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## Making Institutional Repositories Work

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# 16 | Defining Success and Impact for Scholars, Department Chairs, and Administrators: Is There a Sweet Spot?

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Various academic stakeholders are concentrated in the scholarly communication milieu with their varied and similar needs to focus on their ongoing research investments. Scientists, scholars, department heads, and administrators are the primary constituencies that engage academic research investors, such as the university and college library, in academic library-created digital repositories. The initial and ongoing advantage in creating digital repositories has been the usefulness of making multiple scholarly item types (articles, postprints, preprints, theses/dissertations) available to meet researcher and reader needs. We are now embarking on the future of the digital repository that truly engages faculty and administrators, meets institutional goals, holds big datasets, and uses linked data to connect authors, institutional repositories, and global research.

## **INSTITUTIONAL REPOSITORIES: PUBLISHING MODELS AND GLOBAL RESEARCH VISIBILITY**

The first institutional repositories (IRs) initially designed and produced in 2000 and 2001, respectively, utilizing newly constructed EPrints and DSpace software, were created to alleviate the high cost of academic libraries' journal subscriptions, ensure greater access to journal articles, and provide scholarly communication tools for researchers to showcase their work. Overall, academic libraries have been steady in employing an institution's repository to engage researchers' scholarship and make it globally visible for further use. Libraries' primary purpose in archiving faculty research was

the motivation to cancel journal subscriptions and use institutional research budget funding to purchase materials not available through other channels. Recurring universal challenges included faculty unaware of an IR's existence, its benefits, and/or a preference to showcase their research in a subject repository such as the Social Sciences Research Network (SSRN) or arXiv. Faculty who are interested in depositing their work in both an IR and a disciplinary repository (also referred to as central or subject repository) either have librarians deposit in multiple locations or the researchers proxy or self-archive their respective papers.

### **SCHOLARLY COMMUNICATION DISRUPTION: INSTITUTIONAL REPOSITORIES**

In creating and building the University of Nevada Las Vegas (UNLV) institutional repository (IR) using Digital Commons software, initially it was a basic interface created by faculty librarians for scholarship that was undefined. The newly hired repository administrator (the author) made decisions in concert with an advisory board of stakeholders from library departments: special collections, liaisons, digital collections, and a metadata specialist. Some of the early decisions included deciding on a strategic composition of board members, adding FAST (OCLC's Faceted Application of Subject Terminology) metadata, and employing a standard hierarchy for IR staff to follow. Two years later, an updated UNLV interface was necessary to comply with the university's new color and design guidelines. As the primary architect in concert with the libraries' upper management through a series of meetings that included the dean, associate dean, statistics head, the director of technical services, and the IR administrator, an improved interface was agreed upon. For optimum online visibility and findability, IR URLs should contain the university's acronym and the name of the repository, including the extension .edu, delineating an academic Web site.

The role of the IR has evolved in librarians' collaboration with faculty's data deposits. Supercomputers and IR administrators are considering joining forces to accommodate large datasets, and faculty aspire to a potential option of adding data article output, metadata, and a URL to link all of a research project's facets together simultaneously. Librarians' data management knowledge and documentation is rapidly moving more quickly than the data are being ingested in IRs.

Institutional repositories have the ability to engage in linked data to connect item URIs to more easily have item findability across multiple IRs. The linked data cloud is growing exponentially; IR administrators and metadata specialists educated in linked data are gradually expanding their new skills.

Academic libraries are playing a pivotal role in faculty, department chair, and administrator perspectives by how these researcher and scholarship interest groups are engaging the tools they require to showcase their work. At a minimum, to be successful, librarians (repository managers and subject liaisons) and library staff ranging from the dean to support staff must initially and continually show faculty support for depositing their research and open access (OA) ventures: how to get started, remain committed, and convinced that the open publishing model is *the* model for research impact success.

