Open Access: Help or Hindrance to Resource Sharing?

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Introduction

The growing acceptance of the open access movement has created an increasingly large body of free, online information that library users may have difficulty navigating. Students, in particular, may not be fully aware of open access and the corpus of knowledge available to them. As a result, users still request open access materials through interlibrary loan (ILL) despite their ability to access these materials directly.

The Resource Sharing & Delivery Services (RSDS) department of Indiana University-Purdue University Indianapolis' (IUPUI) University Library began tracking ILL borrowing requests for open access materials in 2009. RSDS tracks any request fitting the general criteria of open access content established by Peter Suber: "digital, online, free of charge, and free of most copyright and licensing restrictions" (Suber, 2013). Therefore, the collected data include requests for grey literature, electronic theses and dissertations (ETDs), and public domain works in addition to open access journal content.

In 2011, the author used the collected data to study open access borrowing requests over two fiscal years (July 2009-June 2011) (Baich, 2012). This period showed an increase in open access requests while overall borrowing requests held relatively steady. This paper presents an update on that research using data for July 2011-June 2013. The new study provides evidence that the number of borrowing requests for open access documents continued to grow in the ensuing two years.

Literature Review

It is a commonly held belief that interlibrary loan is and will continue to be adversely affected by the growth of open access. Studies conducted in Japan and Belgium do show a reduction in the number of ILL requests and place at least partial blame on open access (Koyama et al., 2011), (Corthouts et al., 2011), but Schöpfel recently stated there is "little empirical evidence for this causal relation" (Schöpfel, 2014). (McGrath, 2014) also notes the many situations in which interlibrary loan will still be necessary despite any negative impact of open access. The experience at IUPUI University Library has so far run counter to the argument of open access as a hindrance to resource sharing. Open access has not reduced the number of article requests to date, and users actually request open access materials through interlibrary loan. The author could locate only one study which shares the view that open access is "an extraordinarily useful source for librarians to perform document delivery service" (Hu and Jiang, 2014).

One of the key reasons users submit ILL requests for open access materials is difficulty with discovery. There are a vast number of resources for locating open access materials, but users want ease of access. Connaway, et al. found this is so imperative for users that they will "readily sacrifice content for convenience" (Connaway, et al., 2011). Additionally, a 2010 report on the findings of twelve user behavior studies found that Google and other search engines are increasingly central to the search for information (Connaway and Dickey, 2010). In fact, when "information consumers" were asked by OCLC Research where they begin their information search, 84 percent indicated beginning in a search engine while not a single person began their search on a library website (DeRosa, et al., 2010). As Kroll and Forsman note, "researchers find Google and Google Scholar to be amazingly effective in finding isolated bits of information or getting to publications or findings of interest to them" (Kroll and Forsman, 2010). As a result, users are unlikely to search multiple resources for the information they seek both out of convenience and the possible perception that what they seek has been found.

These user behaviors present a particular problem for open access content housed in repositories. Google Scholar doesn't follow the same metadata standards as libraries, which causes a level of incompatibility that can impact discovery. Google Scholar does have Inclusion Guidelines for Webmasters to help increase the likelihood an open access repository will be indexed, but some libraries may lack the knowledge or resources to implement these guidelines (Artlisch and O'Brien, 2011). Artlisch and O'Brien found that "in general, IRs [institutional repositories] that followed these guidelines had a much higher indexing ratio (88-98 percent) than sites that did not (38-48 percent)" (Artlisch and O'Brien, 2011). The current inconsistency in discovery of open access content through a Google or Google Scholar search has a negative impact on user discovery.

