Is it FAIR or FAIR enough?

...

Violeta Ilik
Dean of Libraries
Adelphi University, Garden City, New York

Violeta Ilik
ETD 2022
Novi Sad, Serbia
September 7, 2022


RESEARCH


CRITICAL
INQUIRY

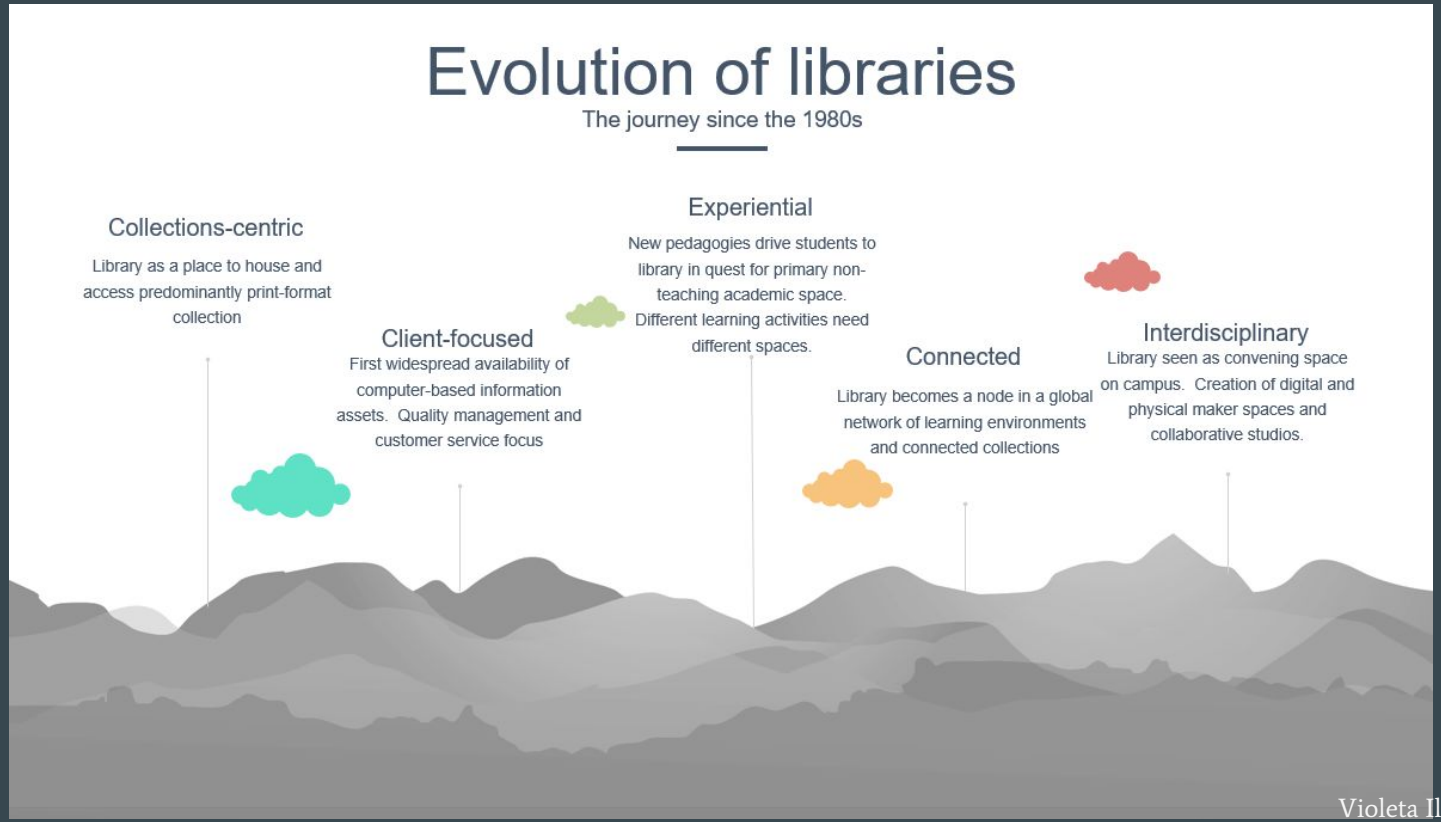

TEACHING


LIBRARY


INNOVATION


LEARNING


NATURE
A WEEKLY ILLUSTRATED JOURNAL OF SCIENCE
PUBLISHING



Designing the library of the future. 2021.

Keith Webster, *Dean of University Libraries and Director of Emerging and Integrative Media Initiatives*

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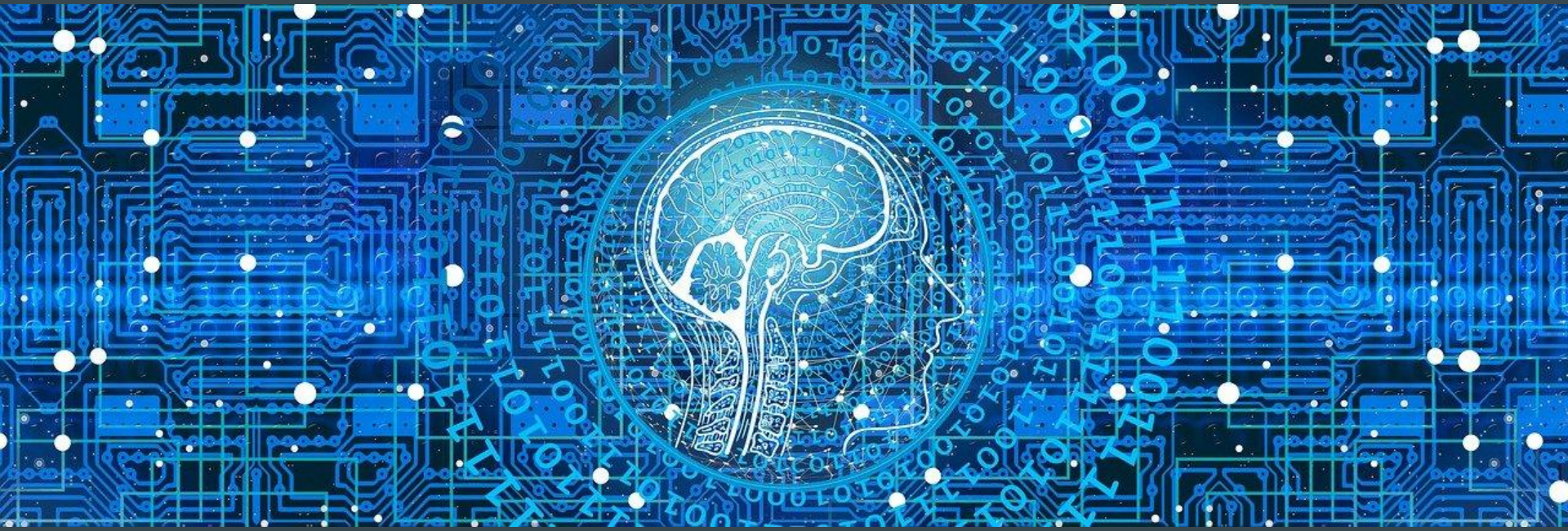

