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2005

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Recommended Citation

Marianne A. Buehler, Adwoa Boateng, (2005) "The evolving impact of institutional repositories on reference librarians", *Reference Services Review*, Vol. 33 Issue: 3, pp.291-300, <https://doi.org/10.1108/00907320510611320>

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The evolving impact of institutional repositories on reference librarians

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Abstract

Purpose – The paper's purpose is to share the insights that the staff of the Rochester Institute of Technology (RIT) Libraries (Wallace Library, RIT Archives, and the Cary Collection) gained into the role of reference librarians in establishing and operating an institutional repository (IR).

Design/methodology/approach – The paper conducts a literature review on a range of published (1999-2005) works to research the background of IRs and to incorporate it with the authors' own experiences.

Findings – The research findings, involving implementing IRs and specifically the effect on the role of the reference librarian in academic libraries, were found to be not as extensive as expected.

Originality/value – This paper is intended for those who are involved in developing and promoting IRs. The outcome of the paper is to stimulate thought and to contribute to the dialog on the topic of how IRs impact reference librarian roles and careers.

Keyword(s): Academic libraries; Knowledge management; Reference services; Librarians; Electronic publishing; Archiving.

Successfully riding the crest of technology waves requires balance, perseverance, patience, vision, and hope. A fairly recent technology wave is the library-created and managed institutional repository (IR). This paper utilizes Lynch's (2003) definition of an IR as:

[...] a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members.

Why libraries create and support institutional repositories

Librarians are creating and supporting IRs in order to provide access to a wide range of digital scholarly materials (e.g. preprints, postprints, and technical reports) produced by faculty and others at their universities. This is in response to dramatic increases in journal costs, in conjunction with the escalating commercialization and volume of scholarly publishing, having a

diminished access to research resources on a global level:

Journal subscription rates have gone up an average of 8.5 percent per year since 1986, while library budgets have risen 5.6 percent per year, according to ARL statistics ... (Carlson, 2002).

Universities are buying back their institutional scholarship, and many journal subscription costs exceed library serial budgets.

IRs also foster the reform of the scholarly publishing system by supporting the open access movement, which advocates free online access to scholarly materials with minimal restrictions on their use. By providing free access to digital scholarly works at universities, IRs help to realize the goals of the open access movement. The decision about what digital materials to make available is institution specific: not all universities make all materials available to all users; however, university IRs typically make the majority of their contents available worldwide.

In addition to helping to solve the serials pricing crisis, IRs are a convenient and useful showcase. According to the brochure originated by the nonprofit organization, Create Change: "Scholarly communication refers to the formal and informal processes by which the research and scholarship of faculty, researchers, and independent scholars are created, evaluated, edited, formatted, distributed, organized, made accessible, archived, used, and transformed" (ARL Libraries, 2000). It is convenient to the university community to have the ability to search and use a database that contains an institution's easily accessible and peer reviewed research, such as post-prints, reports, conference proceedings, and monographs. Professional materials that could include preprints, images, audio, video, and respective supporting data can also be valuable to researchers. Faculty and other scholars are able to view and expand on what projects are retrospectively and currently underway, opening opportunities for collaboration and further peer review. It also has the ability to showcase faculty work to prospective higher education students or current students looking for an expert in his or her field of interest to study with.

Another benefit is that IRs can increase the global visibility of institutional scholarship. If the IR supports the OAI-PMH protocol, metadata for items in the IR can be harvested by search services such as OALster. The use of persistent identifiers in an IR ensures that as URLs for items change that they can still be found. As a result of direct use of IRs and the inclusion of metadata from search services, institutional researchers have the capacity to share their work with other scholars around the world for further comment or collaboration. The swift dissemination of research materials and their greater global visibility has the potential to raise scholars' recognition in academia and increase institutional prestige. Another significant benefit is the potential for greater research impact; a study by Lawrence (2001) found that articles that were freely available on the internet were cited 336 percent more frequently than those that were not.

Underutilized theses and dissertations which previously had to be purchased or obtained through interlibrary loan, can be made easily available to users in electronic form in IRs. Capstone Projects that are not archived except on a student's computer, can be archived for public visibility and use.

IRs also offer the benefit of preserving institutional scholarship. As libraries increasingly move to electronic-only journal collections, the question of preservation becomes more important since the future viability of specific commercial publishers cannot be assured.

