

Digital Scholarship Ecosystems for Open Science

(Lightning Talk)

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Texas State University Libraries

Presented for AIDR and Open Science
Symposium, Carnegie Mellon University
October 20, 2020



Repository



Identity Management System



Elect

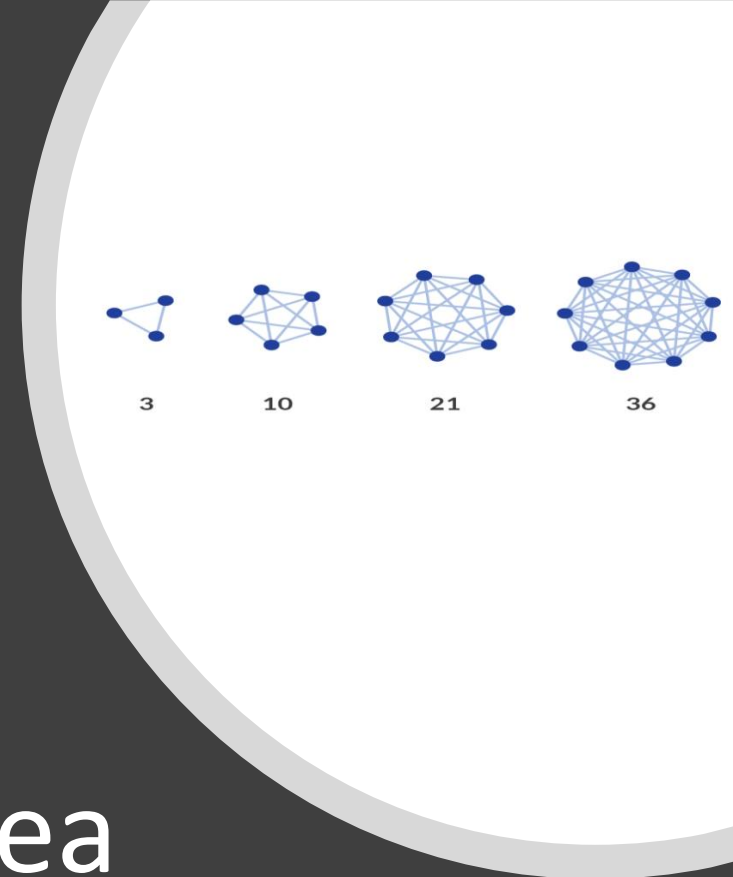
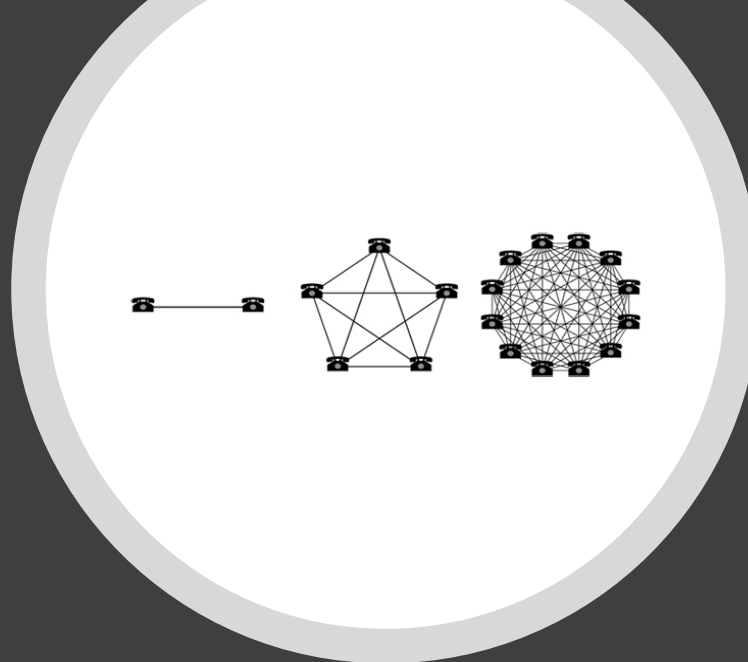
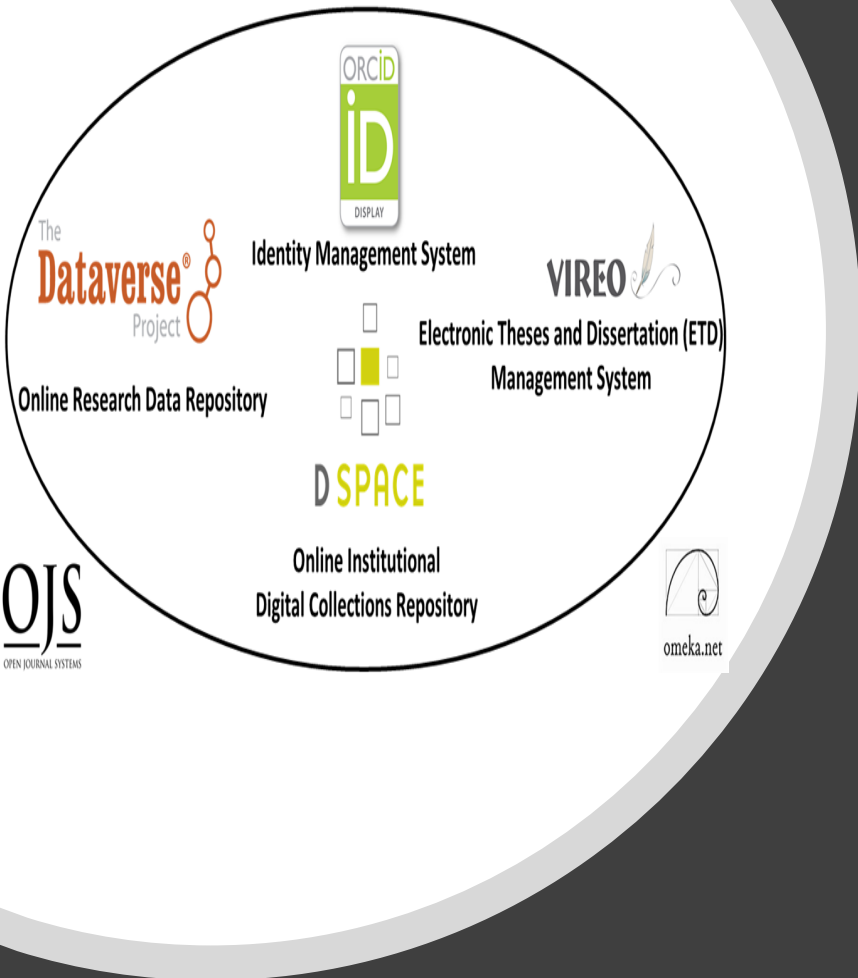
DSpace

Online Institutional
Digital Collections Repository

What is a Digital Scholarship Ecosystem for Open Science?

Network of Several
Software Components to Enable
Research Faculty & Graduate Students
and Raise Research Profiles