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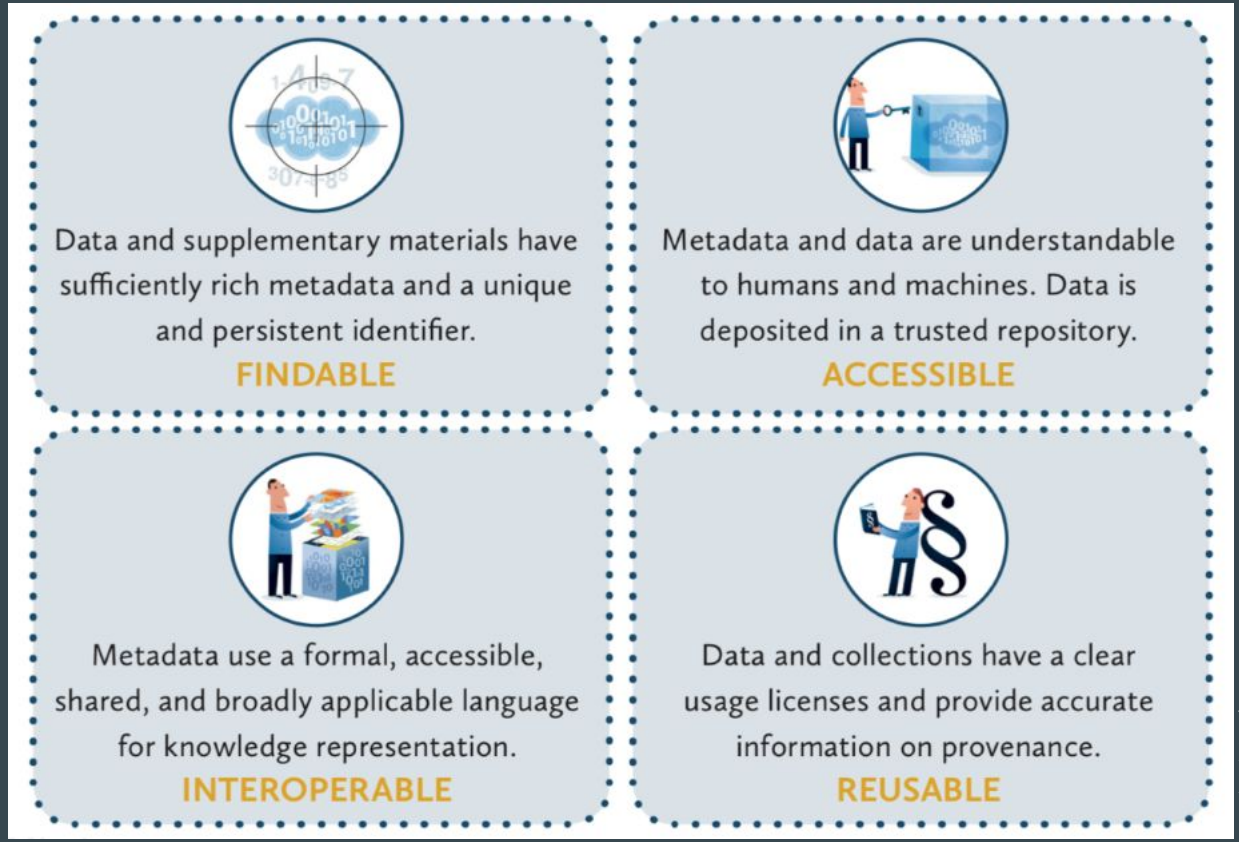
Keeping up with the best ways to find information



Wilkinson et al., "The FAIR Guiding Principles for scientific data management and stewardship", 2016

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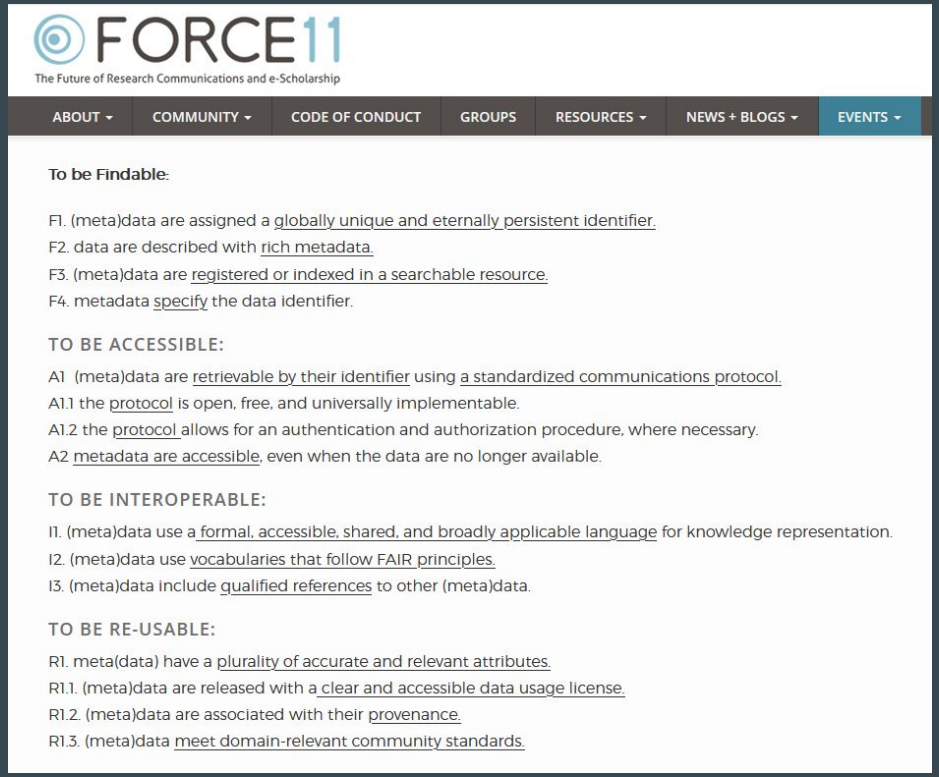
Keeping up with the best ways to find information



FORCE11

The Future of Research Communications and e-Scholarship

ABOUT | COMMUNITY | CODE OF CONDUCT | GROUPS | RESOURCES | NEWS + BLOGS | EVENTS

To be Findable:

F1. (meta)data are assigned a globally unique and eternally persistent identifier.
F2. data are described with rich metadata.
F3. (meta)data are registered or indexed in a searchable resource.
F4. metadata specify the data identifier.