The discovery problem extends beyond open access materials. The most recent study of literature regarding ILL requests for owned items summarizes the literature by stating, "most … found that interlibrary loan requests for

items owned or available through electronic access through the library represented 30 percent or greater of the total cancelled requests" (Kress et al., 2011). While there are a number of factors that can cause users to place requests for owned items, one of the key issues is similar to that for open access materials. Libraries offer numerous methods for locating an item – online catalogs, databases, A-Z e- journal lists, and OpenURL link resolvers – that retrieve different formats and results. This does not align with users' need for convenience and ease of access and may result in a greater reliance on ILL to locate information. The initial 2000 study of ILL requests for owned items suggested that users may "take the line of least resistance in a search and believe that if it is not in the first place they look, it must not exist" (Yontz et al., 2000). This proves to be a prescient statement in light of later research. As discussed earlier, users' demand for ease of access has only increased in the ensuing years.

Overview of IUPUI and University Library

IUPUI
IUPUI is an urban university with nineteen schools and academic units from both Indiana University and Purdue University enrolling more than 30,000 students. IUPUI is administratively linked to Indiana University (IU) and is considered a core campus in the IU system along with Bloomington. The IU system also includes six regional campuses around the state. IUPUI has its own extension campus, Indiana University-Purdue University Columbus, located approximately forty-five miles south of Indianapolis (IUPUI, n.d.; Indiana University, n.d.). All Indiana University campus libraries collaborate in a number of ways including a shared online catalog, a remote circulation service, and some shared subscriptions.

University Library
IUPUI University Library serves the faculty, staff and students of all IUPUI schools except the law, medicine and dentistry schools, which have their own libraries. The Herron School of Art also has its own library, but it reports administratively to the Dean of University Library. Resource sharing services for Herron users are provided by University Library.

David W. Lewis, the Dean of University Library, is a well-known proponent of the open access publishing model and has written a number of articles on scholarly communication and open access. One of his earliest works on the topic is an unpublished paper titled "Six Reasons Why the Price of Scholarly Information Will Fall in Cyberspace" (Lewis, 1997). Guided by Dean Lewis' vision, University Library has developed a strong structure and services to support the scholarly communication of IUPUI faculty.

One of the library's earliest open access initiatives was the launch of an institutional repository in 2003. The largest collection within the institutional repository, now known as IUPUI ScholarWorks, is that of electronic theses, dissertations, and doctoral papers from IUPUI graduates. The growth of this collection was largely facilitated by the IUPUI Graduate Office's ETD submission requirement, which began in 2005. In 2008, the library launched its first hosted open access journal in Open Journal Systems (OJS). At the time of its transition to OJS, *Advances in Social Work* was edited by an IUPUI faculty member.

That same year, University Library refocused the existing Digital Libraries Team as the Digital Scholarship Team to be more inclusive of scholarly communication and open access issues. The increased focus on scholarly communication resulted in the addition of several librarian positions to the Team including a Digital Scholarship and Data Management Librarian (2011); Scholarly Communications Librarian (2013); Digital Scholarship Outreach Librarian (2013); Digital User Experience Librarian (2014) and Digital Humanities Librarian (2014). These new positions are largely focused on supporting IUPUI faculty research and its dissemination to a broader audience.

In 2013, the Digital Scholarship Team increased its outward focus again with the creation of the IUPUI University Library Center for Digital Scholarship to enrich the research capabilities of scholars at IUPUI, within Indiana communities, and beyond by:

- Digitally disseminating unique scholarship, data, and artifacts created by IUPUI faculty, students, staff and community partners;
- Advocating for the rights of authors, fair use, and open access to information and publications;
- Implementing and promoting best-practices for creation, description, preservation, sharing, and reuse of digital scholarship, data, and artifacts;
- Strategically applying research-supporting technologies;

- Teaching digital literacy (IUPUI University Library, 2014).

University Library also launched another major service in 2013 in the form of the IUPUI Open Access Publishing Fund. This fund "underwrites reasonable publication charges for articles published in fee-based, peer-reviewed journals that are openly accessible" (IUPUI University Library, 2013). Though administered by University Library, financial support comes from several key campus stakeholders including the Office of the Vice Chancellor for Research, IU School of Dentistry, Robert H. McKinney School of Law, and University Library. Since its launch, the Fund has supported the publication of sixteen faculty articles representing nine of IUPUI's schools (Jere Odell, personal communication, 17 Dec. 2014).