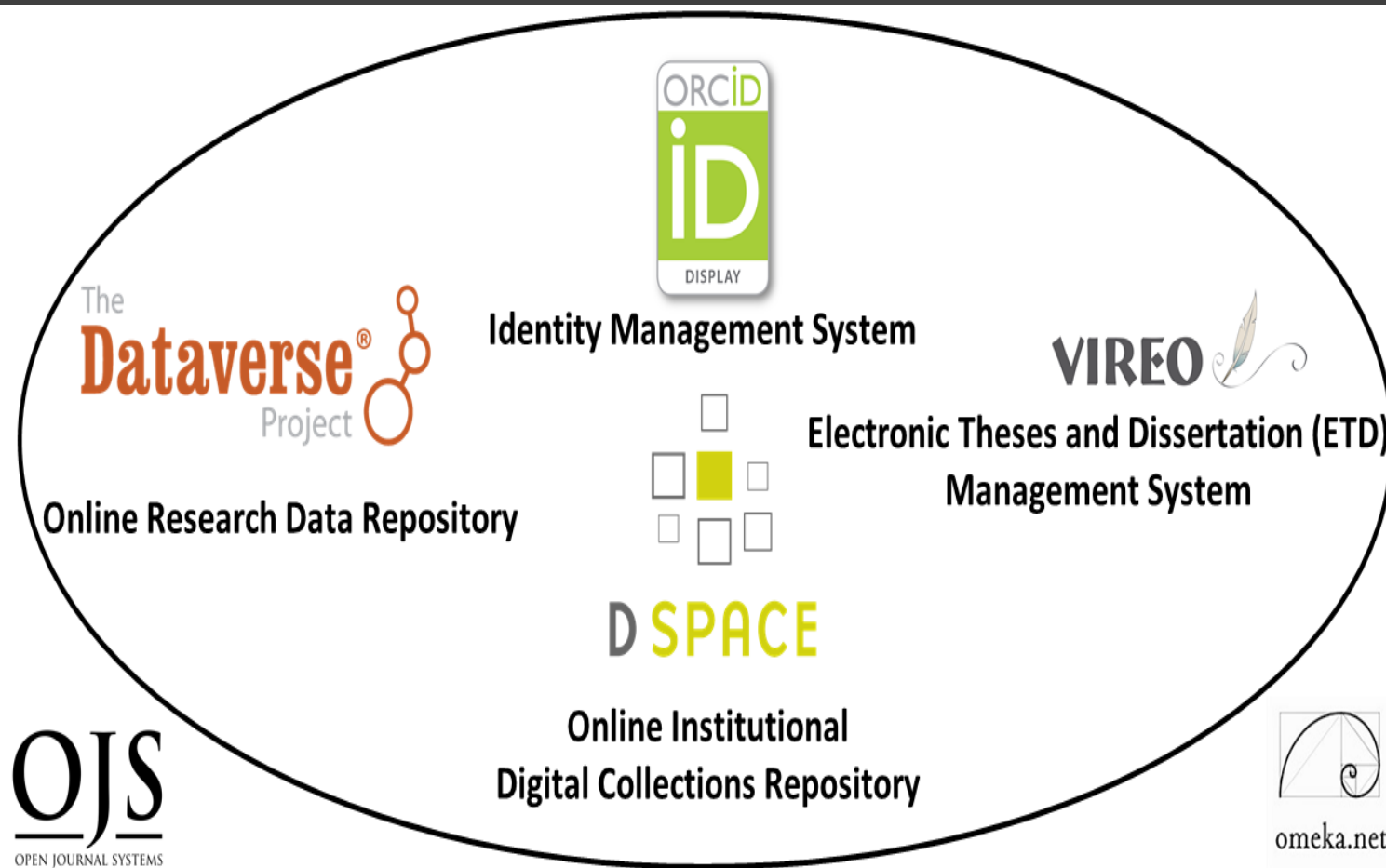




Simple Larger Idea

Collocating Open Source Digital Components in a Networked Research Ecosystem Enables Larger Connections and/or Network Effects

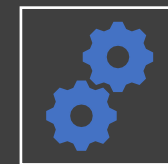
What are the General Characteristics of this Digital Scholarship Ecosystem?