TO BE ACCESSIBLE:

A1 (meta)data are retrievable by their identifier using a standardized communications protocol.
A1.1 the protocol is open, free, and universally implementable.
A1.2 the protocol allows for an authentication and authorization procedure, where necessary.
A2 metadata are accessible, even when the data are no longer available.

TO BE INTEROPERABLE:

I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.
I2. (meta)data use vocabularies that follow FAIR principles.
I3. (meta)data include qualified references to other (meta)data.

TO BE RE-USABLE:

R1. meta(data) have a plurality of accurate and relevant attributes.
R1.1. (meta)data are released with a clear and accessible data usage license.
R1.2. (meta)data are associated with their provenance.
R1.3. (meta)data meet domain-relevant community standards.

https://www.go-fair.org/fair-principles/

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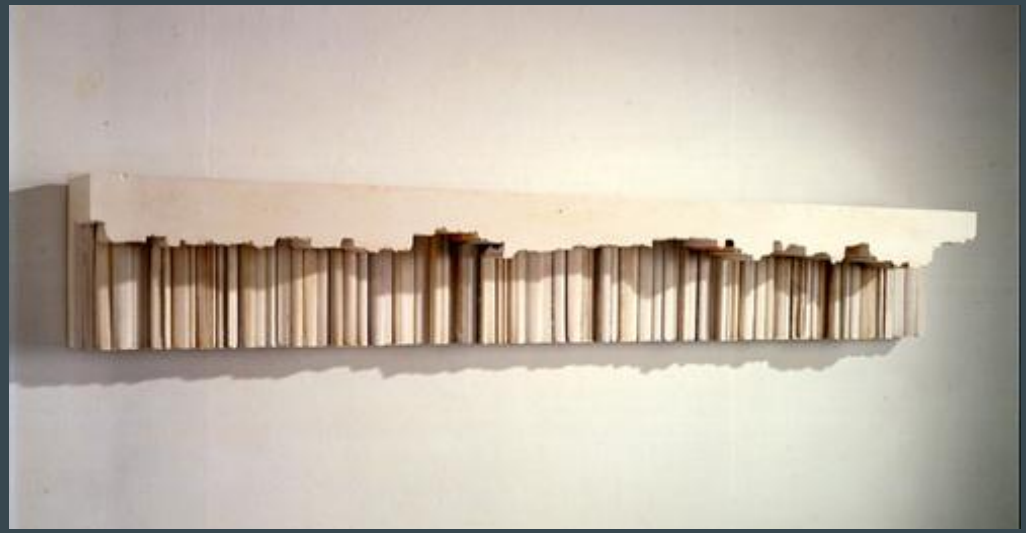
Collections and Open Strategies



Rachel Whiteread, "Untitled" (2000)

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Library Digital Systems: this?

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Library Digital Systems: or this?

https://pixabay.com/illustrations/monitor-binary-binary-system-1307227/

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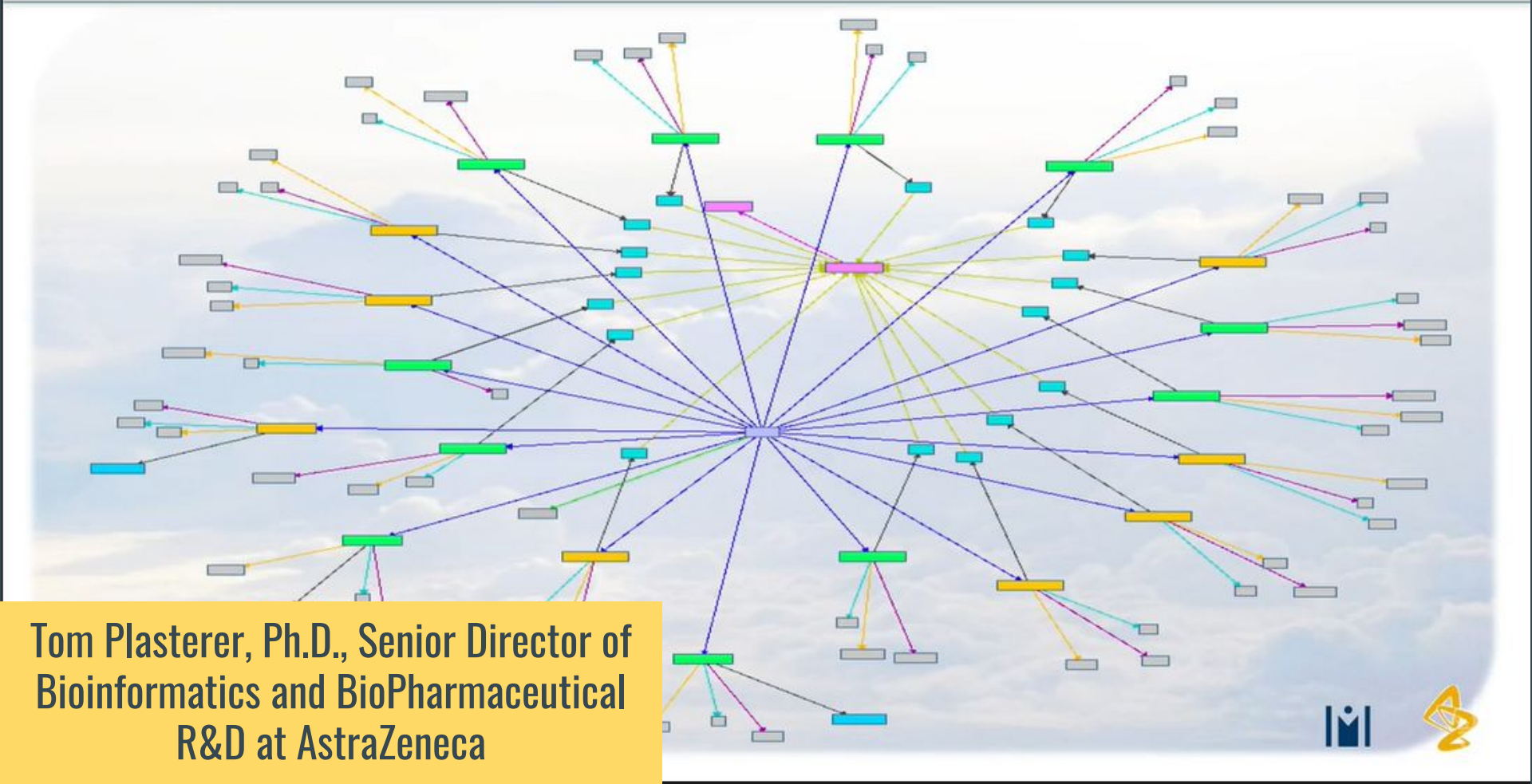
IIx Approach: Build a FAIR Data Knowledge Graph