Current roles to support an IR

The work of collecting, preserving, and providing access to scholarship is a natural and primary

function of libraries. Throughout the twentieth century libraries have evolved from totally physical spaces to a blend of physical and virtual environments. Academic libraries wishing to establish IRs is consistent with an educational milieu that contains an existing complex suite of information resources required to support a research and learning environment. Core traditional library skills, such as handling various types of information, teaching and training, facilitating, evaluating and promoting information resources, implementing complex information systems, and providing high-quality user support remain relevant. These strengths can be utilized in the IR environment as librarians implement the technical and hierarchical function of IRs, convey the benefits of submitting scholarship to faculty and students, deposit materials for the institutional community, and manage the preservation and presentation of digital scholarly materials.

Established library practices can still be utilized in the changing landscape of IRs, such as establishing metadata quality standards, preservation policies, and collection development practices. In order to recruit content for IRs, reference librarians must use their marketing and instructional skills:

[...] communication and team skills are also needed for librarians working and negotiating with colleagues in the library, IT services and academic departments (Horwood *et al.*, 2004).

Librarians continue to learn new skills to master the latest and greatest technologies. The rhetorical question is: "How do librarians continue to add new services into their working week while not dropping or giving up previous services that still exist and are necessary?" This requires the library administration to balance staff priorities and responsibilities, and it may require them to reorganize the library and to hire new staff, which is dependent on budgetary conditions.

For reference librarians already inundated with other new and existing technologies, the IR becomes one more technology to learn about and to add to a busy schedule of technology instruction. As Tenopir and Ennis (1998) note:

Excitement can be a double-edged sword, however I suspect this university librarian is not alone when she says all of the changes are exciting but we're wearing out. Many librarians report an increase in their workloads as more and different resources are added with no increase in professional staff.

Shifting librarian roles

The future configuration of scholarly communication is unclear, but what is clear is that libraries have a key role to play. Library roles are becoming more deeply engaged with the broader vision of the institution by being more intertwined and interdependent with other stakeholders, such as the university administration, faculty, and other departments. A case in point is that most faculty do not have the time to stay abreast of changes in information technology as it applies to scholarly communication and teaching. Lougee (2003) describes this role as diffuse, meaning libraries are becoming a more integrated part of the community by infusing library expertise into research, teaching, learning, and service functions. The library's level of relevance and visibility to faculty and the institution will increase as librarians support faculty in their digital publishing activities.

Another key change is for librarians to de-emphasize their role as keepers of traditional collections and to emphasize their content expertise. Instead of serving as a passive support agency, the library can serve as a collaborator in research, teaching, and learning (Lougee, 2003). Examples of emphasizing librarian content expertise include:

- educating faculty on the importance of open access for global sharing of scholarship with enhanced professional visibility for the author and the institution;
- negotiating with publishers on behalf of faculty or encouraging faculty to retain the right to publish in IRs as well as in scholarly publications; and
- depositing materials in IRs on behalf of researchers and undertaking file formatting and conversion.

Moving from a facility-based operation to an expansive campus-wide enterprise potentially enables anyone in the university community to participate in sharing scholarship through the IR.

IRs allow libraries to provide direct access to scholarly materials instead of through the systems of serials' publishers and vendors. Providing open access to materials in IRs will hopefully relieve some of the pressures of the serials crisis. Subsequently, librarians may be able to spend less time concerned and dealing with subscription issues. Librarians may welcome the opportunity for IR management roles involving increased frequency and quality contact with faculty, which can inform and enrich library collection development decisions (Crow, 2002).

Marketing, marketing, marketing

The marketing of a new library resource or service is always essential to spread the word of a value-added tool to enrich the academic lives of a university community. Faculty involvement is critical to ensure a system that will meet the scholarly needs of dissemination and visibility and will be archived for use now and in the future. It is a new imperative for reference librarians to engage faculty in a change agent role by garnering IR buy-in. An MIT DSpace study shows that faculty need to see information regarding an IR at least five times and according to the California Digital Library study, seven times before the IR registers as a technology worthwhile to pursue (Branschofsky, 2004). Given these baseline studies and anecdotal evidence, librarians must realize that perseverance in pursuing contact with faculty within the IR context is essential to populate the archive.

Academic libraries already interact with faculty in a variety of ways; their main purpose has always been to support both research and teaching. Before the advent of the internet, library staff worked basically in a hard-copy medium. Library subject specialists, bibliographers, generalists, technologists, and other staff now support faculty in a variety of mediums to provide appropriate, best-value resources. When the work of planning and creating the IR is complete and it is ready to accept scholarly submissions, the next step is to populate it with institutional content.