Open Source
Software

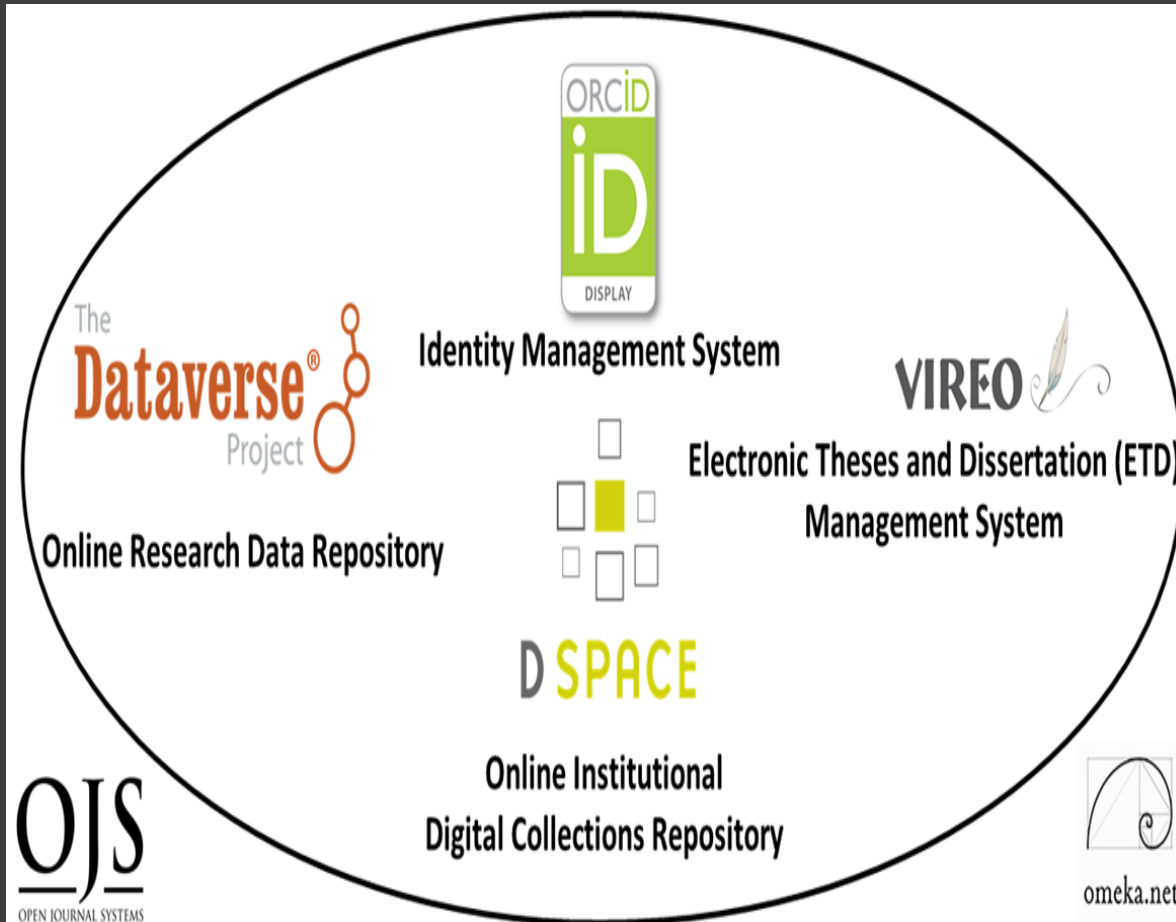


Active Developer
Communities



Customizable
Components

Digital Scholarship Ecosystem Consists of Six Open Source Software Components



TWO PRIMARY

- RESEARCH DATA REPOSITORY
- DIGITAL COLLECTIONS REPOSITORY

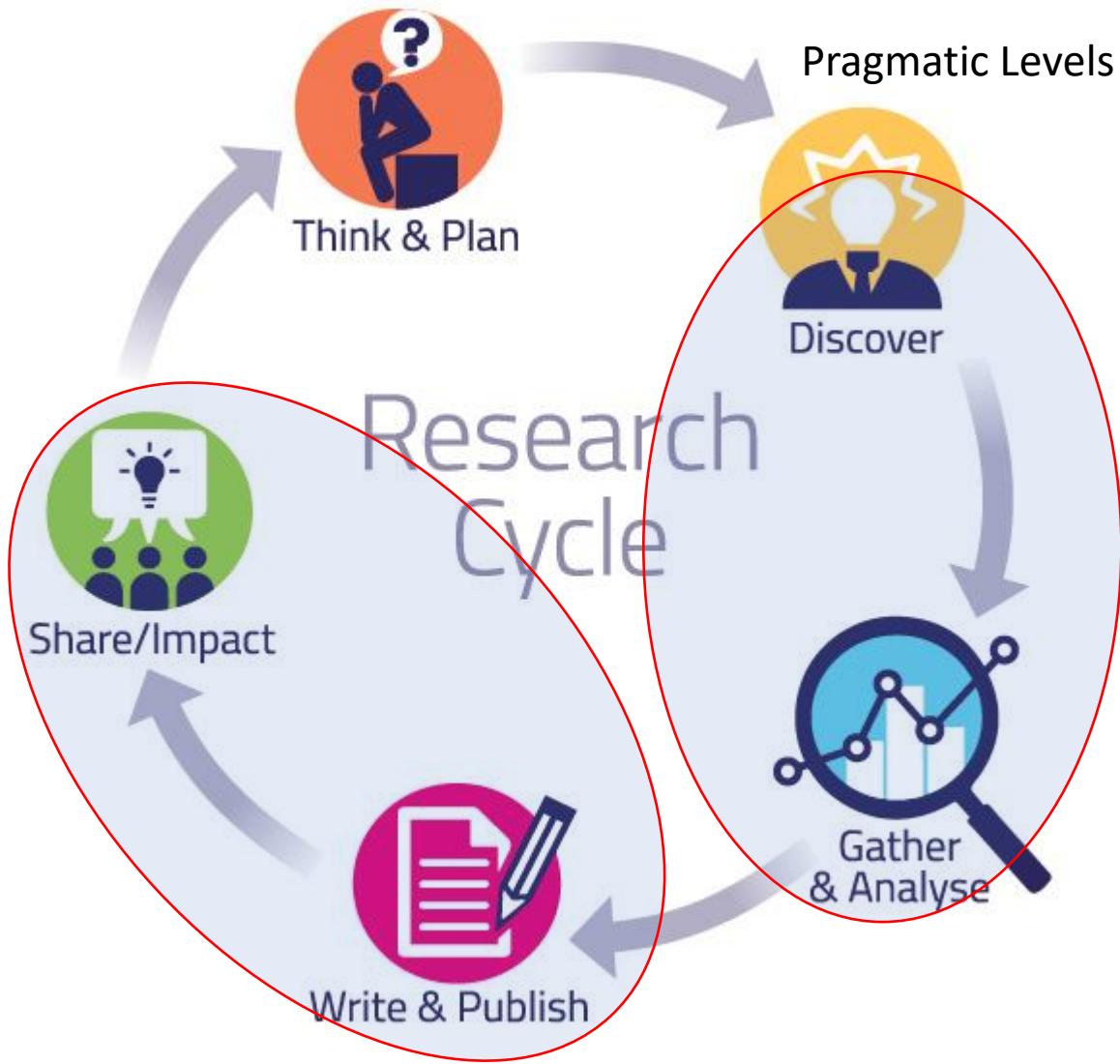
Content

FOUR TERTIARY

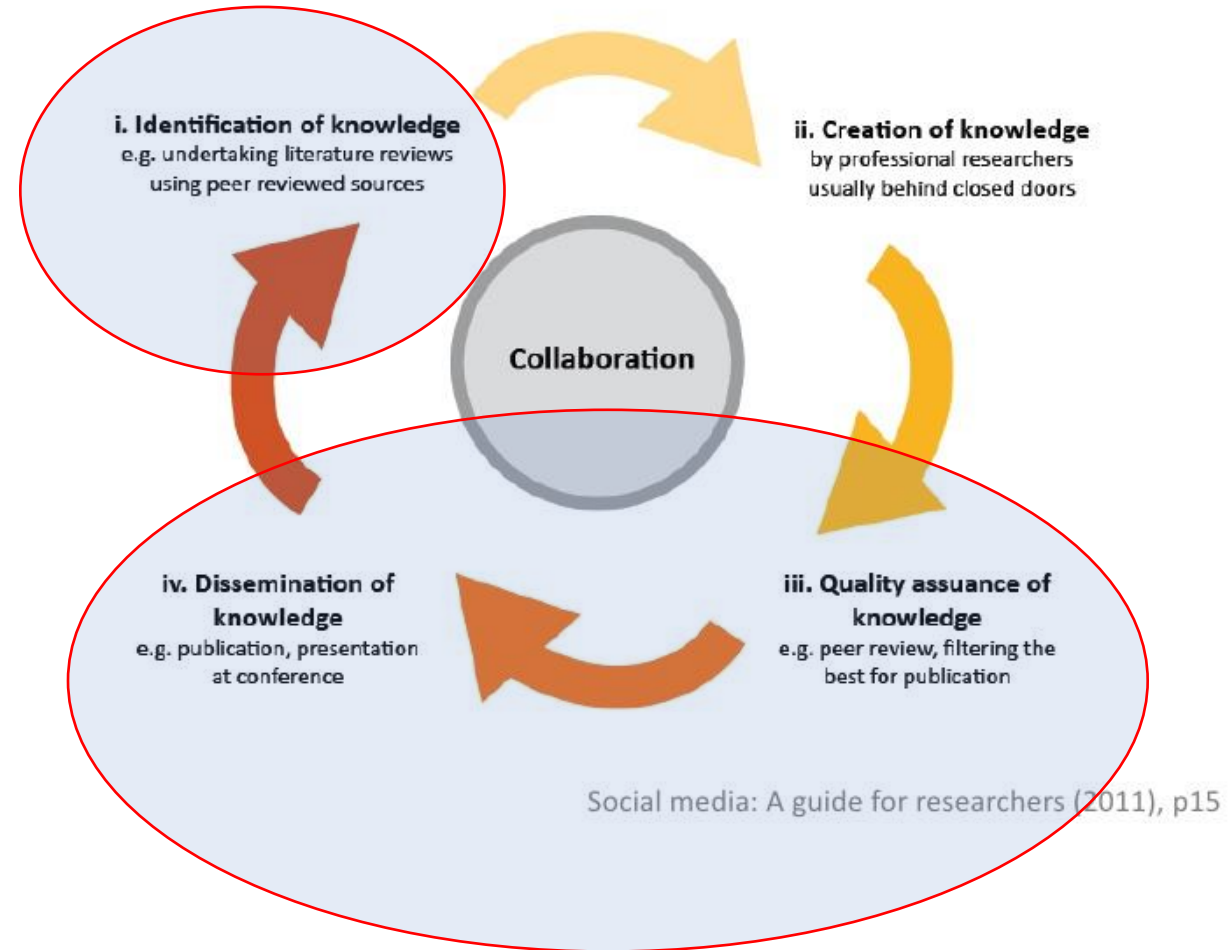
- Electronic Thesis and Dissertation Management System
- Identity Management System
- Open Academic Journal Software
- User Interface/Content Management Software

Communication

These Digital Ecosystem Components Together Enable the Academic Research Cycle



The academic research cycle



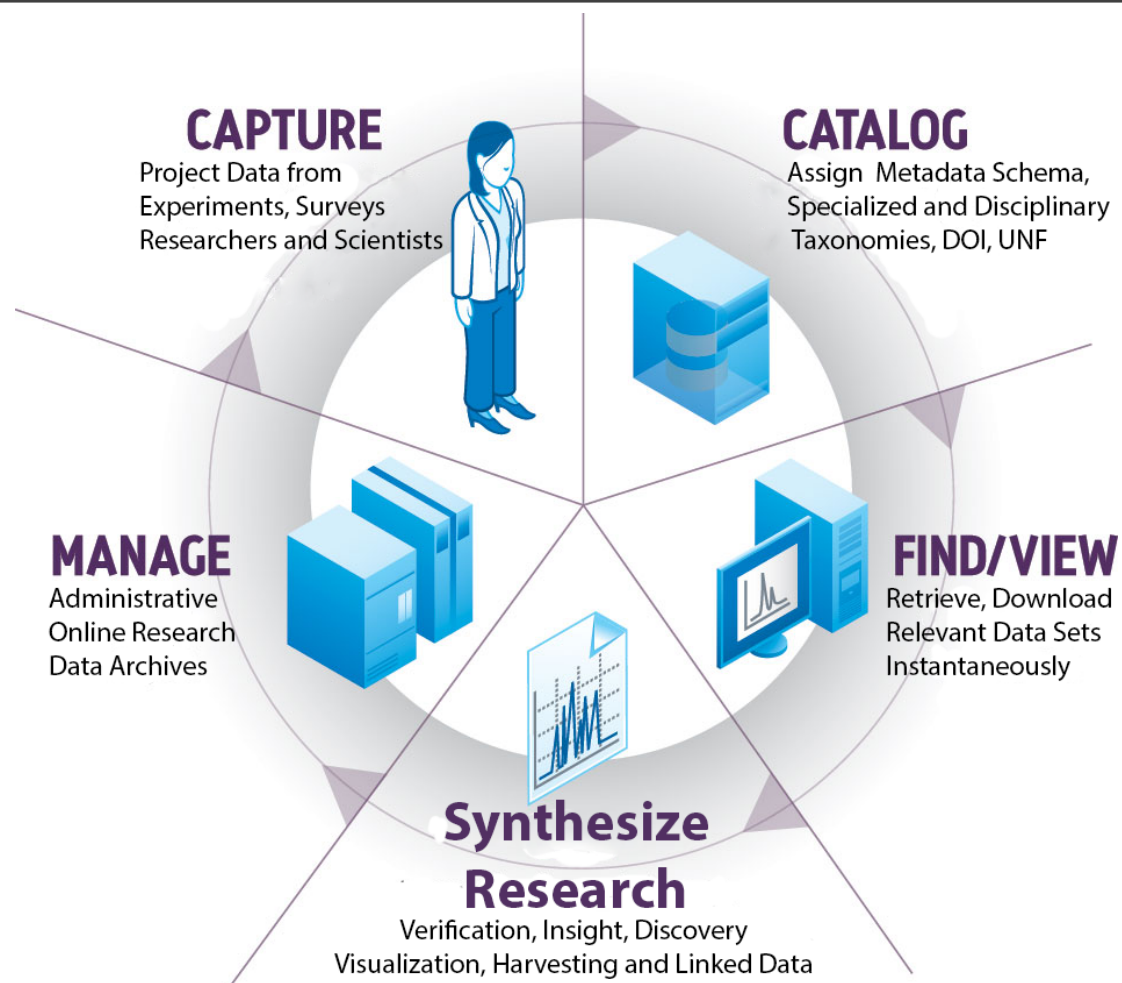
#1 Component for Open Science, Research Data Repository



