Digital Scholarship Research Ecosystems

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Director, Collections and Digital Services
Texas State University Libraries

Presented for Association of South Eastern Research Libraries
April, 2020
What is a Digital Scholarly Research Ecosystem?

Network of Several Software Components to Enable Faculty and Student Research and Raise Research Profiles, Retrieval and Accessibility
Simple Larger Idea

Digital Ecosystem Metaphor Focuses Upon Relationships
Specifically Focusing Upon the Discrete Research Component Relationships
within the Networked Digital Environment
Digital Ecosystem Components Together Enable Various Parts of the Academic Research Cycle

Collocating Open Source Digital Components in a Networked Research Ecosystem Enables Connections and Larger Network Effects
Network Effects: Metcalfe’s Law

Early Telecommunications Law for Ethernet (1993)

The Systemic Value of Compatibly communicating components grows as the square of their number increases.

Component Networks may be Internal and/or External
Digital Research Ecosystem

Main Software Components

- Digital Collections Repository (Dspace)
- Research Data Repository (Dataverse)
- Identity Management System (ORCID)
- ETD Management System (VIREO)
- User Interface Software (OMEKA)
- Open Journal Software (OJS3)

Hardware: Digitization Lab
General Characteristics
Digital Scholarly Research Ecosystem

- Open Source Software
- Customizable Components
- Active Developer Communities
Texas State University Libraries
digital Scholarly Research Ecosystem
Primary Components
Organizes, centralizes and makes accessible research and knowledge generated by the institution’s research community (Faculty and Graduate Students):

Pre-prints
Faculty Publications
White Papers
Conference Presentations
Graduate Student Theses and Dissertations
Primary Use Case Value
Application of Structured Metadata Schema for Search Engine Optimization
Athermal annealing of low-energy boron implants in silicon

Donnelly, David W., Southwest Texas State University, Dept. of Physics;
Covington, B. C., Southwest Texas State University;
Grun, J., Naval Research Laboratory, Washington, DC;
Fischer, R. P., Naval Research Laboratory;
Peckerar, M., Naval Research Laboratory;
Felix, C. L., United Industries Inc.


Recommended Citation:
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This item appears in the following Collection(s)
- Faculty Publications-Physics

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Application of Structured Metadata Schema for Search Engine Optimization Opens Accessibility and Multiple Points of Access
Percent Increase in Article Citations by Discipline with Open Access Online Availability (Immediately Available Through Google)

Range = 36% - 250%

(Data: Stevan Harnad and Heather Joseph, 2014)
A Vast Majority of Publishers Allow Digital Archiving in some form. (82% from 2562 publishers)

March 2020 Sherpa/Romeo Copyright Polices & Self Archiving

Source: www.sherpa.ac.uk/romeo/statistics.php?la=en&fIDnum=&mode=simple
Digital Collection Repositories Give Insight and another window/Altmetrics Faculty/Student Research (Statistics)
Research Data Repository

Texas State University Dataverse
A platform for publishing and archiving Texas State University’s research data.

Dataverse

CAPTURE
Project Data from Experiments, Surveys Researchers and Scientists

CATALOG
Assign Metadata Schema, Specialized and Disciplinary Taxonomies, DOI, UNF

MANAGE
Administrative Online Research Data Archives

FIND/VIEW
Retrieve, Download Relevant Data Sets Instantaneously

Synthesize Research
Verification, Insight, Discovery Visualization, Harvesting and Linked Data
Data Citation and Metadata

Harvard Dataverse Network

REPLICATION DATA FOR: A MULTIVARIATE MODEL OF STRATEGIC ASSET ALLOCATION
hdl:1902.1/0BXRESLBQJUNF 3.7rYhZ2TeREKtAWEtEdPKA==

**CATALOGING INFORMATION**

If you use these data, please add the following citation to your scholarly references. Why cite?


Citation Format | Print ▼

Results found in this publication can be replicated using these data.

Original Publication


Publications


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<td>John Y. Campbell (Harvard University); Yeung L. Chan; and Luis Viceira</td>
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The Dataverse can be configured as a single Instance or as a Consortial Model

(Texas Aggregates 22 Individual Instances, through the Texas Digital Library)
Share, publish, and archive your data. Find and cite data across all research fields.

Welcome to the Texas Digital Library Test Dataverse!

IMPORTANT: This Dataverse server does NOT include the TwoRavens add-on.

Because of this, you may receive errors when ingesting certain datasets and the "explore" button will not work.