Subject liaisons typically have the academic pulse of their assigned colleges from collection development and reference positions to building new relationships in new forms of scholarly communication that encompass research workflows, impact measures, and the like. In these new liaison roles, there has been “no formal training, no assessment tools, and no measures of performance” and “the need to transcend vestiges of turf protection and work towards a collaborative model of scholarly support . . . addressing the changing nature of research and teaching” (Kenney, 2014). Making IRs work has embraced data tools (DMPTool), linked data, persistent personal identifiers, and depositing research in both subject and institutional repositories, leveraging processes across multiple platforms.

Most universities and colleges now have numerous Web pages developed on the topic of scholarly communication for librarians. In 2014 ACRL’s Scholarly Communication Committee updated its Scholarly Communication Toolkit (<http://acrl.ala.org/scholcomm/>) resources to support librarians’ work with administrators, department heads, and faculty.

Typically, there is ongoing turnover in faculty, department heads, and administration in an academic environment. Interim deans and other administrators do not make critical decisions while temporarily holding down their academic role. Once new department heads and administrators are hired and in place, it is time to set up an appointment to support their knowledge of the digital repository and garner curriculum vitae and

full-text content. Without an academic mandate to archive articles and postprints (final approved papers) in an IR, repository administrators will need to build relationships.

The UNLV IR role has matured to incorporating IR metadata and full text to OAIster and WorldCat and by presenting the green and gold models to the Graduate College, College of Engineering, deans, associate deans, department heads, and faculty to create a greater understanding of what research article versions are journal copyright legal to deposit in an IR. Successful repository managers engage their library liaisons by offering workshops on researcher profile tools, such as SelectedWorks (bepress), to showcase faculty scholarship, updates on predatory publishing practices, researcher identifiers, and the current state of open access to research to provide library colleagues with tools to build effective programs on their campuses. ACRL's 2014 update on its Scholarly Communication Toolkit focuses on supportive librarian essential dialogue topics that include author's rights and licensing, digital repositories, journal economics, new models of publishing and scholarship, digital humanities, research data management, outreach and engagement actions, and realigning library resources, services, and practices. These are but a few of the essential tools that assist librarians in the service of facilitating and defining success and impact for faculty, department heads, and administrators.

## **SCHOLARLY COMMUNICATION SITUATION: THEN AND NOW**

As an early adopter of an institutional repository, Cornell University's DSpace installation was primarily underused by faculty and consisted of empty or underpopulated research collections. Faculty had little motivation to migrate from disciplinary repositories or personal Web sites, and had concerns about redundancy with other dissemination tools, copyright confusion, plagiarism fears, having one's work scooped, and knowing what constitutes a published work using green and gold model definitions (Davis & Connolly, 2007). Six years later, Cornell's library continues expectations of faculty diligence in preserving their research and active dissemination, asking them to do more than they have been typically willing to be responsible for, as stated in the 2013 *White Paper: Institutional Repositories at Cornell*.

Another epiphany of hampered IR success was accountability by the University of Rochester (UR) Library's organizational culture. It was manifested by a set of protracted assumptions and complicated policies (modeled after MIT's) that faculty were expected to follow. UR Library intentions were principled and simultaneously misguided. The provost and library dean were interested in scholarly communication economics and e-theses/dissertations (ETDs). Their ethnographic study led to creating researcher profile pages and department communities when their success was clearly with individuals, and not bureaucratic decisions that included securing departmental agreements, levels of service, and form signing. UR librarians learned to stress the value of research sharing and preservation, especially for works that supplemented published materials, presentations, and gray literature that included high-demand musical scores (Lindhahl, Bell, Gibbons, & Foster, 2007).

Dubinsky's (2014) mixed method study included two quantitative considerations: repository growth by IR item counts and IR content authored by faculty in the sciences, humanities, and social sciences. The author's two measures provided a recent picture of the growth and scope of IRs that reflected faculty participation using the Berkeley Electronic Press's Digital Commons repository system of 107 institutions of higher education academic repositories (whittled down from 214). IR administrator training, technologies, and strategies were used to engage faculty participation in IRs. Item counts included pre/postprints, metadata records only, full text, and gray literature.