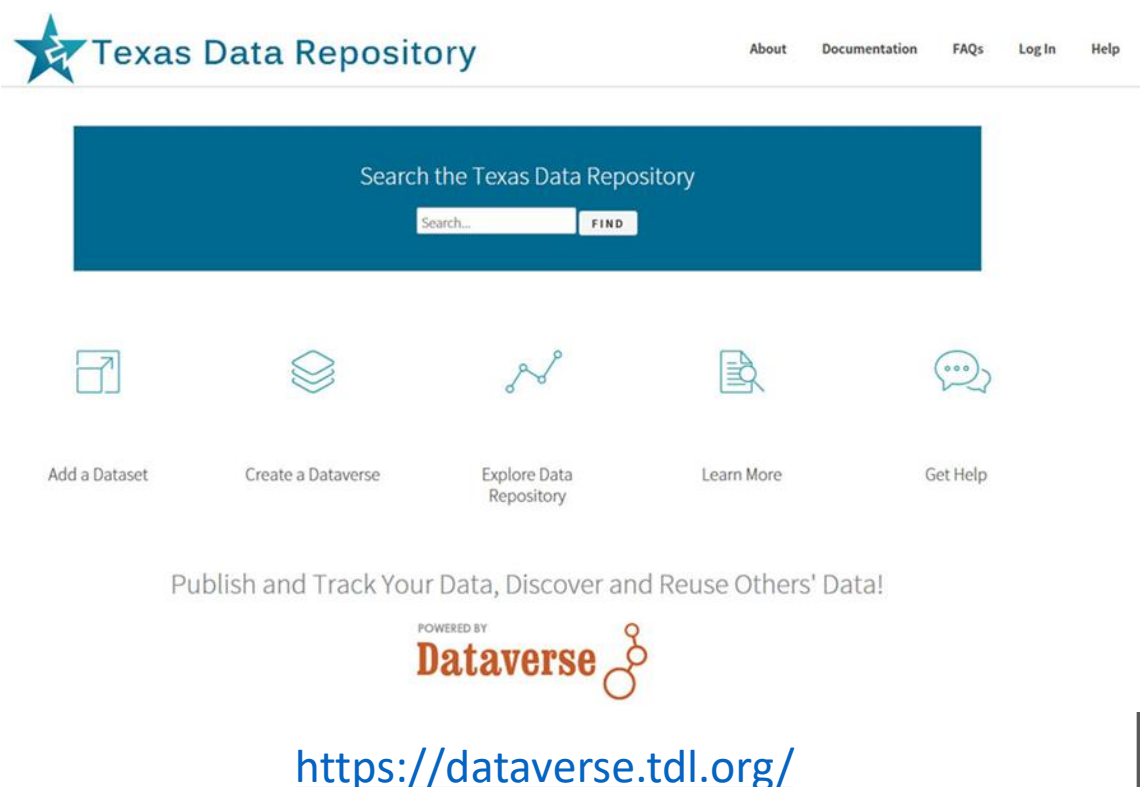
<https://dataverse.tdl.org/dataverse/txstate>

Research Data Repository

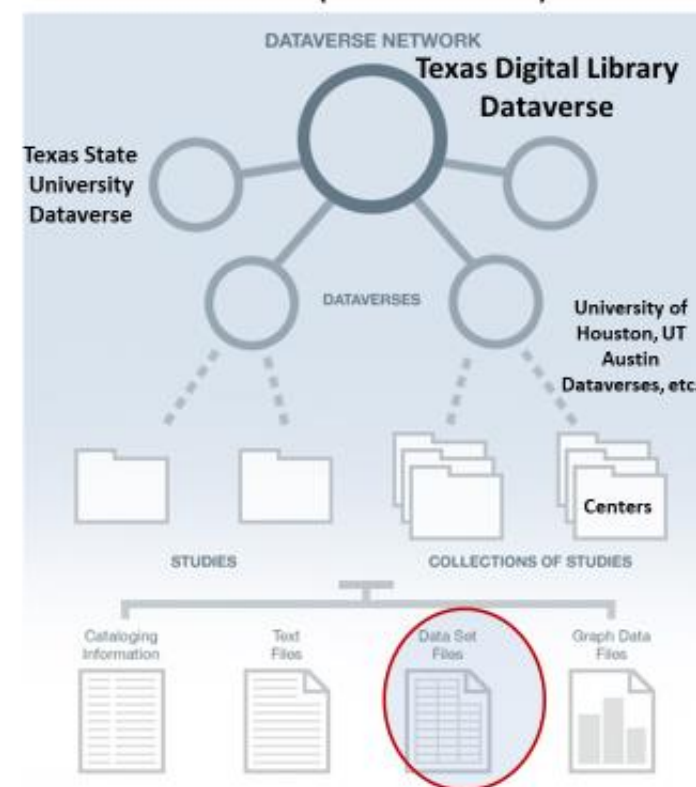
<https://dataverse.tdl.org/dataverse/txstate>



Dataverse can be configured as Single Instance or as a Consortial Model



Dataverse Architecture (Consortial)



(Texas Aggregates 22 Individual Instances, through the Texas Digital Library)



#2 Institutional Digital Collections Repository (Dspace)

Organizes, centralizes and makes accessible research and knowledge generated by the institution's research community (Research Faculty and Graduate Students):

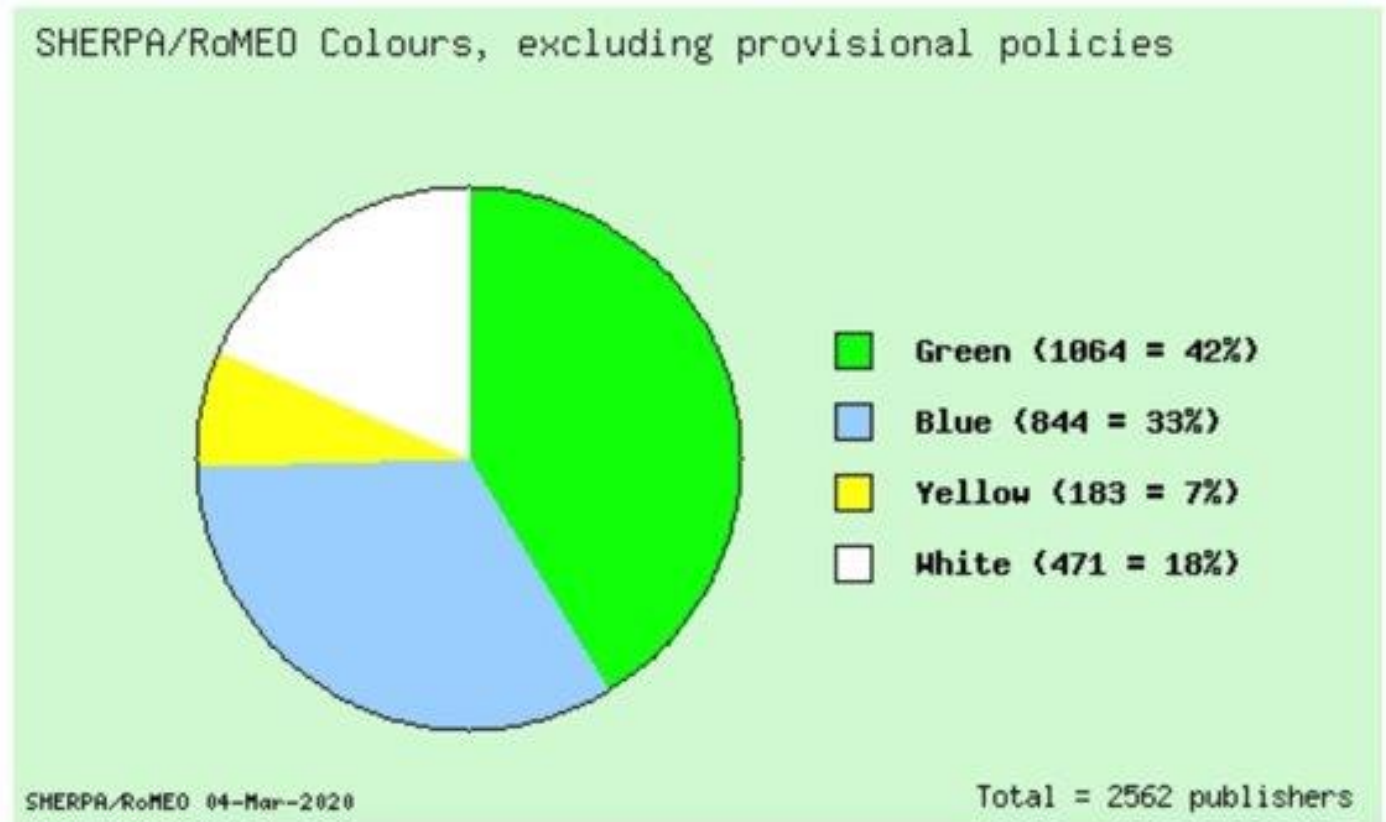
- Pre-prints
- Faculty Publications
- White Papers
- Conference Presentations
- Graduate Student Theses and Dissertations