In September 2014, the Director of the Center was elevated to Associate Dean for Digital Scholarship once again emphasizing the importance of scholarly communication and open access to the library.

Open Access Policies
In April 2009, the IUPUI Library Faculty, the governing body for all librarians from the campus' five libraries plus Columbus, passed a Deposit Mandate in affirmation of its support of the open access movement. The mandate requires IUPUI and IUPUC Librarians to deposit their scholarly articles in the institutional repository, IUPUI ScholarWorks.

After months of work, the IUPUI Faculty Council's Library Affairs Committee introduced an Open Access Policy. Following discussion at IUPUI Faculty Council meetings and a series of town hall meetings, the IUPUI Faculty Council passed the Open Access Policy on October 7, 2014, becoming the first Indiana University faculty body to do so. The Policy requires the deposit of faculty-created scholarly articles in IUPUI ScholarWorks.

Overview of Resource Sharing Operations

IUPUI University Library's RSDS department provides interlibrary loan and document delivery services to the faculty, staff and students of all IUPUI schools except the law, medicine and dentistry schools, which have their own libraries. University Library also has an agreement with Martin University, a local university without its own library, to provide ILL services to its affiliates. RSDS consists of half an FTE librarian, three FTE staff (two of which have responsibility for resource sharing services) and two-three FTE student employees. IUPUI University Library is an OCLC supplier, participates in RapidILL, and uses the OCLC ILLiad ILL management system.

Total ILL borrowing requests have decreased slightly over the past three fiscal years, but each decrease can be attributed to fewer loan requests. When borrowing copy requests are considered separately, the statistics show an increase in this type of request every fiscal year since 2008/2009. The large increase in article requests in 2008/2009 can be attributed to the implementation of a document delivery service for articles and book chapters owned by the library. These trends are illustrated in Figures 1 and 2.

Figure 1. Borrowing Requests Submitted by Fiscal Year
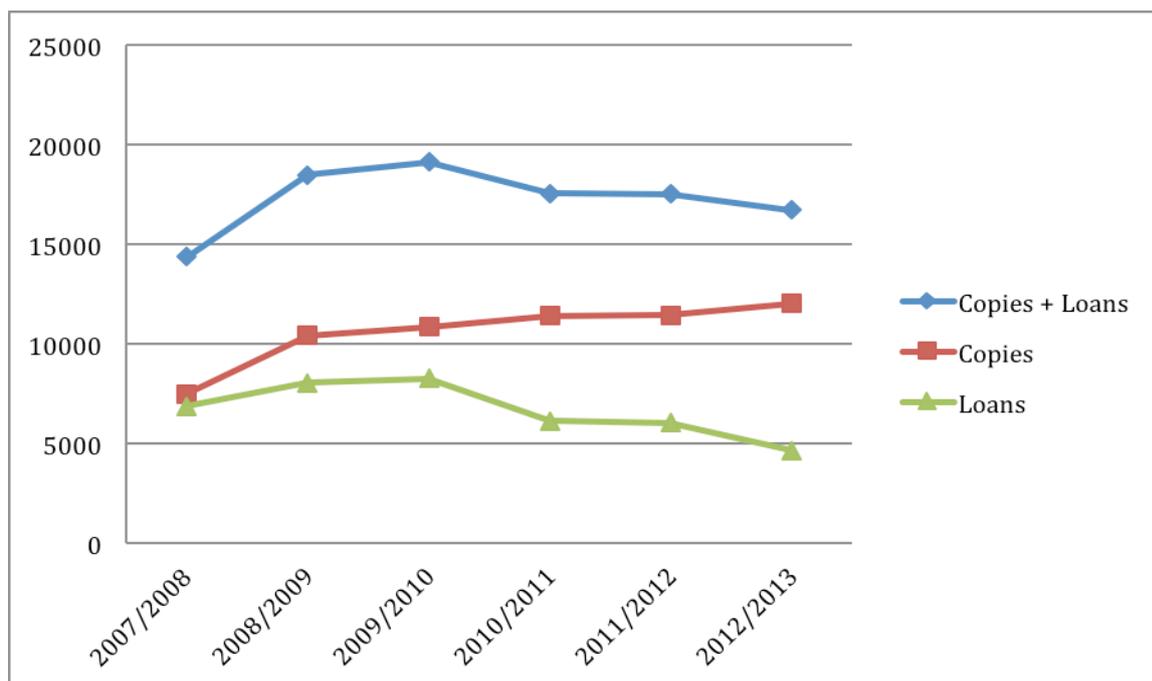
**Figure 2.** Borrowing Copy Requests Submitted