This recent study presents a current assessment of the growth, scope, and successful strategies of increasing faculty participation, and an analysis of the IR's content. In the 107 repositories, there were 63,706 items primarily in the sciences. Faculty IR participation concerns included a lack of repository awareness, copyright concerns, preference for a disciplinary repository, perception of submission process difficulty, and plagiarism fears. Respondents planned to develop promotional and instructional tools and held a preference for direct and personal communication with faculty one to one and groups. IR administration survey responses to a mediated deposit method showed an inclination to spend the time promoting IRs instead of faculty deposit instruction. The rising numbers of faculty content items indicates that they are willing to participate in the OA "movement."

## **IR MAPPING: INSTITUTIONAL GOALS AS A WHOLE, DIFFERENT INTERESTS, AND INVESTMENTS**

What is the sound of one e-print (a digital version of a research document, usually a journal article, but could also be a thesis, conference paper, book chapter, or a book that is accessible online—Wikipedia) downloading? Berkeley Electronic Press's Digital Commons has developed an online real-time readership activity map that answers the question nicely.

Each pin drop represents a reader. The map shows where the reader is located and the card shows the title of the downloaded article as well as the collection to which it belongs. The map successfully demonstrates the value of the IR investment for many academic libraries. As a library project, this in turn demonstrates the value of the library and the role it plays in fulfilling the goals of its academic institution. An example of the readership map in action is at Purdue University's institutional repository called e-Pubs: [http://docs.lib.purdue.edu/readership\\_map.html#content](http://docs.lib.purdue.edu/readership_map.html#content).

On the scale that readers are discovering materials in repositories, readership statistics are difficult to conceptualize. This kind of visualization can finally demonstrate the impressive impact that the libraries are having with their IR initiatives. In addition, the real-time mapping is a compelling author investment instrument for faculty, department chairs, administrators, and graduate student scholars with the potential for greater research visibility, citations, and use impact. Where scholarly research impact success influences academic institutional goals, the reflection on the organization is magnified through the ability to obtain grants, book contracts, journal articles, and speaking engagements, to name a few.

## **WHAT MEASURES OF SUCCESS AND IMPACT MATTER TO SCHOLARS, DEPARTMENT CHAIRS, AND ADMINISTRATORS: EXAMPLES**

Diverse constituents at academic institutions have related and at the same time, varied interests and investments in IRs. Approaches to assessment in this chapter will focus on academia where faculty, department chairs, and administrator contingents can acquire research output that meets their needs within their broader institutional goals.

Academia is increasingly interested in research statistics and other metrics that provide impact documentation for administrators to be accountable

to their superiors, regents, or board. Institutional repositories are one of the multiple research archival tools that provide quantitative scholarly output usage statistics directly to faculty, department heads, administrators, graduate students, and to journal article authors. DSpace, EPrints, and Digital Commons, three of the most used institutional repository software packages, provide a variety of data. DSpace's and EPrints' administrators may make repository decisions to code in statistics, including the Open Access button for requesting an author's postprint. Digital Commons' "Discipline Commons" data and scholarly content downloads are e-mailed monthly to the repository manager. Each author receives download counts and the dashboard has referral URLs, search terms, university downloads (own university and others), a list of research and downloads, and a chart mapping downloads over time.

### **ALTERNATIVE METRICS**

Altmetrics (alternative metrics), as listed above, is based on online scholarly communication activity that may include a variety of other tool options; please see the section on sustainable publishing and green and gold models below for more altmetrics choices. "Altmetrics can supplement existing usage statistics to provide a broader interpretation of research-output impact for the benefit of authors, library-based publishers and repository managers, and university administrators alike" (Konkiel & Scherer, 2013).