A Vast Majority of Publishers Allow Digital Archiving in some form. (82% from 2562 publishers)

March 2020 Sherpa/Romeo Copyright Policies

RoMEO colour	Archiving policy	Publishers	%
green	Can archive pre-print and post-print	1064	42
blue	Can archive post-print (ie final draft post-refereeing)	844	33
yellow	Can archive pre-print (ie pre-refereeing)	183	7
white	Archiving not formally supported	471	18

Summary: **82%** of publishers on this list formally **allow** some form of self-archiving.



Google search results for "Athermal annealing of low-energy boron". The search bar shows the query. Below the search bar, it says "About 105,000 results (0.36 seconds)". The first result is "Scholarly articles for athermal annealing of low-energy boron". Below this, there are several links to articles, including "Athermal annealing of low-energy boron implants in silicon" by Donnelly, David W., and B. C. Covington.

dc.contributor.author	Donnelly, David W.	
dc.contributor.author	Covington, B. C.	
dc.contributor.author	Grun, J.	
dc.contributor.author	Fischer, R.P.	
dc.contributor.author	Peckerar, M.	
dc.contributor.author	Felix, C. L.	
txstate.contributor.author	Donnelly, David W., Southwest Texas State University, Dept. of Physics	
txstate.contributor.author	Covington, B. C., Southwest Texas State University	
txstate.contributor.author	Grun, J., Naval Research Laboratory, Washington, DC	
txstate.contributor.author	Fischer, R.P., Naval Research Laboratory	
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txstate.contributor.author	Felix, C. L., United Industries Inc.	
dc.date.available	2013-07-19T16:20:49Z	
dc.date.issued	2001-04-02	
dc.identifier.uri	https://digital.library.txstate.edu/handle/10877/4675	
dc.subject	"Athermal annealing", "baron implants", silicon	en_US
dc.title	Athermal annealing of low-energy boron implants in silicon	en_US
dc.language.iso	en_US	en_US

Access
Findable
Search Engine
Optimization

Primary Use Case Value Application of Structured Metadata Schema for Search Engine Optimization

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#2 of 105,000
Immediately
Available

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dc.subject	"Athermal annealing", "baron implants", silicon	en_US
dc.title	Athermal annealing of low-energy boron implants in silicon	en_US
dc.language.iso	en_US	en_US

Digital library page for "Athermal annealing of low-energy boron implants in silicon". The page shows the title, authors (Donnelly, David W., Covington, B. C., Grun, J., Fischer, R.P., Peckerar, M., and Felix, C. L.), and the institution (Southwest Texas State University, Dept. of Physics). It also includes a "Download" button and a "View/Open" link. The page is part of the "Faculty Publications-Physics" collection.

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.

Comments:

Original publication information [Appl. Phys. Lett. 78, 2000 \(2001\)](#)

Recommended Citation:

Donnelly, David W. and Covington, B. C. and Grun, J. and Fischer, R.P. and Peckerar, M. and Felix, C. L., "Athermal annealing of low-energy boron implants in silicon" (2001). *Applied Physics Letters*.
<https://digital.library.txstate.edu/handle/10877/4675>

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Download



Name: Donnelly- 2001 APL ...
Size: 322.5Kb
Format: PDF

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<https://digital.library.txstate.edu/>

Contributor	dc.contributor.author	Donnelly, David W. 🇺🇸	
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Title	dc.title	Athermal annealing of low-energy boron implants in silicon	en_US
Language	dc.language.iso	en_US	en_US

Dublin Core
Metadata

Access Points

Findability

Search Engine
Optimization (SEO)

Google

athermal annealing of low-energy boron



Web

Shopping

Images

Videos

News

More ▾

Search tools

About 105,000 results (0.36 seconds)

Scholarly articles for athermal annealing of low-energy boron

Athermal annealing at room temperature and ... - Shao - Cited by 19

Athermal annealing of low-energy boron implants in ... - Donnelly - Cited by 10

Hydrogen passivation of silicon carbide by low-energy ... - Achziger - Cited by 53

Athermal annealing of low-energy boron implants ... - Scita...

scitation.aip.org/content/.../1.1359784?... ▾ American Institute of Physics ▾

by DW Donnelly - 2001 - Cited by 10 - Related articles

Athermal annealing of low-energy boron implants in silicon. D. W. Donnellya) and B. C. Covington. Department of Physics, Southwest Texas State University, ...

Athermal annealing of low-energy boron implants in silicon

digital.library.txstate.edu ▾ ▾ Faculty Publications-Physics ▾

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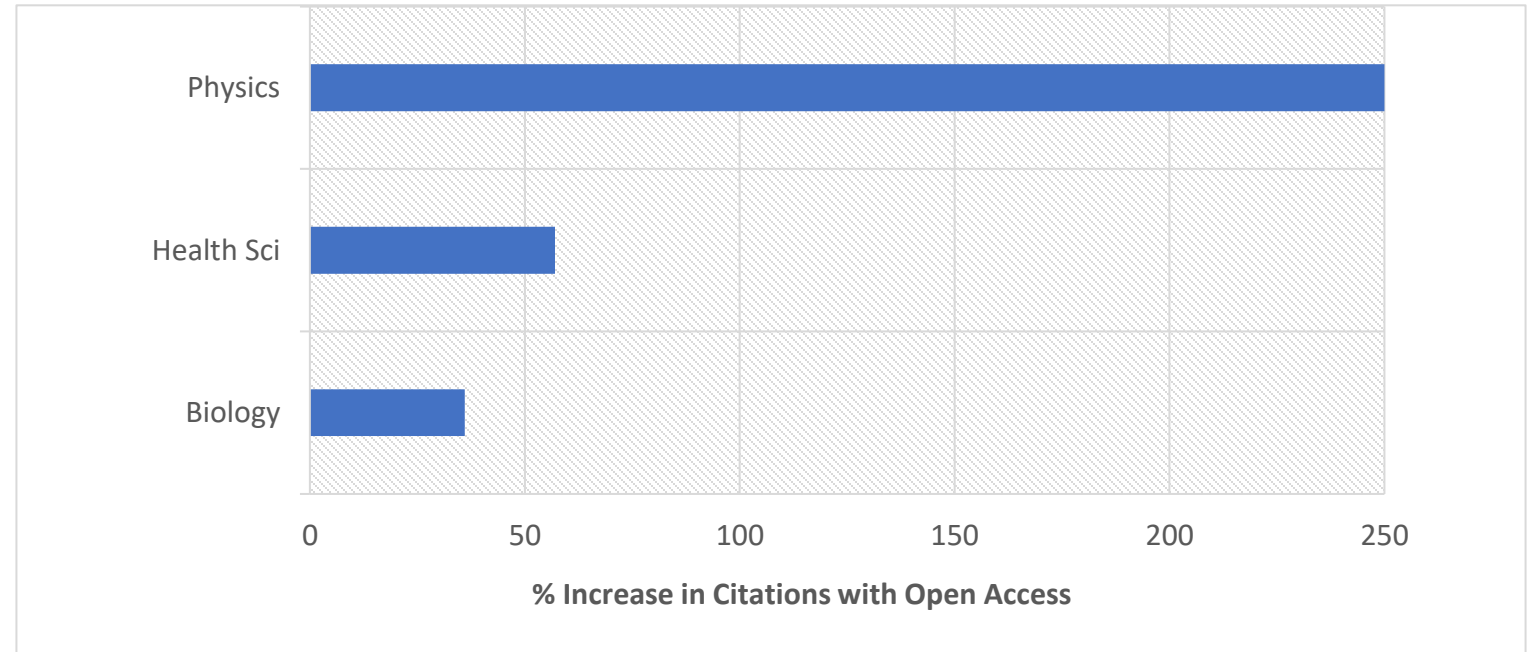
Athermal annealing at room temperature and enhanced ...

connection.ebscohost.com/.../athermal-annealing-room-temperature-enh... ▾

Athermal annealing of implantation damage induced by low energy boron implants at room temperature was observed after coimplantation and such annealing ...