Tom Plasterer, Ph.D., Senior Director of Bioinformatics and BioPharmaceutical R&D at AstraZeneca

Resource Description and Access Part I

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The interrelated processes of cataloging, classification & indexing

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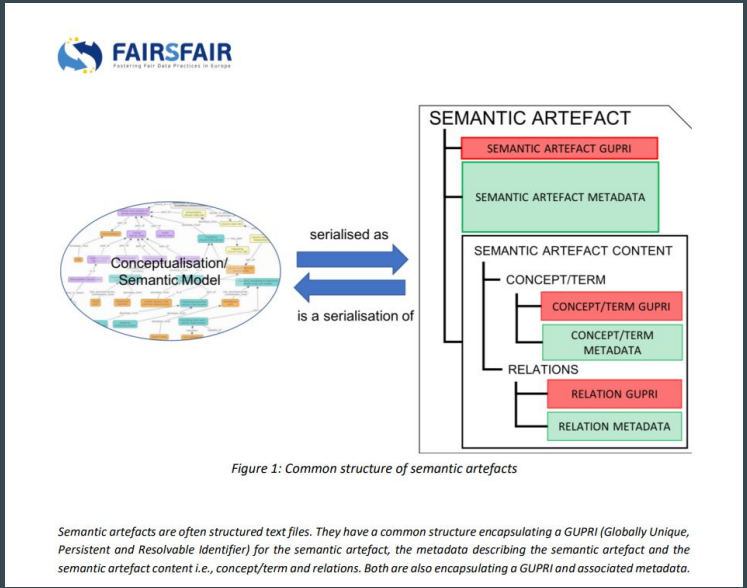
Resource description and Access Part II

"Semantic artefacts (i.e. controlled vocabularies, ontologies, thesauri, and other knowledge organisation systems) are key building blocks for the implementation of the FAIR principles, specifically as emphasized in the Interoperability principle I2 "(Meta)data use vocabularies that follow FAIR principles". However, most of these artefacts are actually not FAIR themselves."



Hugo, W., Le Franc, Y., Coen, G., Parland-von Essen, J., & Bonino, L. (2020). D2.5 FAIR Semantics Recommendations Second Iteration. Zenodo. https://doi.org/10.5281/zenodo.5362010

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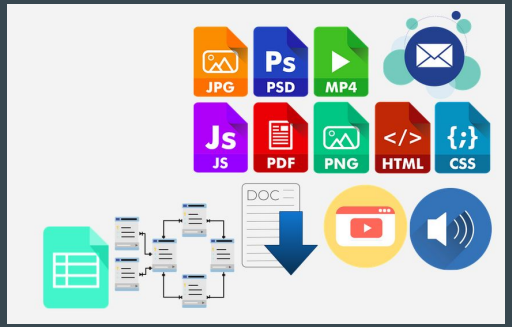
Preservation, Conservation, Digital Preservation

- Preservation and conservation of all recorded knowledge, regardless of the storage medium
- Digital preservation goal is the accurate rendering of authenticated content over time

> Digital Preservation is a series of managed activities necessary to ensure that digital objects can be located, rendered, used and understood in the future



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Sokolova, Dina; Ilik, Violeta; Davis, Stephen P. (2019). Digital Preservation at Columbia University Libraries. Learn More Session, Columbia University Libraries. New York, NY, November 21, 2019. https://doi.org/10.7916/d8-3d1r-5515

Why Digital Preservation Matters?

- More knowledge is stored electronically
- Digital information is increasingly important to our culture, knowledge and economy
- Digital content depends on hardware and software to make it available and requires active management to ensure its ongoing accessibility
- As new technologies appear, older ones become obsolete, making it difficult to access older content

Illustration by Jørgen Stamp digitalbevaring.dk CC BY 2.5 Denmark

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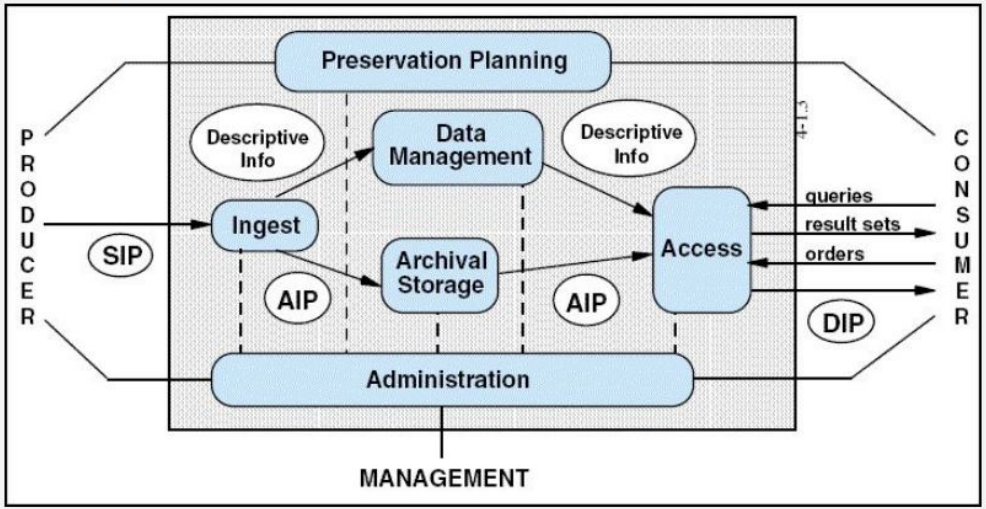
OAIS Reference Model

Open Archival Information System (OAIS) reference model provides a framework for the understanding of archival concepts needed for long term digital information preservation and access.



Submission Information Package (SIP) - information sent from the producer to the archive
Archival Information Package (AIP) - information stored by the archive
Dissemination Information Package (DIP) - information sent to a user when requested

Scholarly Communication Services

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Dissemination plan for scholarly works - timeline

Scholarly Publishing Timeline

- **1323**: Compagnie du Gai Sçavoir, the oldest learned society on record, is founded in Toulouse, France.
- **1660**: The Royal Society of London is founded.
- **1665**: *Journal des Sçavans* and *Philosophical Transactions of the Royal Society of London* are first published. Each journal used some form of peer review, although not exactly like today's version. *Philosophical Transactions* published famous scientists such as Newton, Hooke, van Leeuwenhoek, Faraday, and Darwin.
- **1731**: *Medical Essays and Observations*, the first fully peer-reviewed journal, is launched by the Royal Society of Edinburgh.
- **1743**: The American Philosophical Society, the first scholarly society in what is now the US, is created.
- **1848**: The American Association for the Advancement of Science is founded. AAAS publishes the journal *Science* and is the largest general scientific society in the world.
- **1869**: *Nature* publishes its first issue.
- **1880**: *Science* publishes its first issue.
- **1947**: Elsevier, the longtime publishing giant, launches its first international journal, *Biochimica et Biophysica Acta*.
- **1990**: *Postmodern Culture* becomes the first online-only journal with no printed version available.
- **1991**: arXiv, the science pre-print server, is launched.
- **2003**: The Public Library of Science (PLOS) is founded.
- **2006**: *PLOS ONE*, the wildly successful open access megajournal, begins publishing. In 2013, *PLOS ONE* published 31,500 articles!
- **2010**: The altmetrics manifesto, describing potential new ways to gauge the impact of research beyond citations and impact factors, is written.
- **2012**: Several innovative and relatively new journals, including *F1000 Research*, *PeerJ*, and *eLife*, are launched. These journals are experimenting with new forms of peer review, new business models, and new funding sources.

https://www.aje.com/arc/scholarly-publishing-brief-history/

How does dissemination works?