Fiscal Year	Submitted	% Change from Previous Year
2007/2008	7,516	
2008/2009	10,441	38.92%
2009/2010	10,867	4.08%
2010/2011	11,422	5.11%
2011/2012	11,466	0.39%
2012/2013	12,065	5.22%

Open Access ILL Workflow

The RSDS department utilizes the OCLC ILLiad ILL management software, which supports the creation of custom routing rules, queues, and emails that assist staff in automating workflows. Two custom queues, "Awaiting Open Access Searching" and "Awaiting Thesis Processing," allow staff to monitor potential open access borrowing requests. Items published in the US prior to 1923 are considered to be within the public domain and free from copyright restrictions. A custom routing rule directs any borrowing request with a pre-1923 publication date into the "Awaiting Open Access Searching" queue so staff can search for freely available electronic copies prior to sending the request to another library. Staff members use ILLiad addons, which automatically execute searches in HathiTrust, Internet Archive, and Google or Google Scholar based on information in the request.

With the increase in availability of electronic theses and dissertations (ETDs), staff members now search for open access versions if a title is not part of our ProQuest Dissertations & Theses (PQDT) subscription before submitting a request via OCLC. The "Awaiting Thesis Processing" queue facilitates this by segregating all requests with a document type of thesis or containing the phrase "Dissertation Abstracts." When a thesis or dissertation request is submitted, an RSDS staff member first searches the PQDT database to determine whether IUPUI University Library has access through its subscription. If access is not possible through ProQuest, the staff member searches Google Scholar and/or Google for an ETD deposited in an institutional repository. It is only after failing to find an ETD that the staff member will turn to OCLC where she will confirm there is no electronic resource record or URL included in the print record. If no ETD is located, the staff member will submit a request for a physical copy from another library. A visual representation of these workflows is depicted in Figure 3.