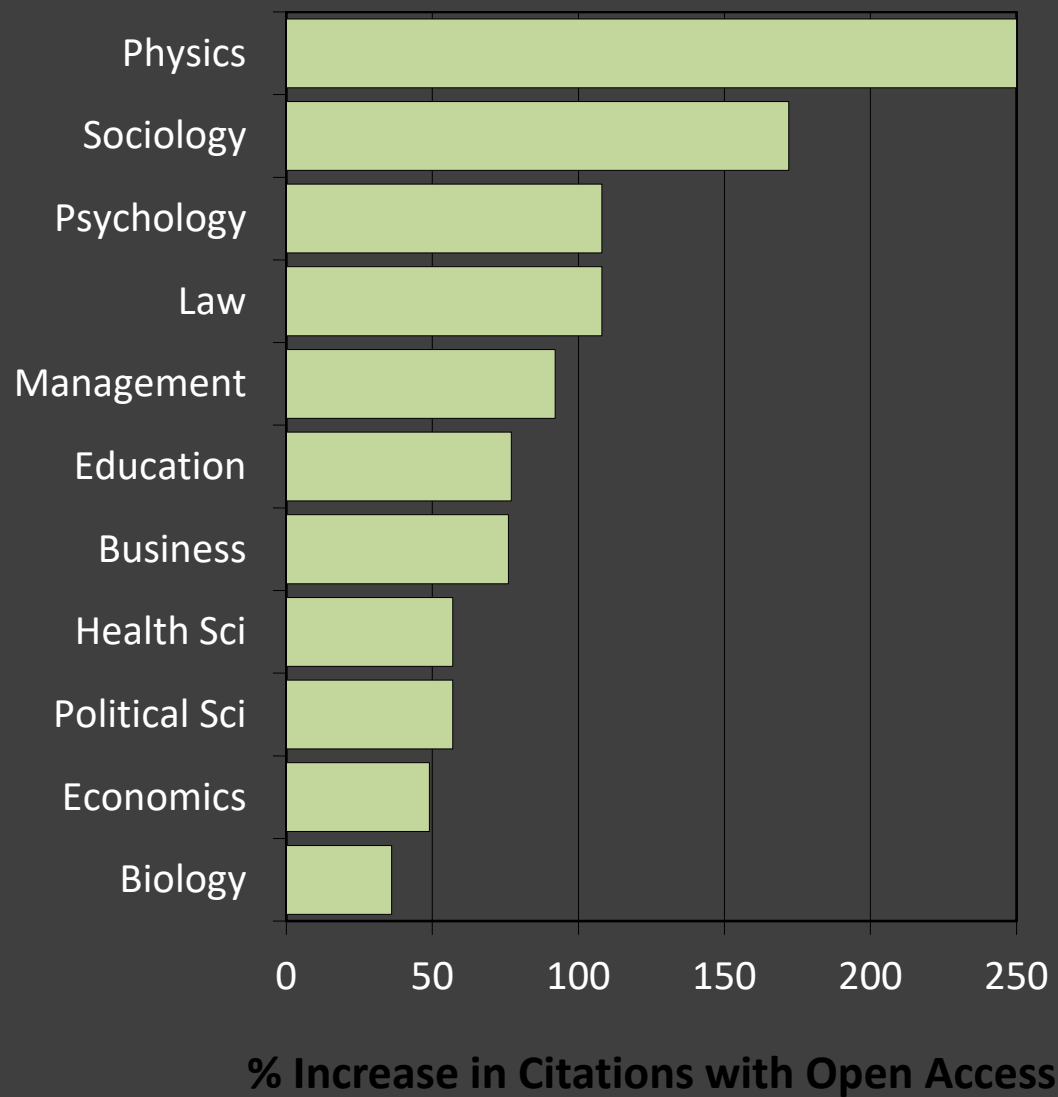
#2 of 105,000
Immediately
Available

Percent Increase
in Article
Citations by
Discipline with
Open Access
Online Availability
Through Google



**Range = 36%-250% Increase in Citations over 2 Year
period**

(Data: Stevan Harnad and Heather Joseph, 2014)



Percent Increase in Article Citations by
Discipline with Open Access Online
Availability Through Google

Range = 36%-250%

(Data: Stevan Harnad and Heather Joseph,
2014)

Vireo



Electronic Thesis and Dissertation Management System

- Bridges Student Thesis/Dissertation Submission with Graduate School Review,
- Connects the Collections Repository And Data Repository so graduate students can publish and link their theses/dissertations, data and research
- Addresses Intermediary steps in the ETD Process



ORCID is a hub connecting the research landscape



Researcher Identity Management System

- Gives Researchers Unique Number (ORCID ID) Connecting and Disambiguate Scholars names:

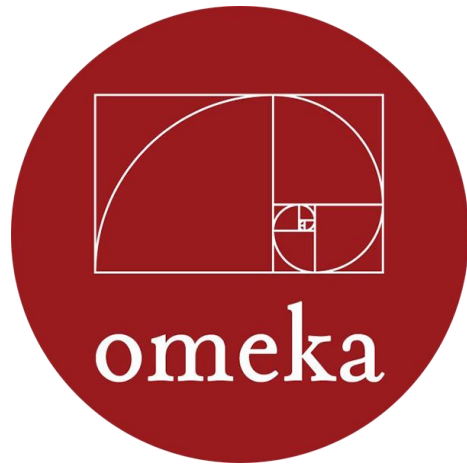
Maria Hernandez, Biochemist

Maria Hernandez, M.D. or Astrophysicist

- Allows Papers in the collections repository and datasets in data repository to 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 OJS3