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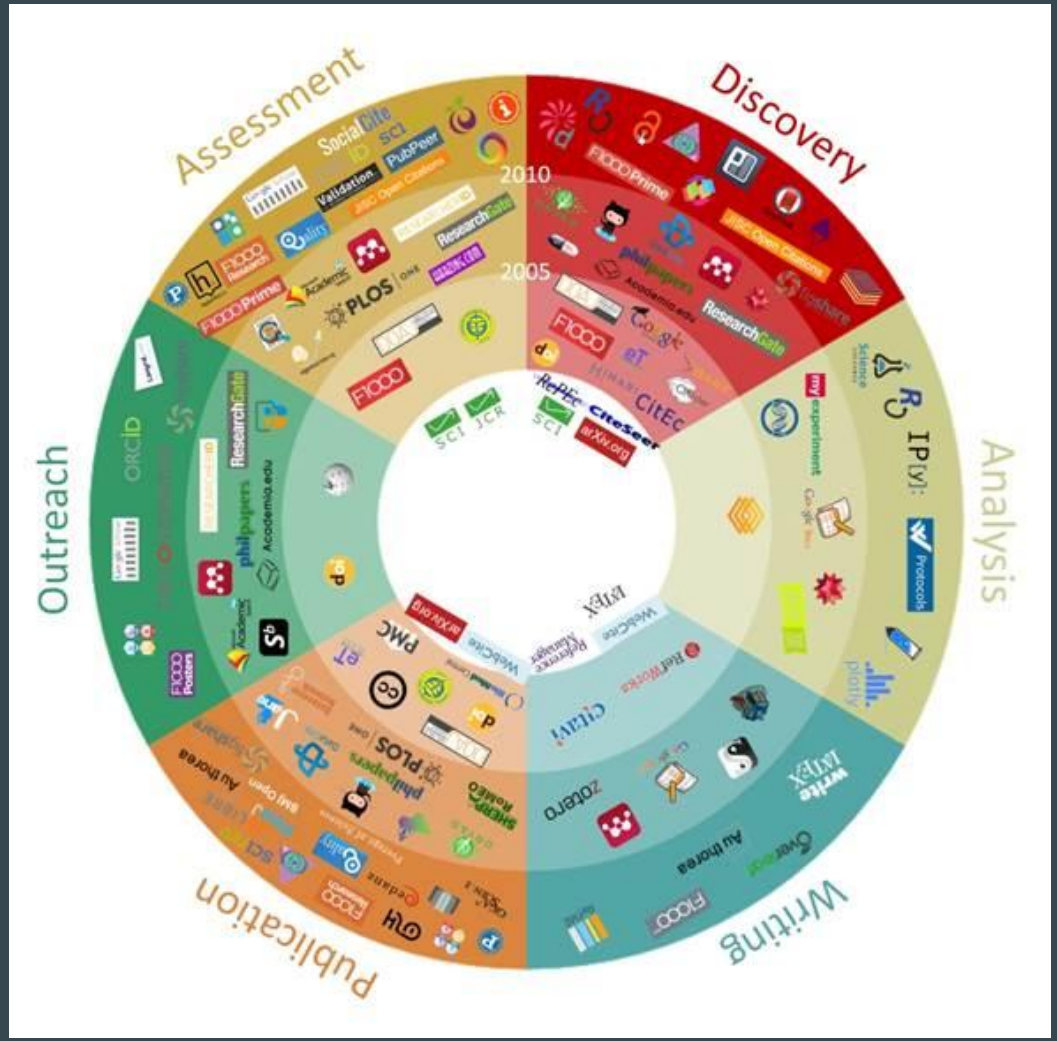
Gutzman, Karen E, and Patty Smith. Dissemination In Action: Communicating Research In a Digital World. Chicago, Illinois, United States: DigitalHub. Galter Health Sciences Library & Learning Center, 2018. doi:10.18131/g3-pcsa-cq75

101 Innovative tools and sites in 6 research workflow phases (< 2000 -2015)

Kramer, Bianca; Bosman, Jeroen (2015): 101 Innovations in Scholarly Communication - the Changing Research Workflow. figshare. Poster. https://doi.org/10.6084/m9.figshare.1286826.v1



Yes, well curated, deeply integrated, special purpose repositories exist

- Genbank
- Worldwide Protein Data Bank
- uniProt
- Space Physics Data Facility
- SIMBAD

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Data

“Institutional (for example, a single university), open globally-scoped repositories such as Dataverse7, FigShare (http://figshare.com), Dryad8, Mendeley Data (https://data.mendeley.com/), Zenodo (http://zenodo.org/), DataHub (http://datahub.io), DANS (http://www.dans.knaw.nl/), and EUDat9”

Wilkinson MD, Dumontier M, Aalbersberg IJ, Appleton G, Axton M, Baak A, Blomberg N, Boiten JW, da Silva Santos LB, Bourne PE, Bouwman J, Brookes AJ, Clark T, Crosas M, Dillo I, Dumon O, Edmunds S, Evelo CT, Finkers R, Gonzalez-Beltran A, Gray AJ, Groth P, Goble C, Grethe JS, Heringa J, 't Hoen PA, Hooft R, Kuhn T, Kok R, Kok J, Lusher SJ, Martone ME, Mons A, Packer AL, Persson B, Rocca-Serra P, Roos M, van Schaik R, Sansone SA, Schultes E, Sengstag T, Slater T, Strawn G, Swertz MA, Thompson M, van der Lei J, van Mulligen E, Velterop J, Waagmeester A, Wittenburg P, Wolstencroft K, Zhao J, Mons B. The FAIR Guiding Principles for scientific data management and stewardship. Sci Data. 2016 Mar 15;3:160018. doi: 10.1038/sdata.2016.18. Erratum in: Sci Data. 2019 Mar 19;6(1):6. PMID: 26978244; PMCID: PMC4792175.