A best-practice assessment tool where department chairs and administrators can employ this data might encourage faculty scientists and scholars to build a virtual visible community of scholars to archive current and retrospective research in an IR. Academically showcasing research in multiple venues provides the opportunity to increase citation impact for globally prominent articles.

In highlighting academic internal and external stakeholders' supplementary standards of impact next to traditional metrics, trustees and state representatives are interested in the university's research significance within the state and beyond. Faculty tenure reviewers might request a faculty's scholarship IR report that shows supplemental impact measures to help the committee members understand the reach of the academic achievement (Konkiel & Scherer, 2013) beyond the Thompson-Reuters journal impact factor (JIF).

Scholarly and popular impact each have their own place of influence and value for the author and stakeholders. Services and Web sites track scholarship usage during the research life cycle. “As supplementary metrics, scholarly altmetrics can prove value for OA content, including content held by repositories” (Priem, Piwowar, & Hemminger, 2012).

Individual tweets that mention specific articles showcase who is reading and sharing the scholarship, in addition to what they are saying about it online. Altmetric.com’s content dashboard showcases sophisticated demographic reports for its readers. Giving authors insight into their readership can help them better understand how their OA content archived in IRs is making an impact. The visual of how content is used and shared on which Web sites, by what demographics, and for what purposes is fascinating so we can know where our research’s online works are used and cited (Konkiel & Scherer, 2013).

Harvard University’s *Good Practices for University Open-Access Policies* project is a consultation service to assist other universities in developing their own open access policies. This pro bono resource is valuable for administrators to take advantage of, to support the success of their institutional scholars by engaging in spreading awareness of open access models to globally showcase faculty and scholars’ research (Suber, 2014).

## CREATION AND PRESERVATION

While librarians are focused on open research, faculty can distinguish this model as a nonissue in publishing within the status quo. Faculty overall are focused on creating but not necessarily preserving open knowledge. Stevan Harnad, University of Southampton, has argued that academics should publicly showcase their articles in digital repositories (Davis & Connolly, 2007; Harnad, 1994). International collective efforts would moderate power-wielding publishers that limit access to the scholarly literature. Additionally, Raym Crow conjectures that by increasing the dissemination of scholarship, open access research in repositories can “increase competition in the marketplace and reduce the monopoly power of journals” (Crow, 2002). Institutional repositories were not designed to simply host journal articles, but to preserve a variety of research material types that may encompass articles, theses and dissertations, datasets, institutional records, OA journals, and educational resources, among other scholarly content.

Research disciplines play a role in the dissemination of work that faculty are willing to deposit in an IR. Lawal's 2002 survey using nine disciplines across the United States and Canada solicited faculty participation to determine deposited articles in digital repositories. Results reported that the highest participants were physicists and astronomers, followed by computer scientists and mathematicians, engineers, psychologists and cognitive scientists, and biological scientists. There were no contributions from chemists. Participants cited "the dissemination of research results, visibility, and the author's exposure as reasons for depositing their work" (Lawal, 2002). This study conducted at the genesis of the open access to research progression demonstrates that scientists were already participating in open scholarship at some level.

PubMed Central's meager National Institutes of Health (NIH) faculty research paper archiving participation was a recommendation, not required at the time this chapter was written. Faculty who received grant monies overall were not participating in the article deposits. The low compliance rate resulted in the NIH holding funds back from researchers who did not comply with depositing the funded research articles in PubMed Central (Charbonneau & McGlone, 2014).

Cornell University faculty's lack of motivation and understanding of the advantages of open access research, the U.S. and Canadian survey that found no chemists participated in article deposits, and the NIH not receiving the contracted articles in return for grant monies all characterize the current faculty and publisher culture at some level. These few examples represent a multitude of research that is locked up behind subscriptions providing financial and paywall success to journal publishers. Stevan Harnad and Raym Crow both address increasing article dissemination methods that encourage open access to research. In what scholarly communication dimension can we define success for the creators that would include scholars, department chairs, and administrators?