Search options:
- Find
- Advanced Search
Collaboration Across Institutions Continues to Increase

Network Effects of Digital Ecosystems Allow Opportunities among Research Institutions
Digital Scholarly Research Ecosystem

Secondary Components
(Dependent on and work in Concert with Primary Digital Repositories for their Content and Data)
Vireo

Electronic Thesis and Dissertation Management System

• Addresses Intermediary steps in the ETD Process
• Bridges Student Thesis/Dissertation Submission with Graduate School Review, Online Publication and ETD Preservation
• Connects with Both the Collections Repository And Data Repository so students can publish and link their theses, dissertations and data
Researcher Identity Management System

- Gives Researchers Unique Number (ORCID ID) Connecting and Disambiguate Scholars names
  Maria Hernandez, Biochemist
  Maria Hernandez, M.D. or Astrophysicist

- Allows publications from a researcher to be found, linked and aggregated across multiple information Systems. Essentially, papers in the collections repository and datasets in data repository can be associated with ORCID ID’s for aggregation of research profiles.

Orcid can act as a Network Hub aggregating from several sources and connecting to other internal and external networks
Omeka and OJS

Open Source User Interface Software
Allows an elegant portal/gateway entrance for large research projects, digital collections and data repositories - linking research texts, images, media and research datasets and acting as a middleware front end to connect components and component networks.

Open Access Academic Journal Software for refereed journal workflow, online publishing. Allows connections to Dataverse/Dspace to background research and datasets etc.
The Digitization Lab
Expands Possibilities for Faculty and Graduate Student Research Projects

Digitization possibilities on research levels range from OCR to and textual digitization digitization to images, 3D objects, audiovisual and visualization possibilities (IIIF etc)

(i.e. Digitization Lab’s IIIF Framework can create internal or globally distributed Image Libraries.)
Combining These Research Ecosystem Components
Opens Amazing Possibilities For Digital Scholarship & Research Collaboration Opportunities

**Cognitive Cartography/Multimedia Archives**
(Video, Text, GIS, Images, Field Notes)
*Dick Reavis: National Tour of Texas*

**Multimedia, Digital Archives/Retrospective ETD Projects**
(Digital video, online exhibit images, text, digital archives)
*Severo Perez: And the Earth Did not Swallow Them*

**Online Exhibits/Digital Archives/Online Academic Journals**
(Images and text, Omeka front end/Database back end, IIIF)
*Cabeza de Vaca La Relacion Digitization*
*Santiago Tafolla: Mexican Amer. Confederate Soldier*

**Interactive Image Archives/Data & Research Projects**
(Image libraries, Interactive Commenting/Metadata)
*Texas State Flickr Commons*

**Digital Libraries Archiving & Documentation Projects**
(Text, Metadata, OCR, Search, Zoom ability, Page Turning)
*Pedagogs University Yearbooks*

**Projects, Prototypes Grant Partnerships**

**Complexity**

**Faculty Digitization Proposals/Partnerships**
Assessment and Results
Quantitative and Qualitative Measures

Annual Usage Growth
(Downloads, Number of Items, ORCID ID’s and Hosted Journals)

Ecosystem Implemented in Stages, 2014-2019

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LibQual Biannual Survey
2013-2019, Faculty and Student System Perceptions, Comments

Making electronic resources accessible from my home or office

- Perceived 2019
- Perceived 2017
- Perceived 2015
- Perceived 2013
Timelines and Implementation Paths
Many Roads To Rome (1-5 Year Paths)

Year 1
Digital Collection Repository and Digitization Lab

Year 2
User Interface Software (OMEKA), Identity Management System, ORCID

Year 3
Data Repository

Year 4
ETD Middleware (VIREO) and OJS Software

Year 5
Complex Digitization Projects, IIIF Server, Faculty Grant Projects etc.
Human Resources

• System Administrator/Programmer
  server infrastructure set-up/maintenance/basic customization

• Digital Collections Librarian: Administration, Marketing, User Support, Collections and Data Repository, OJS/ORCID

• Metadata Librarian: Dublin Core, Specialized Schema

• Web Developer/Programmer: OMEKA, System Integration

• Project Manager/Department Head (PMP Certification)

• Digitization Specialist

• GIS Specialist/Data Visualization Specialist

• AI Specialist/Post-Doc/CLIR Fellow
Summary Reflections

Placing Digital Scholarship Components within an Ecosystem Paradigm Enables:

1) Better Guidelines and Roadmaps for Developing Digital Scholarly Components

2) Pathways Forward and Evolutionary Possibilities for Digital Research System Development

3) New Possibilities For Researchers within the academic research cycle
Adoption Lifecycle, 2020
Digital Scholarship Research Ecosystems
Future Pathways
Networked Global Scholarly Research Environment
Questions, Comments

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http://rayuzwyshyn.net

Texas State University Libraries Website. [https://www.library.txstate.edu/](https://www.library.txstate.edu/)

Texas State Digital Collections Repository [https://digital.library.txstate.edu/](https://digital.library.txstate.edu/)

Texas State Data Research Repository [https://dataverse.tdl.org/dataverse/txstate](https://dataverse.tdl.org/dataverse/txstate)

Texas State Online Research Identity Management System: [https://guides.library.txstate.edu/researcherprofile/orcidTexas](https://guides.library.txstate.edu/researcherprofile/orcidTexas)

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Texas State Digital & Web Services: [https://www.library.txstate.edu/services/faculty-staff/digital-web-services.html](https://www.library.txstate.edu/services/faculty-staff/digital-web-services.html)
Can we Enable Scholarly Research Network Ecosystem Possibilities on Global Levels?