Data

"Distinct from peer initiatives that focus on the human scholar, the FAIR Principles put specific emphasis on enhancing the ability of machines to automatically find and use the data, in addition to supporting its reuse by individuals."

Wilkinson MD, Dumontier M, Aalbersberg IJ, Appleton G, Axton M, Baak A, Blomberg N, Boiten JW, da Silva Santos LB, Bourne PE, Bouwman J, Brookes AJ, Clark T, Crosas M, Dillo I, Dumon O, Edmunds S, Evelo CT, Finkers R, Gonzalez-Beltran A, Gray AJ, Groth P, Goble C, Grethe JS, Heringa J, 't Hoen PA, Hooft R, Kuhn T, Kok R, Kok J, Lusher SJ, Martone ME, Mons A, Packer AL, Persson B, Rocca-Serra P, Roos M, van Schaik R, Sansone SA, Schultes E, Sengstag T, Slater T, Strawn G, Swertz MA, Thompson M, van der Lei J, van Mulligen E, Velterop J, Waagmeester A, Wittenburg P, Wolstencroft K, Zhao J, Mons B. The FAIR Guiding Principles for scientific data management and stewardship. Sci Data. 2016 Mar 15;3:160018. doi: 10.1038/sdata.2016.18. Erratum in: Sci Data. 2019 Mar 19;6(1):6. PMID: 26978244; PMCID: PMC4792175.

Software

FAIR Principles for Research Software (FAIR4RS Principles)

The ultimate goal of FAIR is to increase the transparency, reproducibility, and reusability of research. For this to happen, software needs to be well-described (by metadata), inspectable, documented and appropriately structured so that it can be executed, replicated, built-upon, combined, reinterpreted, reimplemented, and/or used in different settings.

Chue Hong, N. P., Katz, D. S., Barker, M., Lamprecht, A-L, Martinez, C., Psomopoulos, F. E., Harrow, J., Castro, L. J., Gruenpeter, M., Martinez, P. A., Honeyman, T., et al. (2022). FAIR Principles for Research Software version 1.0. (FAIR4RS Principles v1.0). Research Data Alliance. DOI: https://doi.org/10.15497/RDA00068

Software

"Research software registries are typically indexes or catalogs of software metadata, without any code stored in them; while in research software repositories, software is both indexed and stored (Lamprecht et al., 2020). Both types of resource improve software discoverability and research transparency, provide information for software citations, and foster preservation of computational methods that might otherwise be lost over time, thereby supporting research reproducibility and replicability. Many provide or are integrated with other services, including indexing and archival services, that can be leveraged by librarians, digital archivists, journal editors and publishers, and researchers alike."

Garijo D, Ménager H, Hwang L, Trisovic A, Hucka M, Morrell T, Allen A, Task Force on Best Practices for Software Registries, SciCodes Consortium.

2022. Nine best practices for research software registries and repositories. PeerJ Computer Science 8:e1023 https://doi.org/10.7717/peeri-cs.1023

Software - TRUST Principles and CoreTrustSeal

Both the TRUST Principles (Lin et al., 2020) and CoreTrustSeal Requirements (CoreTrustSeal, 2019) call for a repository to provide information on its scope and list the terms of use of its metadata to be considered compliant with TRUST or CoreTrustSeal.

CoreTrustSeal and TRUST also require that a repository consider continuity of access.

Transparency, **R**esponsibility, **U**ser focus, **S**ustainability and **T**echnology: the TRUST Principles provide a common framework to facilitate discussion and implementation of best practice in digital preservation by all stakeholders.

Are you paying attention?

Strout warned us in 1956: “We may be so blinded by . . . firmly established customs that we are incapable of seeing some utterly simple alternatives which might quickly resolve our problems, and which will someday look so easy and obvious that our descendants will in turn look upon us as unseeing and unimaginative.”

We were and still are on a digital revolution tornado path

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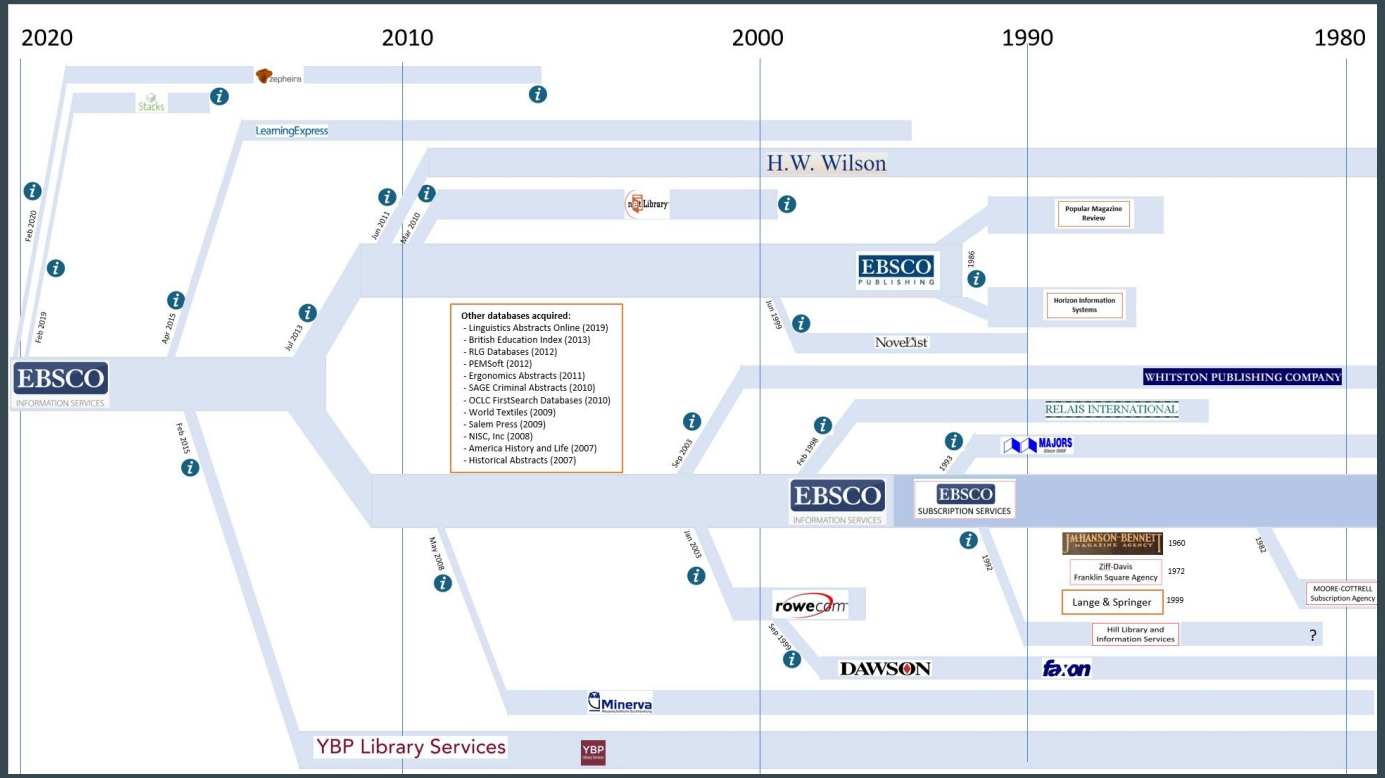
EBSCO: mergers and acquisitions