## **AUTHOR IDENTIFIERS**

Locating an article or an author's list of research papers can be a frustrating task unless the scholarship is deposited in a digital repository. Google and other search engines are typically able to locate works that are not locked up behind journal subscriptions. For those researchers with institutional

library journal subscriptions, access is more probable and expensive whether paid for by interlibrary loan or journal holdings. An expanding list of metadata for rights' holder identifiers is being created to aid in identifying and locating researchers and their scholarship: DOIs, EZID, ORCID, ISNIs, CrossRef, and FundRef. Identifier discovery of scholarly works is an advantage for faculty and student scholars, department chairs, and administrators to acquire author and scholarship data that meets their individual and collective research needs.

### **SUSTAINABLE PUBLISHING: GREEN AND GOLD MODELS**

Publishers are not encouraging scientists and scholars to self-archive—it is a responsibility of authors to manage their research output and support colleagues and graduate/undergraduate students in doing the same (Nature Web Focus, 2014). To enable researchers to take advantage of and make sense of the green and gold open access publishing model and avoid the failure of not globally showcasing their work, the author proposes a visual mapping of the scholarly communication methodology that encompasses a context of interpretation for faculty to garner a greater understanding and knowledge of how and why the green and the born open access (OA) and article publishing charge (APC) gold models provide open access to research.

University administrators should become familiar with the evolving academic scholarly communication landscape and offer their support in improving the dissemination and impact of research activities, especially those involving open access to the scholarship produced by their faculty. Open access policies will benefit authors by increased citations and the impact of their research, also providing access to scholarship for independent or underfunded researchers.

Benefits provided by an open access fund are clear to those who believe in and promote open access to their research. Authors can publish in open access journals with the knowledge that their institution, supported by administrators, department heads, and possibly the library will absorb the subsidized article publication charges. Readers will have free access to these articles in a timely manner. Discussions may result in a faculty member's use of and support for new services created by the library's scholarly communication initiatives. Some faculty will become advocates for introducing changes in the institution's strategy of disseminating

locally generated scholarly content (ACRL Scholarly Communication Toolkit, 2014).

This is an opportunity for scholarly communication and liaison librarians to promote library services focused on faculty knowledge of IR advantages and how faculty can reposition their scholarship to be openly accessible and more successful in its findability. The green (postprint or preprint) and gold (born digital in an OA journal) publishing business models have been designed to advocate for and to utilize open research. Open access frameworks have exploited scholarly tools and applications, created greater awareness, and noted usage impact. Social media tools, such as download counts, referrer URLs, citations, and more, globally participate in circulating the OA research. Alternative metrics have also appeared in digital repository software (bepress's Digital Commons) and on publisher Web sites where an article publication charge (APC) is the norm, such as the Public Library of Science's (PLOS) policy.