Is it Desirable or Time to Begin Thinking About Empowering a Global Research University Community?
Research Universities and Digital Research Ecosystems

• \( \sim 266-300 \) Research Institutions US & Canada
  Carnegie R1 & R2, Very High or High Research Activity

• \( \sim 1000-1250 \) Research Universities Worldwide
  QS Rankings and Times Higher Education Supplement. (40% Europe, 26.5% Asia Pacific, US/Canada 18%, Latin America 9% and Middle East/Africa.

• Enable Top 2-3% Research Institutions Globally, 1000 Institutions beyond the US and Canada.
  (This represents the other 90% of Research Libraries Globally)
One Server Per Research Institution
2020-2025

• Empower 1000 Research University Institutions/Research Libraries Globally

• Gift each Research University One Configured Server Ecosystem with 6 Open Source Scholarly Research Software Components, < $1000.00 US/Server or set up Fractional Server Space with Mirror Sites Globally (SAAS)

• Set Up brief weeklong training over five continents

• Connect Networks

• Measure the Effects
Brainstorming Models

One Laptop Per Child

Dreamed up mid-late 90’s, Launched 2005

- Nicholas Negroponte, MIT Media Lab Founding Director
- Noble Initiative/Grand Ambitions
- Vision: Give each child in world access to a laptop with open source software for less than 100.00 $US/laptop
- Gage Effects For Education Globally
- Can We do the same thing for academic research globally?
Larger Digital Scholarly Research Projects Can Act as Qualitative/Quantitative Benchmarks

Cognitive Cartography/Multimedia Archives
(Video, Text, GIS, Images, Field Notes)
**Dick Reavis: National Tour of Texas**

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**Pedagog** University Yearbooks

Faculty Digitization Proposals/Partnerships

1) Project Completion (Milestones)
2) Usage Statistics
Research Universities and Digital Research Ecosystems

• **~266-300** Research Institutions US & Canada, Carnegie R1 & R2, Very High or High Research Activity, 124 ARL Libraries

• **~1000-1250** Research Universities Worldwide
  
  QS Rankings and Times Higher Education Supplement. (40% Europe, 26.5% Asia Pacific, US/Canada 18%, Latin America 9% and Middle East/Africa.

• **26,000-40,000** Universities Globally. Research Universities 2.7% - 4.2% of all universities worldwide. Highest by Country: **US 156**, UK 76, Germany 45, Japan 44.

• Other Top 2-3% Research Institution Academic Libraries Globally, 1000 Institutions beyond the US and Canada. This represents the other 90% of Research Libraries Globally
Research Universities and Digital Research Ecosystems

- **124** ARL Research Libraries (US and Canada)
- **131** US Research Universities (Carnegie R1, Very High Research Activity)
- **135** Doctoral Universities (Carnegie R2, High Research Activity, US), ~266-300 Research Institutions US & Canada
- **1011** Research Universities Worldwide (40% Europe, 26.5% Asia Pacific, US/Canada 18%, Latin America 9% and Middle East/Africa. QS Rankings
- **1250** Research Universities Worldwide, *Times Higher Education Supplement* (2.7% - 4.2% of all universities worldwide)
- By Country: **US 156**, UK 76, Germany 45, Japan 44
- Global Estimates of General University #’s **26,000-40,000**

Empower Other Top 2-3% Research Institution Libraries Globally, 1000 Institutions, the other 90% of Research Libraries Globally
Combining Components
System Synergies
Digital Scholarly Research Ecosystem
Network Effects
Both In and Between Individual Components and In and Among Component Networks

1) ORCID Aggregates from Several Sources and Networks and Connects to Other Networks, Internal and External
2) OMEKA can act as a middleware front end connecting several components and component networks internally.
3) Digitization Lab’s IIIF Framework can create internal or globally distributed Image Libraries.
4) Dataverse can be configured as a single Instance or as a Consortial Model (Texas 22 Individual Instances, TDL)
Ecosystem as System Enables Core Research

• Articles, Theses, Dissertations in the collections repository can be associated with datasets in the data repository for reference, verification or reproducibility.

• Journal article citation lists can be associated with articles and datasets in the Collections and Data Repositories

• Further Desired Connections can also guide developmental paths for both component software and the ecosystem
## Assessment and Results

### Quantitative and Qualitative Measures

#### Annual Usage Growth

- **(Downloads, Number of Items, ORCID ID's and Hosted Journals)**

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  - Perceived 2015
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