Open Source User Interface Software

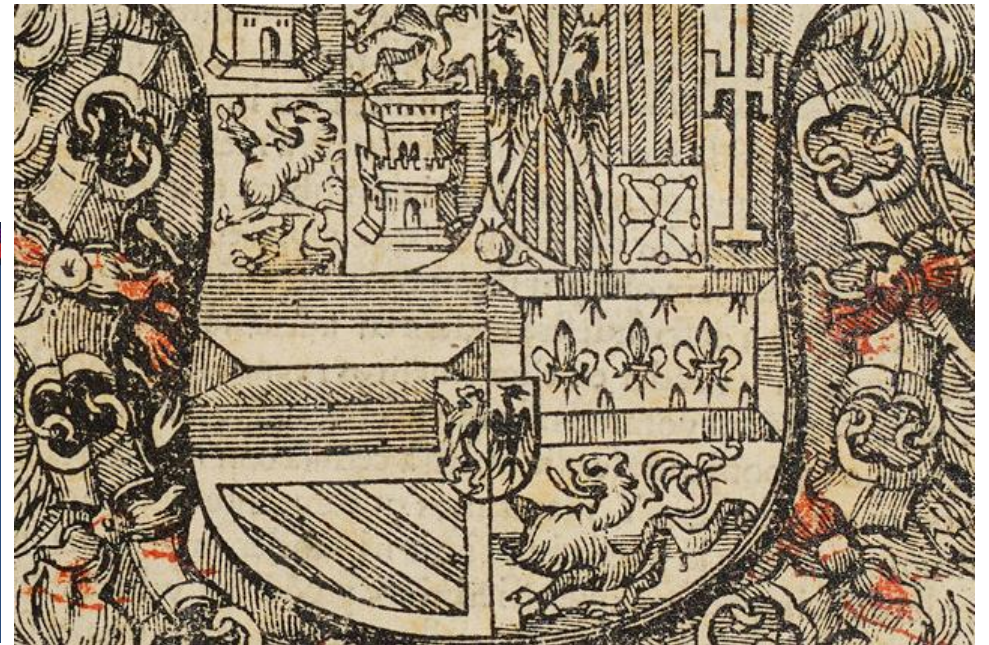
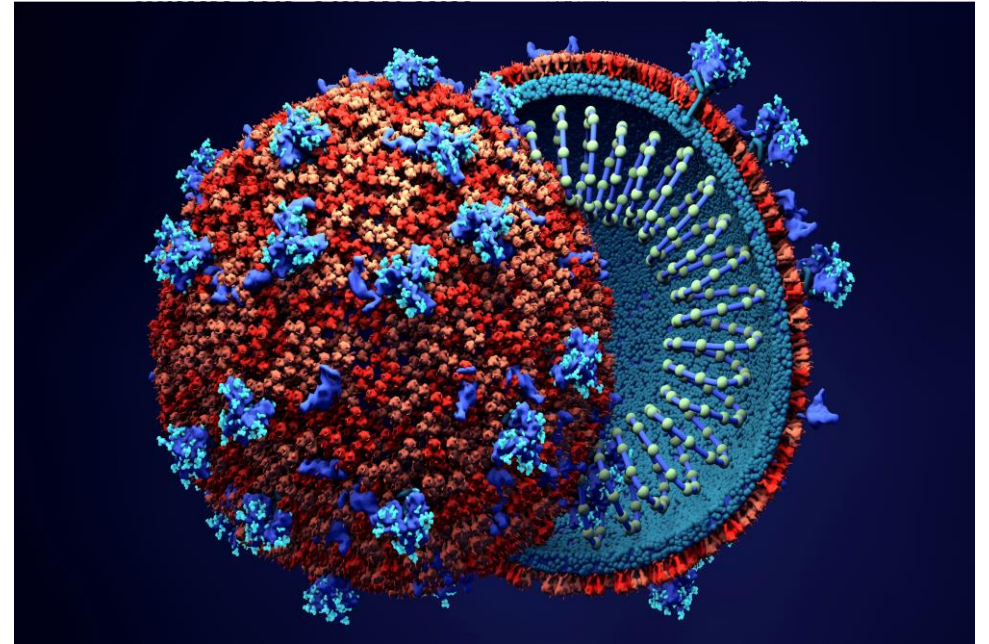
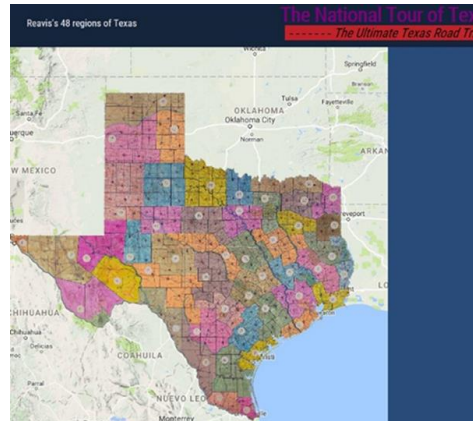
Provides a front end gateway for more complex research projects
- linking text, image media and datasets and acting as a front end for connecting components.



Open Access Academic Journal Software for refereed journal online publishing, workflow and connections with background research and datasets etc. through Dataverse/Dspace connections

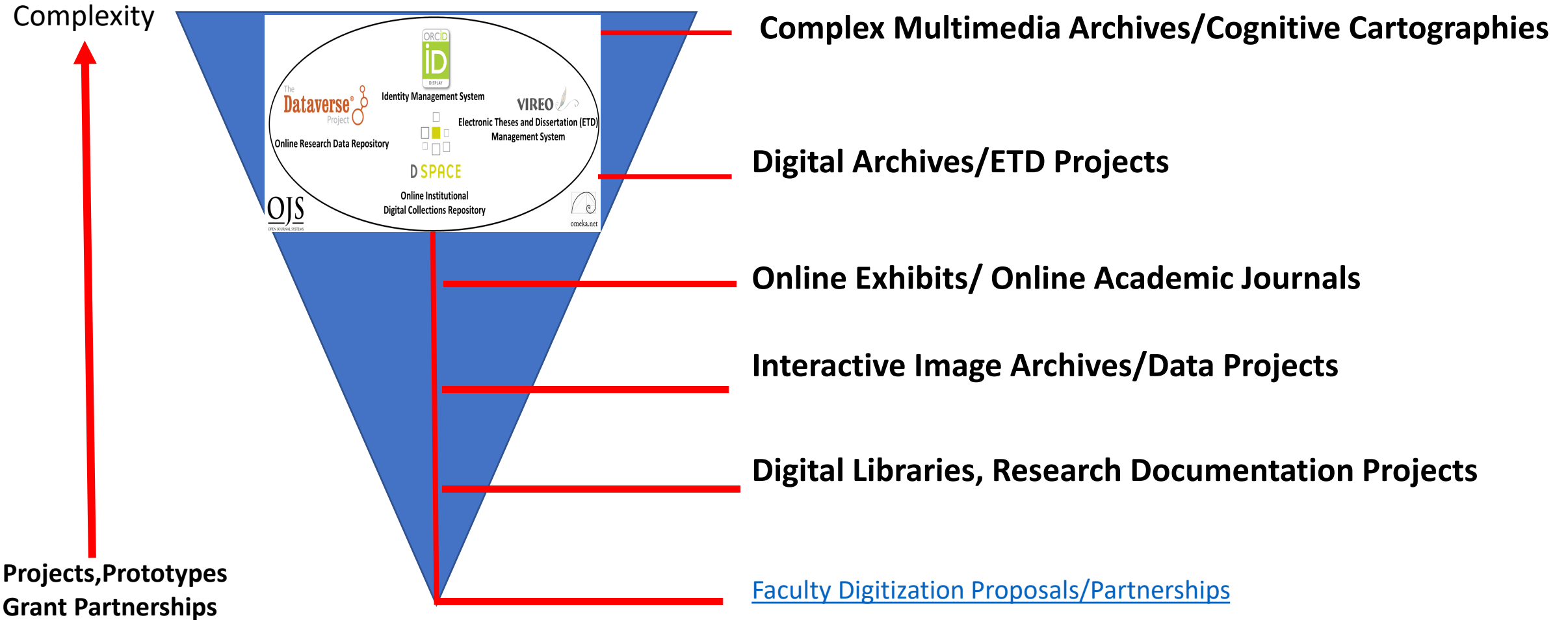
The Digitization Lab

- Expands Possibilities for Faculty/Graduate Student Research Projects
- Possibilities range from OCR, scientific slides, image, manuscript & journal digitization to 3D objects, audiovisual material, GIS and visualization technologies



Together, These Research Ecosystem Components

Open Amazing Possibilities For Digital Scholarship & Collaboration



HUMAN RESOURCES



Human Resources

Essential

- **System Administrator/Programmer**
server infrastructure set-up/maintenance/basic customization
- **Digital Collections Librarian:** Administration, Marketing, User Support, Collections and Data Repository, OJS/ORCID

Optional as System Expands

- **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**

Implementation Paths For Open Science

(Many Roads To Rome for Timelines, 1-5 Year Paths)