The biggest challenge of the IR appears to be garnering content for it. Librarians, more than ever, have to become marketing specialists embarking on a mission of advocacy for the IR. For faculty who are used to the traditional journal peer review process, there are questions raised about the benefits of submitting materials to the IR. Does it warrant the required time and effort to do so, especially since there is no peer review? Reference librarians who have been assigned to promote the IR and to train potential users will encounter resistance: "There is no reward or incentive." "It is not a priority." "I have already published my papers where my professional peers have immediate access to my scholarship." "I don't have the time" are often the remarks received from faculty. Concerns about copyright may be voiced at IR presentations. Can faculty and students be enticed to add their scholarship into the IR? Targeting graduate students working on their theses and projects as they prepare to graduate, and on proactive faculty that tend to gravitate to using new technologies is one promising strategy.

Managing and participating in the evolving scholarly communication process is a new challenge for librarians. Committing to an institutional repository requires libraries to carefully consider the

implications of moving beyond a custodial role model to actively contributing to the evolution of scholarly communication, a paradigm shift from the traditional to a more practical and enriched institutional landscape. According to The Scholarly Publishing and Academic Resources Coalition (SPARC): "For libraries with an organizational imperative to invest in the future, institutional repositories offer a compelling response" (Crow, 2002).

The RIT experience

In late 2002, the RIT Libraries' director embarked on an in-house IR. The Library wanted to utilize a tool that could house RIT scholarship and have the ability to harvest metadata from other OAI-PMH compliant systems. Some faculty migrating to RIT who have submitted their journal articles and preprints to their former institution's IRs wanted to have their materials also available in RIT's IR.

An RIT DML task force was formed by three library staff members that included the head of Library Technology Services, the Art/Photo librarian, and a Production editor of the Cary Graphics Press. The library staff were respectively chosen for their expertise in technology systems, digital image databases, and publishing. The two other task force members were a representative from RIT's Educational Technology Center (campus learning technologies and media production services) and a faculty member from the College of Imaging Arts and Sciences (CIAS). These members added value and expertise because they were from RIT departments with tangential experiences in the digital realm.

The task force explored various IR systems, such as eprints, Digitool, DSpace, and Fedora. Their directive was to research and define the scope of an IR that would serve the RIT community. They also examined best practices, selected the IR software (DSpace), and helped to define IR technology standards.

In early 2003, the task force created a questionnaire that was e-mailed to the RIT faculty and staff list to gather background information that was needed to support the IR. Questions were asked in relation to the types of either digital or analog materials that were owned and if an IR environment would be a useful tool to store and display their items in. We had a 25 percent response rate: 80 percent of faculty respondents were extremely interested and had positive comments and over 60 percent maintained their own digital collections.

There is a great deal of energy and money tied to the creation of digital and analog materials across campus. Most of it is not accessible, and much of it is not being archivally maintained for use now or for the future, although it has scholarly or historical significance to the Institute. There was no single system for searching all non-digitized and digital materials created across RIT's community. The Library's response to this need was to establish the newly conceived RIT Digital Media Library (DML). Our intent was (and still is) that the RIT DML be used by faculty and students for the purposes of showcasing and sharing research and encouraging interdisciplinary study.

By early summer of 2003 during Phase I of the IR project, eight more library staff members also began dedicating some significant portion of their time toward the development of the DML project. Three format teams were created:

- e-prints (the library coordinator for Distance Learning, a software specialist, the Liberal Arts librarian, and a Technical Services technician);
- e-theses and dissertations (ETDs) (the head of Cataloging, an Information Delivery Services technician, a Serials technician, and, a software specialist); and

- multimedia, encompassing images, audio, video (all task force members).

Each team had a leader who was charged with creating a formal plan for his or her initiative and who was responsible for seeing that the team's tasks were completed on time. The Library staff's time and talents were stretched to support this new resource, but there were high hopes that it would be valued and utilized. It was felt that ongoing DRM support should be provided by a Digital Media specialist, who would be responsible for maintaining and growing this resource.

The three formats became our IR sub-libraries. To facilitate a design that went beyond the DSpace "out of the box" look, another team, the Digital Design Team (the Library director, the Library coordinator for Distance Learning, head of Library Technology Services, head of Cataloging, the Web Server administrator, another Serials technician with web design skills, a reference assistant, and a systems' co-op student (hired specifically to upgrade and maintain DSpace) was formed to design and implement the desired user interface and to develop documentation (e.g. guidelines by format, submission guidelines, and compiled copyright information).

The multimedia team did not develop documentation because there was (and still is) a lack of funds to either develop or purchase software to view and properly use these formats. In addition, the Library needed (and still needs) a dedicated server with sufficient capacity to support these bulky file types.