Library Technology Guides is a service provided by Marshall Breeding https://librarytechnology.org/mergers/



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Clarivate: mergers and acquisitions

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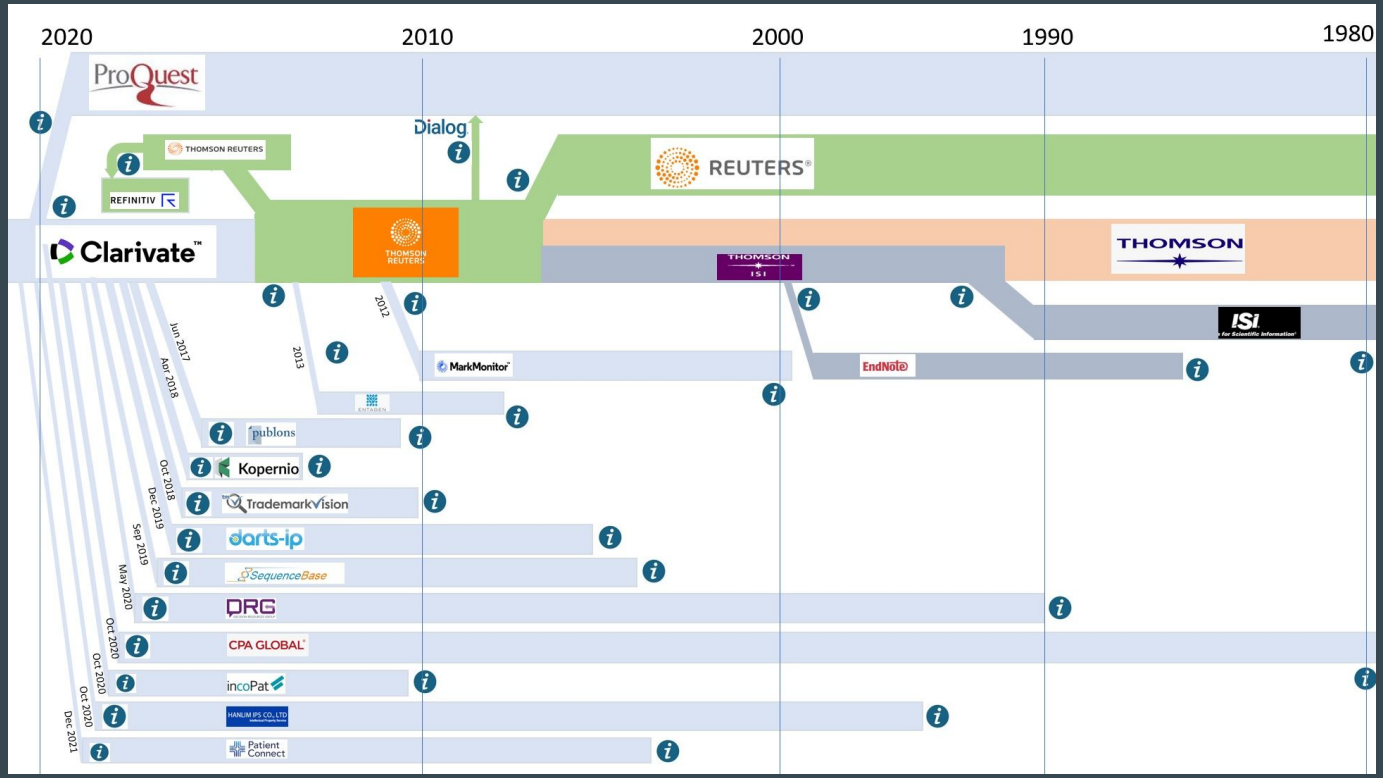

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ProQuest: mergers and acquisitions

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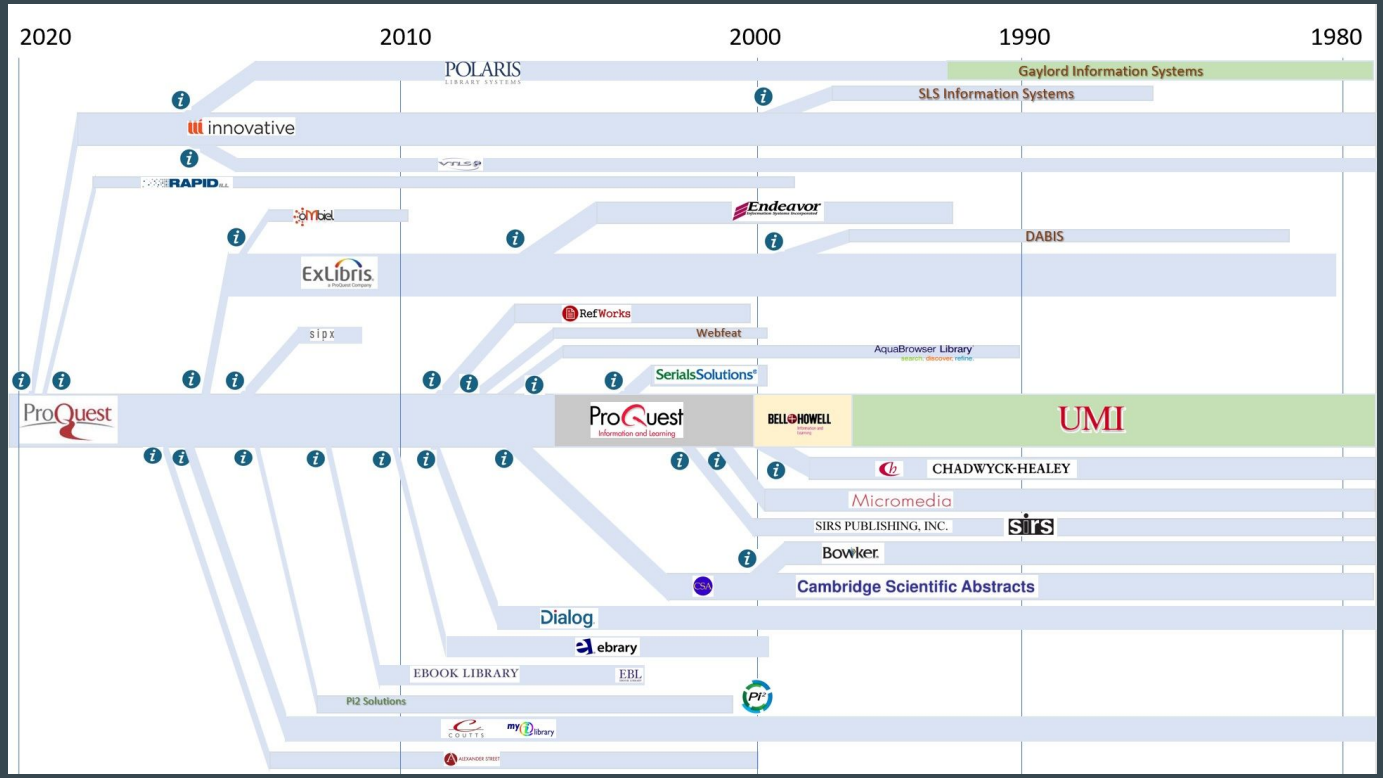
https://librarytechnology.org/mergers/