Year 1

Data Repository and Digital Collection Repository

Year 2

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

Year 3

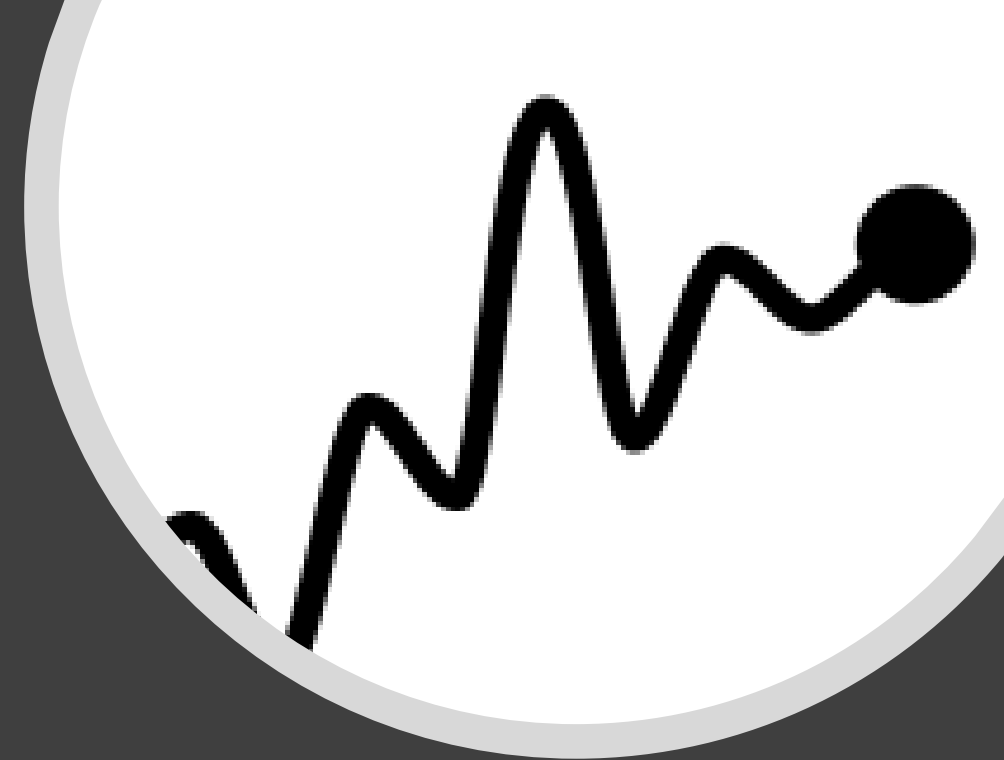
Digitization Lab

Year 4

ETD Middleware (VIREO) and OJS Software

Year 5

Complex Digitization Projects, IIF Server, Faculty Grant Projects etc.



Assessment and Results

Quantitative and Qualitative Measures

Ecosystem
Implemented
in Stages,
2014-2019

System	2014	2015	2016	2017	2018	2019
Downloads						
DSpace	326,762	318,742	385,163	341,224	972,359	1,010,349
ETDs	136,985	158,240	200,373	328,420	470,437	505,658
Dataverse	n/a	n/a	n/a	455	3,451	2,043
Number of Items						
DSpace	1,340	1,437	1,546	1,660	2,135	2,720
ETDs	967	1,174	1,326	1,581	1,789	2,218
Dataverse	n/a	n/a	n/a	28	33	53
ORCID IDs						
ORCID	101	190	316	438	545	669
Hosted Journals						
OJS	1	1	2	2	3	4

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



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



Summary Reflections

Placing Open Science Research Cycle Components within an Ecosystem Paradigm Enables:

- 1) New Possibilities For Research accessibility, retrieval and sharing
 - 2) Better Roadmaps for Future Development of Digital Open Science Components
 - 3) Evolutionary Guideposts for Research Systems Development
- 

Further References, Papers & Working Examples

Uzwyszyn, R. 2020 **Developing an Open Source Digital Scholarship Ecosystem (Preprint)**. ICEIT2020. Oxford, UK.

https://www.researchgate.net/publication/336923249_Developing_an_Open_Source_Digital_Scholarship_Ecosystem

Texas State University Libraries Website.

<https://www.library.txstate.edu/>

Texas State Digital Collections Repository

<https://digital.library.txstate.edu/>

Texas State Data Research Repository

<https://dataverse.tdl.org/dataverse/txstate>

Texas State Online Research Identity Management System:

<https://guides.library.txstate.edu/researcherprofile/orcid>

Texas State Electronic Thesis and Dissertation Management (VIREO):

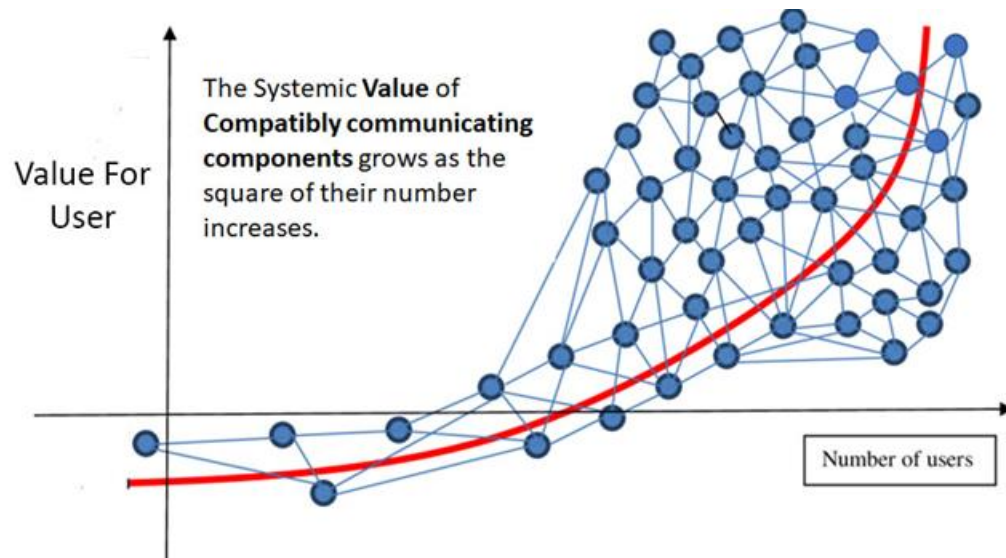
<https://www.tdl.org/etds/>

Texas State Digital & Web Services:

<https://www.library.txstate.edu/services/faculty-staff/digital-web-services.html>

Further Links to Open Source Software & Downloads

- **Dspace**
<https://duraspace.org/dspace/>
- **Dataverse**
<https://dataverse.org/>
- **Omeka**
<https://omeka.org/>
- **Open Journal Systems 3**
<https://pkp.sfu.ca/ojs/>
- **ORCID**
<https://orcid.org/>
- **Vireo**
<https://www.tdl.org/etds/>



Questions, Comments

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Director, Collections and Digital Services

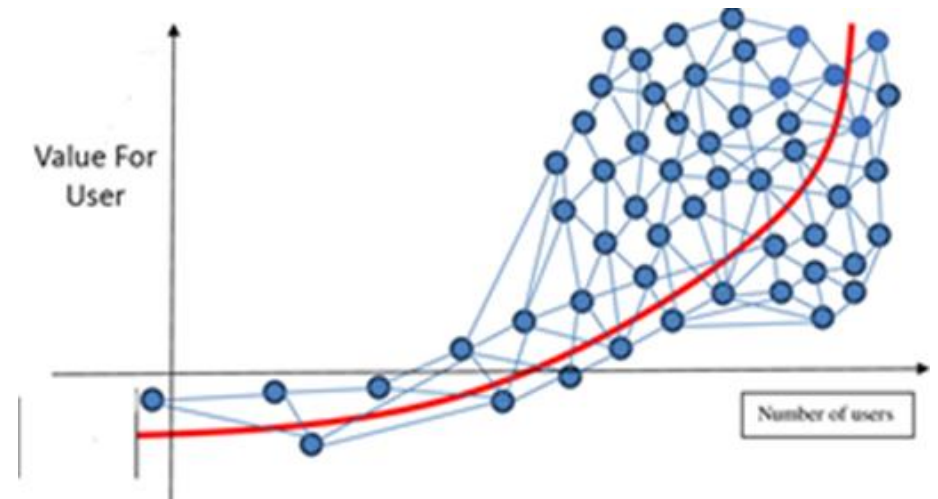
Texas State University Libraries

ruzwyshyn@txstate.edu, 512-245-5687

<http://rayuzwyshyn.net>

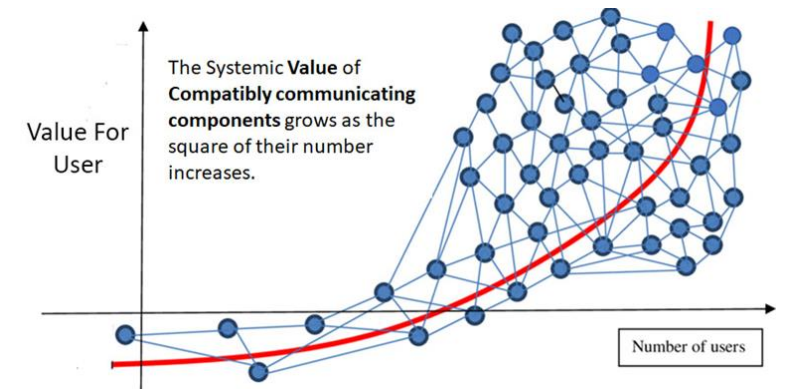
Future Pathways

Networked Global Scholarly
Research Environment



Research Universities and Digital Research Ecosystems

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

