | **Expert**       |
| ● Understands the rationale for descriptive metadata | ● Employs basic descriptive, structural, and administrative metadata  
● Knows how to capture basic metadata elements  
● Develops understanding of when and where to deploy metadata | ● Develops structures for customized descriptive, structural, and administrative metadata  
● Analyzes and interprets metadata from external disciplinary sources  
● Understands the structure and purpose of ontologies and metadata interoperability in facilitating better data sharing |
Metadata for research data
Replication Data for: Oblique photos of rock outcrops within the Stillwell anticline, west Texas

Surpless, Ben, 2016, "Replication Data for: Oblique photos of rock outcrops within the Stillwell anticline, west Texas", doi:10.18738/T5/DQPLIK, Texas Data Repository Dataverse, V1

Description
Compiled oblique-view digital photos of Site 1 rock outcrops within the Stillwell anticline, west Texas.

Subject
Earth and Environmental Sciences

Keyword
Stillwell
Replication Data for: Oblique photos of rock outcrops within the Stillwell anticline, west Texas

Surpless, Ben, 2016, "Replication Data for: Oblique photos of rock outcrops within the Stillwell anticline, west Texas",
doi:10.18738/T8/DQPLIK, Texas Data Repository Dataverse, V1
<table>
<thead>
<tr>
<th>Metadata Type</th>
<th>Metadata Details</th>
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<tbody>
<tr>
<td>Geospatial Metadata</td>
<td>Latitude and longitude values; geographic names</td>
</tr>
<tr>
<td>Social Science &amp; Humanities Metadata</td>
<td>Unit of analysis, research instrument, population covered</td>
</tr>
<tr>
<td>Astronomy and Astrophysics Metadata</td>
<td>Spatial and spectral resolution, fraction of sky, object count</td>
</tr>
<tr>
<td>Life Sciences Metadata</td>
<td>Organism, measurement type, technology platform</td>
</tr>
<tr>
<td>Metadata Type</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Geospatial Metadata</td>
<td>DDI Lite, DDI 2.5 Codebook, DataCite, and Dublin Core; Country / Nation field uses ISO 3166-1 controlled vocabulary</td>
</tr>
<tr>
<td>Social Science &amp; Humanities Metadata</td>
<td>DDI Lite, DDI 2.5 Codebook, and Dublin Core</td>
</tr>
<tr>
<td>Astronomy and Astrophysics Metadata</td>
<td>International Virtual Observatory Alliance’s (IVOA) VOResource Schema format; based on Virtual Observatory (VO) Discovery and Provenance Metadata</td>
</tr>
<tr>
<td>Life Sciences Metadata</td>
<td>Based on ISA-Tab Specification, along with controlled vocabulary from subsets of the OBI Ontology and the NCBI Taxonomy for Organisms</td>
</tr>
</tbody>
</table>
## Data Organization & Management

<table>
<thead>
<tr>
<th>Emerging</th>
<th>Intermediate</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Understands the lifecycle of data</td>
<td>● Recognizes the practices, values, and norms of (sub)discipline as they relate to managing data</td>
</tr>
<tr>
<td>● Develops habits relating to file naming best practices</td>
<td>● Understands the lifecycle of data and develops basic data management plans</td>
</tr>
<tr>
<td>● <strong>Tracks data provenance and clearly delineates and denotes versions of a dataset</strong></td>
<td>● Recognizes the relation of subsets or processed data to the original datasets</td>
</tr>
<tr>
<td>● Recognizes that data must be prepared for its eventual curation at its creation and throughout its life cycle</td>
<td>● Develops habits relating to file naming best practices</td>
</tr>
<tr>
<td></td>
<td>● <strong>Tracks data provenance and clearly delineates and denotes versions of a dataset</strong></td>
</tr>
<tr>
<td></td>
<td>● Recognizes that data must be prepared for its eventual curation at its creation and throughout its life cycle</td>
</tr>
</tbody>
</table>
New versions are created when . . .

- New data is added
- Data or metadata is corrected
- Raw data is reprocessed
WHY IT’S IMPORTANT TO TRACK VERSION CHANGES...

Reproducibility
Citability

IS THERE A REPRODUCIBILITY CRISIS?

7% Don’t know
52% Yes, a significant crisis
38% Yes, a slight crisis
3% No, there is no crisis

1,576 researchers surveyed

Versions after archiving

Corrections to metadata
Newly processed data
Part of long-term data management plan (depositing snapshots of data over time)
Versioning data in TDR

A new dataset version is created any time you make changes to the dataset.

- Metadata additions or changes
- Addition of files
- Deletion of files
- Change to terms of use

Older versions are maintained.
## Viewing version differences

<table>
<thead>
<tr>
<th>Version</th>
<th>Files Details</th>
<th>Author(s)</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0</td>
<td>Files (Removed: 1); View Details</td>
<td>Kristi Park</td>
<td>October 20, 2016</td>
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<tr>
<td>2.0</td>
<td>Files (Added: 1; Removed: 1); View Details</td>
<td>Kristi Park</td>
<td>October 20, 2016</td>
</tr>
<tr>
<td>1.2</td>
<td>Additional Citation Metadata: (1 Added); View Details</td>
<td>Kristi Park, Kristi Park</td>
<td>October 20, 2016</td>
</tr>
<tr>
<td>1.1</td>
<td>Files (Changed File Metadata: 4); Terms of Use/Access Changed; View Details</td>
<td>Kristi Park, Kristi Park</td>
<td>October 20, 2016</td>
</tr>
<tr>
<td>1.0</td>
<td>This is the first published version.</td>
<td>Kristi Park</td>
<td>October 19, 2016</td>
</tr>
</tbody>
</table>
Version labelling

DRAFT (unpublished)
1.0 (published)
1.1, 1.2, etc. (minor changes)
2.0, 3.0, etc. (major changes)

Major version changes result in a new citation.

Wrapping Up

Sharing and Preserving
Discovery/Download/Re-use
Citing (Ethics)
Describing
Versioning (Data Organization & Management)
Use TDR to discuss data management needs and obligations with researchers.
Getting Started with TDR

Submit MOU to TDL
Integrate the system with Shibboleth
Select representative for TDR Steering Committee
Questions? Contact TDL support@tdl.org
TDL Services Manager: Courtney Mumma

Started February 1st

Managing and promoting digital preservation and research data services including the Texas Data Repository

TDR Steering Committee - *first meeting coming soon!*
2017 TCDL

May 23-25, Commons Learning Center, Austin, TX

• Early-bird registration deadline: April 14, 2017
• Special hotel rates through April 24, 2017

https://conferences.tdl.org/tcdl/

Texas Data Repository Workshop!
Learn More

Texas Data Repository
Texas Data Repository documentation
Dataverse Workshop slides. (from the TDL Data Symposium, November 2016)

Previous webinars:
- Session 1 Recording: http://hdl.handle.net/2249.1/79231 (“Getting Started with the Texas Data Repository and Data Competencies”)
- Session 2 Recording: http://hdl.handle.net/2249.1/79234 (“Teaching Data: Developing Data Instruction Using a Multi-Level Competency Model”)
- “Launching the Texas Data Repository: How to Implement TDR at Your Institution”

TDL Helpdesk: http://tdl.org/support/helpdesk/