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MAKING KNOWLEDGE OPEN AND EQUITABLY AVAILABLE TO ALL

It is one of the noblest duties of a university to advance knowledge, and to diffuse it not merely among those that can attend lectures - but far and wide”

Daniel Colt Gilman

Founding President, Johns Hopkins University

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Theses and dissertations

Theses and dissertations have long been regarded as the bedrock of graduate
education.

Fineman, Yale. “Electronic Theses and Dissertations.” *Portal (Baltimore, Md.)* 3.2 (2003): 219–227. Web.

A bit of history

The history of electronic theses and dissertations begins in 1987 with a meeting convened by Nick Altair of UMI in Ann Arbor, Michigan, involving participants from Virginia Tech, the University of Michigan, and two fledgling software companies: ArborText and SoftQuad. The discussion focussed on the latest approaches to electronic publishing and the idea of applying the Standard Generalized Markup Language (SGML, an ISO standard approved in 1986) to the preparation of dissertations, possibly as an extension of the Electronic Manuscript Project of the Association of American Publishers.

Fineman, Yale. “Electronic Theses and Dissertations.” *Portal (Baltimore, Md.)* 3.2 (2003): 219–227. Web.

Access to ETDs

NDLTD and several commercial enterprises provide access to ETDs. The most notable of these is ProQuest which, for a price, provides access to many electronic theses and dissertations.

My first experience with ETDs

Vireo is a turnkey Electronic Thesis and Dissertation (ETD) Management System. It addresses all steps of the ETD process, from submission to approval by the graduate office to publication in one or more institutional repositories.

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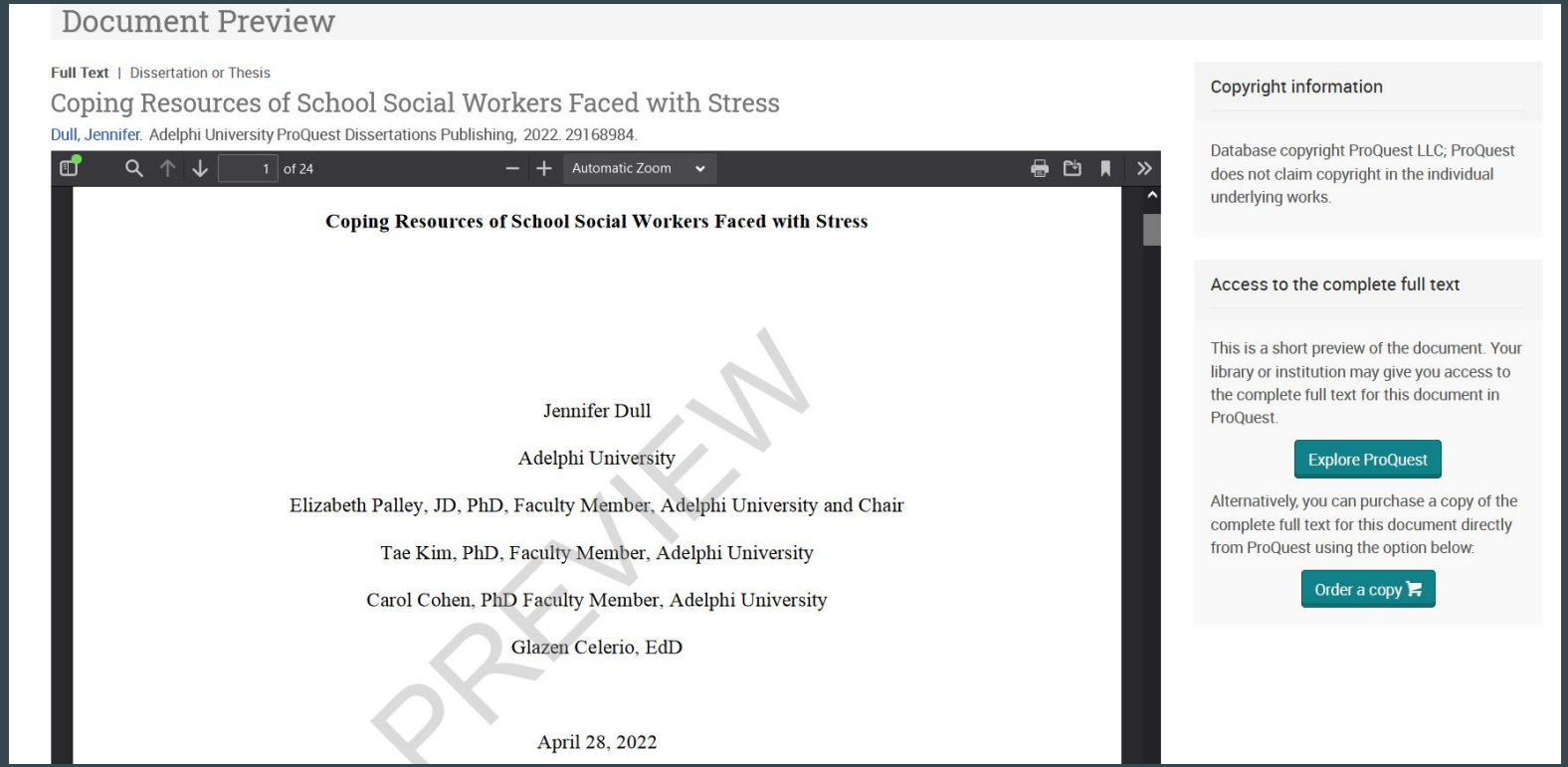
My current experience with ETDs - ProQuest ETD



"The artist is the man in any field, scientific or humanistic, who grasps the implications of his actions and of new knowledge in his own time." - Marshall McLuhan, Understanding Media, p. 65

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Thank you
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