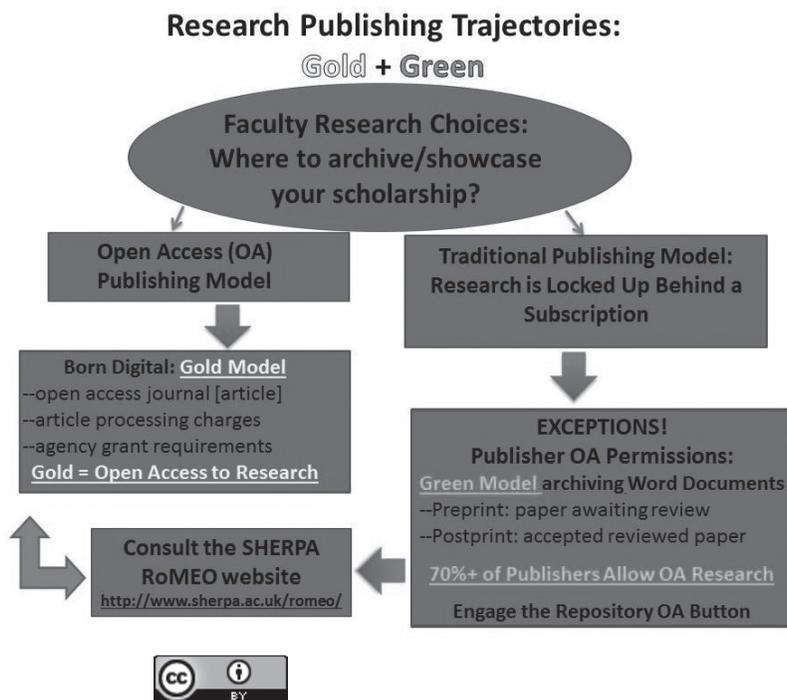
A major hurdle in author awareness of consulting the SHERPA/RoMEO publisher tool is significant. Scholarly communication librarians and IR staff habitually use the publisher copyright policies and self-archiving in the course of their work. Scientists and scholars are typically not familiar with this essential tool that provides opportunities to link global visibility to a preprint or postprint archived in an institutional or subject repository. An author of a journal article who recently submitted a draft paper (preprint) to an editor has an accepted peer-reviewed paper (postprint) with at least a 70%-plus probability of depositing one of the manuscript versions in the library's institutional repository. For greater research visibility, calculate in advance to locate a journal that accepts a preprint or postprint paper version in SHERPA/RoMEO by consciously choosing to submit to a green or gold publisher that offers an OA paper opportunity to be archived in the author's IR. If there are multiple authors, the first author must be proactive to provide the preprint or postprint to all of the authors for their open access benefit, and also to archive in their own institutions' digital repositories (Buehler, 2013).

The green model also indicates that faculty and independent researchers have tangential scholarly communication tools available to alert their colleagues to their pre- or postprint research widely and publicly available for reuse, citation, and impact. The value proposition of increased visibility relates to researcher scholarship, sharing work with peers, and building

upon the original research. Evidence of recent open access scholarship archived in an institutional repository has the potential to be found through online social networks that might include Twitter, commenting, citations, page views, Facebook, LinkedIn, blogging, and Instagram, to name a few. Engaging researchers to embrace the value of green and gold (open access journal) visibility publishing awareness has the opportunity to secure a broader societal impact and efficiency of ensuring open access to research across multiple stakeholders, because it matters. The green and gold journal publishing models are some of the most lucrative strategies that multiple publishers offer authors and the university's IR.

Another source of the green open access publishing terminology confusion for researchers are the terms *postprint* and *preprint*. The SHERPA/RoMEO website (<http://www.sherpa.ac.uk/romeo/>) explains what version of the green model (postprint or preprint) can be deposited in an institutional repository. Once an author locates the journal of his or her publishing choice by consulting SHERPA/RoMEO, all of the open access publishing colors' infrastructure options are visible, and authors can make their own research dissemination decisions based on consulting a publisher's preprint, postprint, and PDF version guidelines (see RoMEO Color Archiving Policy chart at <http://www.sherpa.ac.uk/romeo/search.php?la=en&fidnum=|&mode=simple>).

The open access progression in the publishing infrastructure has experienced its successes and failures. The success of the gold and green publishing models has penetrated researchers who understand the value of open access and those who investigate alternative types of publishing to ensure global visibility and greater impact for their scholarship. Researchers who delve into the philosophical details of providing open access to their scholarship have a clear sense of the open access journal (gold model) and open access repository publishing (green model) intricacies that allow their scholarship to be open. These researchers are typically from institutions that were able to permeate the open access milieu to research through colleague champions to navigate their publisher contracts in the context of the green and born-digital gold model. Universities have employed mandates requiring articles to be archived in their academy's institutional repository (IR) by engaging their faculty senate or the equivalent to support a vote. Many of these polls required years of meetings and conversations to



**Figure 16.1.** A visual map of the gold and green publishing models for authors aspiring to self-archive their open access research in an institutional repository for global visibility. (Copyright 2014 by Marianne A. Buehler. This work is licensed under a Creative Commons License. Attribution: CC BY.)

negotiate final terms. Right now, we have tools that permit open access to research; it requires taking the initiative to grasp the practice.