The actual creation of the design and development of the DML interface required researching other IRs, and incorporating the features we admired the most from them, including simplicity, ease of navigation, bright and cheerful colors, and a personal touch. The personal touch was created by staff members volunteering to have their photos taken, posted, and rotated on the DML homepage each time the page reloads (<http://ritdml.rit.edu>).

The IR's internal structure mirrors how RIT is organized. IR content is controlled by the colleges and individual communities which produce it. Communities were set up for the eight colleges and for non-college departments, such as academic support centers (e.g. the Library, University News, and Online Learning). The Library administers and supports the system as a whole. We also added a Digital Showcase at RIT community for exemplary scholarship that does not fall within other communities, which could include undergraduate work, special projects, or academic writing competitions.

Collections in the communities are by file format. After implementing the DSpace sub-communities feature, we recently added other collections for conference papers and course outlines (officially approved course syllabi), which are organized by the hierarchy of colleges, departments, and programs.

In fall 2003, the Library launched Phase II of the DML implementation, which involved obtaining initial and permanent content and securing institutional support for the IR. New staff members with needed skills were added to the project: the new head of Library Technology Services, the Computer Science and Information Technology Librarian, the Art/Photo Librarian, and the Electronic Resources Librarian. For approximately a year, 40 percent of the Library's staff (20 staff members) spent a significant amount of time and energy on launching and stabilizing the RIT DML presence.

The librarian for the College of Applied Science and Technology (CAST) approached the college's dean, inquiring about his potential interest in being the first beta test college to use the IR. He was very supportive and appreciative because he had considered developing an IR for his college. The dean appointed a community administrator (CA), the first gatekeeper in DSpace's workflow, for CAST's scholarship. He met with the CAST librarian to learn how to use the

software to its full advantage for CAST faculty. The Library deposited a few peer-reviewed articles for the College to get the ball rolling. Another action that was critical for faculty understanding and acceptance of the IR was for the dean to require all departments to attend a presentation on the RIT DML. The presentations were informal, but covered all key IR features such as how the IR works, relevant copyright issues, document deposit procedures, and the importance of open access essential for reforming scholarly publishing. Working closely and communicating regularly with the dean, the IR liaison, and the CAST faculty has been a successful strategy as measured by increased faculty-initiated contact with IR staff and by the growth of CAST content in the RIT DML.

With the RIT DML ready for use and housing a few scholarly items to demonstrate its capabilities, the Library director and one of the RIT DML team leaders (Library coordinator for Distance Learning) presented the repository first to the college deans and the provost (Fall 2003), and then to the RIT administrative council (January 2004), which includes RIT's president. The reaction was very positive, but the caveat was that there would be no additional funds to support the project. This was bad news, since the Library needed a new server, a digital media specialist, and multimedia software. However, we persevered in our vision, wryly referring to our project as "DSpace on a dime".

By late 2003, an Image Action Team (Art/Photo librarian, Electronic Resources librarian, CIAS faculty member, a second Production editor from Cary Graphic Arts Press, a reference assistant, and head of Library Technology Services) was formed to research image software, such as CONTENTdm, Madison DID, and DSpace. Each digital image system was populated with test images from either the RIT Archives photography collection or the Cary manuscript collection or both. These test images were used to assist in evaluating each system's data input, searching, and the display capabilities. System evaluation criteria were developed by team members in conjunction with the findings of a faculty survey administered in the Spring 2004 academic quarter. Over ten RIT faculty/staff also provided valuable input and suggestions. It is anticipated that DSpace version 1.2.1 is to have the ability to show image thumbnails on the item record and provide a higher level of image functionality. For archival purposes, the Image Team felt as though DSpace would fill the niche for archiving and showcasing images.

The Library director requested that appropriate RIT units name a CA; all of the colleges did so as well as add a few additional units. During that process, three other deans wanted their colleges to be included in the beta test project. The library liaisons tried various outreach methods to the Community Administrators, but it appeared as though they did not share their dean's enthusiasm for the IR project (it was probably not internally promoted or mandated within the colleges). We saw a few document deposits from one of those colleges during this period.

Before the Library could market and promote the IR to the other colleges, the reference librarians needed some updating and training on the IR's features, policies, and procedures. Two of the DML team members, who were reference librarians (Computer Science and Information Technology librarian and the Library coordinator for Distance Learning) created comprehensive IR documentation. The documents included: CA guidelines, an overview of the submission process, best practices for librarians to promote the repository, copyright guidelines, a compilation of reasons to self archive, and an IR PowerPoint presentation.