Figure 3. Open Access ILL Workflow
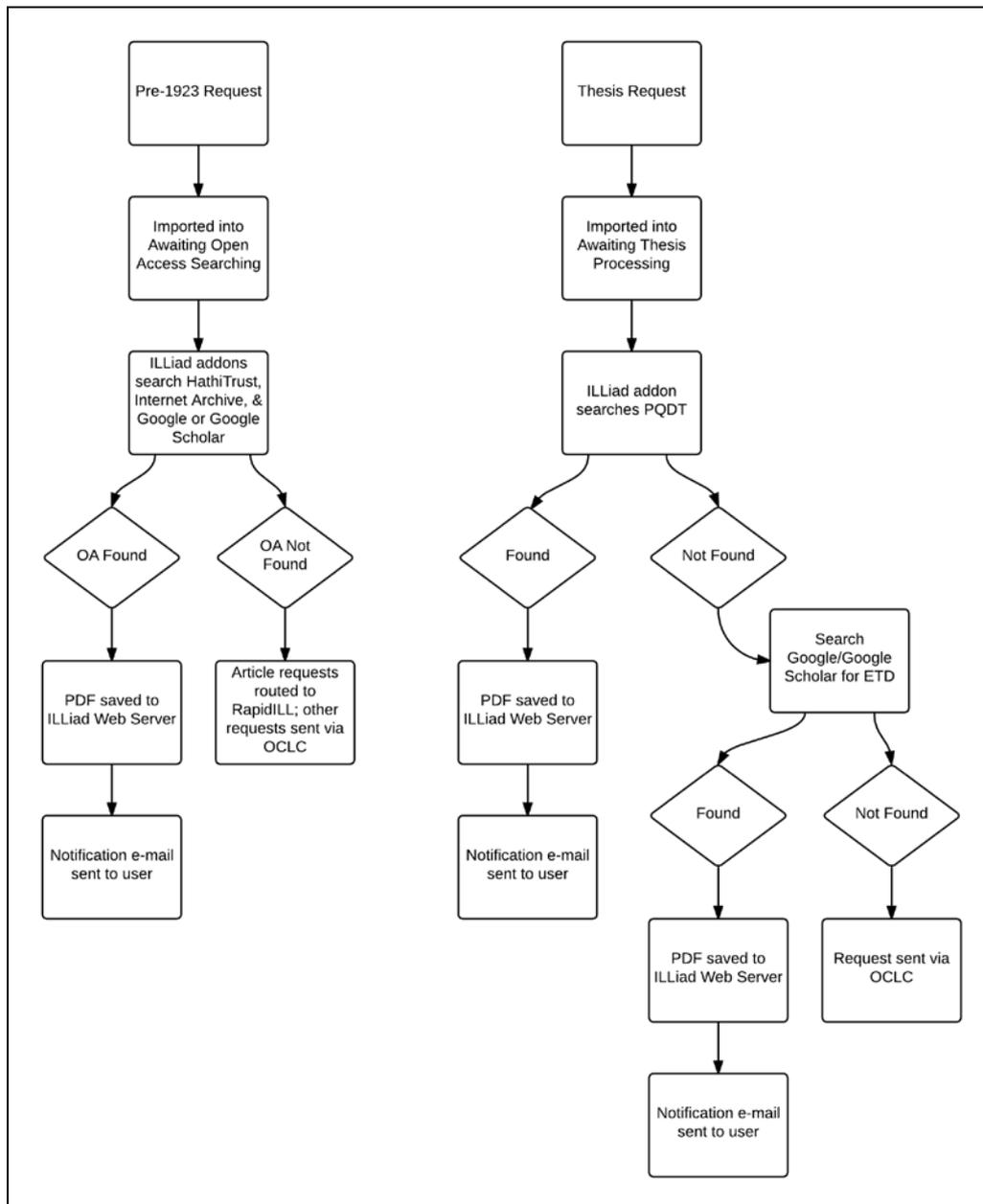
All other article requests are sent into the RapidILL system, which also checks for open access titles. Very few of the open access requests received by IUPUI University Library are fulfilled through RapidILL's open access check (6 of 1,557 requests, or 0.4%). Staff members search the article title in Google Scholar for open access versions when requests are returned from RapidILL as unfilled.

RapidILL also returns requests that are part of our local holdings, which can result in the identification of additional open access items when requests are searched in the library's e-journal portal. The library uses Serials Solutions as its vendor for electronic resource management. Within the administrative module, it is possible to activate "subscriptions" to various open access journal collections. An example of how this appears in the user interface is shown in Figure 4. Thanks to this feature, resources such as PubMed Central and the Directory of Open Access Journals as well as various collections of freely accessible journal titles are linked through the library's e-journal portal. This allows staff to fill requests for gold OA articles as well as those green OA articles archived in PubMed Central with minimal searching and without burdening possible lenders with requests for open access materials.