There are multiple and new informational details in the green and gold open access archiving model for faculty to remember from a previous conversation or presentation. Distributing copies of the diagram in Figure 16.1 to scholars (faculty, department chairs, administrators, and graduate students) will simplify the archiving model process and engage a larger number of valued research articles in open access venues. In addition, offering clarification of the various publishing models for successful open access shows that benefits accrue for authors and readers: expedient dissemination, access to all materials in low-income countries and by independent researchers, a reduced cost of publication, and a new and better science (Rentier, 2013).

Use a visual model to engage scientists and scholars to comprehend the gold article and green postprint/preprint research route. They also must be able to envisage the model to more fully understand how it can deftly benefit their own and their colleagues' community of scholarship.

## **EARLY ADOPTION OF INSTITUTIONAL REPOSITORIES AND CURRENT CORRECTIONS**

Institutional repositories (IRs) continue to evolve and grow as expanding tools with the capability to archive new item types, such as big data and essential metadata identifiers, and meeting the needs of researchers to garner their acceptance of an IR. After the initial waves of new repositories were established in the early 21st century, academic librarians began to evaluate exactly how researchers were using (or not) the repository archiving tool.

## **FUTURE OF INSTITUTIONAL REPOSITORIES: CONNECTING GLOBAL RESEARCH WITH LINKED DATA**

Several advantages of institutional repository archived research benefits for authors and readers provides access and visibility to the Internet's scientific and scholarly production when consuming and publishing Linked Open Data. The W3C Library Linked Data Incubator Group 32 (2010–2011) mentioned in its recommendations to encourage libraries to participate in the Linked Data framework:

The web of information should be embraced, both by making data available for use as Linked Data and by using the web of data in information services. Ideally, data should integrate fully with other resources on the Web. In engaging with the web of Linked Data, libraries can take on a leadership role grounded in their traditional activities: management of resources for current use and long term preservation; description of resources on the basis of agreed rules; and responding to the needs of information seekers. (Baker et al., 2011)

The Semantic Web's Linked Data is a set of best practices for publishing and connecting structured data on the Web. This particular scenario "first links html pages or documents, the second goes beyond the concept

of a document and links structured data.” Digital repositories have the ability to enhance the visibility and interoperability of data (articles, presentations, chapters, etc.) by linking their content to the wider Web of Data (Coalition of Open Access Repositories).

The Resource Description Framework (RDF) for metadata was developed on the Web by the W3C based on using resource expressions that follow the form subject-predicate-object, known as the RDF triple or statement. Within its URI (uniform resource identifier used in institutional repository links), but with a subject (person), the predicate (relationship to the subject), and the object related directly to the subject or another resource that establishes a relationship. The easiest method to facilitate establishing automatic linking between datasets is the use of standard vocabularies that includes describing data or metadata elements and indicating their values (Baker et al., 2011; Lampert & Southwick, 2013; Schreur, 2012). By utilizing URIs to link data (research), the Internet’s network infrastructure and the Web’s ability to access allows people and machines to explore information and additional research interconnections. The ability to easily acquire usable data that meets faculty’s scholarly needs (as readers and authors) is essential for successful ongoing scholarly communication.

In making institutional repositories work for scholars, department chairs, and administrators, each of these groups share strategically relevant interests and research investments in the success of having these needs met. Academic library IR administrators have focused on the scholarly communication needs of faculty, department heads, administrators, and graduate student scholars to create a knowledgeable and understood environment that offers impact through altmetrics and scholarly communication. Linked Data holds the promise of connecting all repositories utilizing the RDF triple model with its association to the Semantic Web and scholarly applications to identify research content. Both Linked Data and IRs expand discoverability of our materials and place information where people are looking for it and where it helps bridge applications and systems (Lampert & Southwick, 2013; Schreur, 2012).

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