Wallace Library reference librarians have used a variety of methods to publicize and promote the virtues of the IR, including meeting with CAs (low response rate; some agreements, no action taken), e-mailing department heads and offering to demonstrate the RIT DML (no responses), many informal conversations with interested faculty or faculty who publish frequently, advertising open IR overview sessions to the RIT quarterly updates to the College of Science dean and library faculty committee, e-mails to faculty regarding specific new DSpace features (e.g. utilizing the Creative Commons self-licensing), invited presentations at department meetings, discussions with graduate program coordinators, speaking with graduate students individually and in classes,

attending an informal college's scholarship discussion, and regular CA contact.

During open demonstrations of the RIT DML, questions regarding copyright issues and adding content into the archive were addressed. In the beginning, some faculty attended out of curiosity about the IR. A few proactive faculty volunteered to submit documents to the IR and they continue to do so. The toughest task for the reference librarians has been to increase interest in the IR.

Cervone (2004) indicates that: "As producers of primary research, it seemed natural that academic institutions would take an interest in capturing, disseminating, and preserving the intellectual output of their faculty, students, and staff. Traditionally, publishers and libraries have served complementary roles in facilitating scholarly publication and preservation." Faculty are troubled by the issue of who owns the materials they put into the IR. They are also concerned that adding material to an institutional repository can impede other, more traditional publication opportunities (Cervone, 2004). The biggest challenge in reforming the traditional publishing model is to change the culture of researchers through significant advocacy activities. This requires being aware of and sensitive to perceived barriers to change.

The Wallace Library is working with RIT's Information Technology Services department to utilize LDAP to authenticate users. We believe in 100 percent availability of materials; realistically, there will be exceptions to this philosophy to accommodate all scholarly work, dependent on copyright, patents pending, and other factors. Any changes to DSpace software were made without altering its core code, so that the modified system would be compatible with periodic DSpace upgrades.

The RIT environment

Interestingly, while the RIT Libraries were researching IR options and creating an IR to house scholarship, RIT was developing an institutional strategic plan requiring its eight eclectic colleges to have a more defined and rigorous scholarly communication output. Highlights of the broad RIT Strategic Plan (Rochester Institute of Technology, 2004) include that RIT units will achieve shared understanding of scholarship, including faculty engaging students in scholarly activities and increasing cross-college collaboration. While some of RIT's researchers and faculty publish traditionally through journals and association publications, others have not taken that route. The shift in institute expectations is creating scholarship anxiety. The Library hopes to play a larger role in allaying the concerns by supporting faculty through increased promotion by subject specialists and also by its newly created Publishing and Scholarship Support Services Center, which is part of the Library's recent reorganization. The Center is responsible for the intake and posting of scholarship in the IR. All RIT faculty have scholarly materials. It takes patience and vision to sift through what researchers have in file cabinets and on their computers in order to consider it for inclusion in the IR.

Even though the Library created a useful vehicle to deposit, store, and present scholarly materials, faculty are often reluctant to take advantage of the IR to showcase their work. The experience of the authors is in a decentralized academic environment, where each college within the university is a world of itself. In this environment, there appears to be minimal cross college sharing of scholarship, in part due to RIT's wide subject range of programs. Some faculty prefer to showcase their individual scholarship on the web pages of their professional organizations and on their individual college department's web page. The major disadvantages of this approach for faculty are lack of accessibility, lack of OAI-PMH compliance, and the need to maintain information in perpetuity.

Unexpected new role as change agents

The authors did not anticipate the amount of work involved in marketing the IR and persuading faculty to use it and to deposit materials in it. Reference librarians have to become change agents to do this. A change agent is "one who initiates a movement toward social change in a group" (*The Oxford English Dictionary*, 2005). To create change, reference librarians have to work with faculty in a variety of ways, "creativity, courage, visibility, perseverance and driving motivation are all indispensable characteristics of people who instigate change rather than observe it" (Wireman, 1998). An effective reference librarian as a change agent will need to demonstrate and implement these five characteristics. Librarians who are conversant with technology and who are willing to engage in new projects that offer new opportunities demonstrate that we are not victims of change, but rather that we are agents of change (Huwe, 2004).

Conclusion

Vision and hope for a scholarly communication shift that benefits the researcher and the institution is the image that the reference librarian needs to project when promoting IRs and to encourage potential users. Functioning as a change agent, the reference librarian should expect resistance and have the tenacity to work through the various stages of understanding the process. Resistance will slow down the process of garnering content into the IR, but with patience and perseverance the rewarding end results will be achieved.

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