Figure 4. Example Open Access Article as Located in E-Journal Portal

IUPUI INDIANA UNIVERSITY–PURDUE UNIVERSITY INDIANAPOLIS

E-Journal Home Page   Help   IUPUI Libraries

Search criteria: Refine or alter criteria

Article:	The Practice Profile of Inquiry: Connecting Digital Literacy and Pedagogy
Journal:	E-Learning and Digital Media
ISSN:	2042-7530 **Date:** 2011
Volume:	8 **Page:** 76

Content is available via the following links

| Coverage Range	Links to content	Resource
2004 - 3 years ago	Journal	Freely Accessible Journals

Post-1922 conference paper and report copy requests are screened for open access versions prior to submission to OCLC. Specific open access searching is typically not done for post-1922 book chapter or loan requests, but staff members are conscious of electronic resource records in OCLC and may sometimes identify an open access item based on the URL included in the record. Extensive searching for open access options does not occur for book chapter and loan requests until all other borrowing options have been exhausted.

When an open access item is located, the staff member enters tracking information into the Call Number and Location fields within the request form and records "open" or "etds" (depending on the document type) as the Lending Library. She then saves the PDF to the ILLiad web server and sends the user a custom email notifying him both of the document's availability on his account and of its location on the open Web. Requests for which an open access version is located are considered filled by RSDS since the staff member has used her time and expertise to find and deliver the item to the user.

Data Overview

Since the publication of the author's 2011 study, open access requests have increase by 24-34 percent each year. Figure 5 shows the number of borrowing requests filled with open access materials during fiscal years 2010 through 2013. Despite these substantial increases, open access requests only account for 7 percent of total borrowing copy requests (1,557 of 23,531).

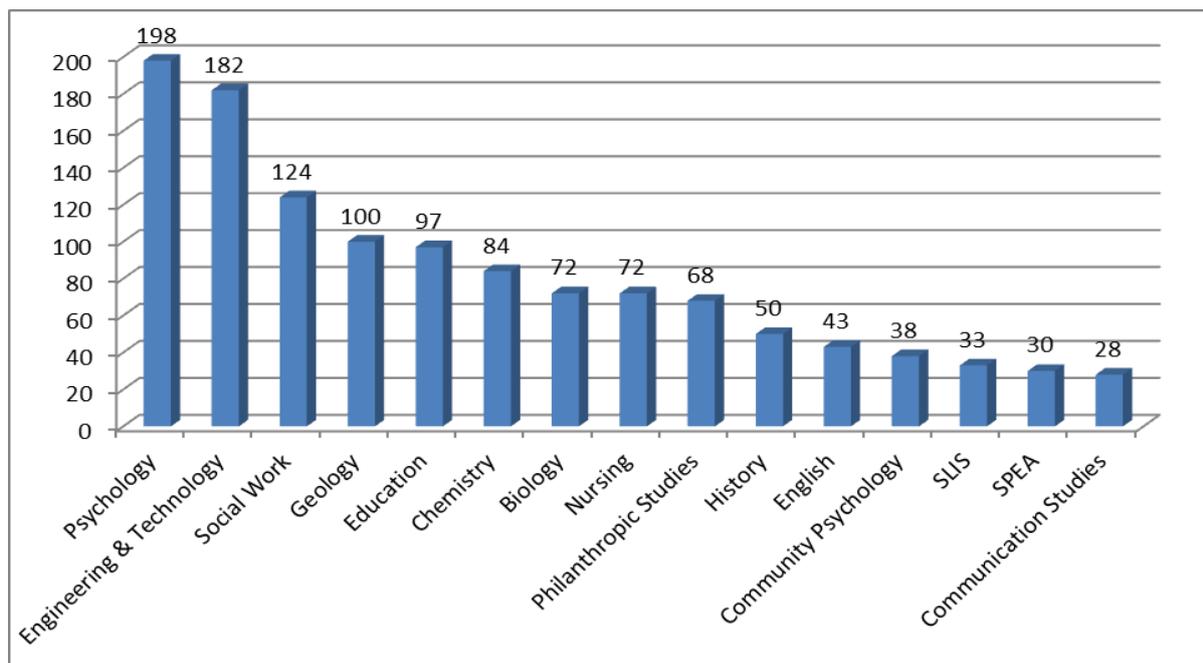**Figure 5.** Open Access Borrowing Requests by Fiscal Year
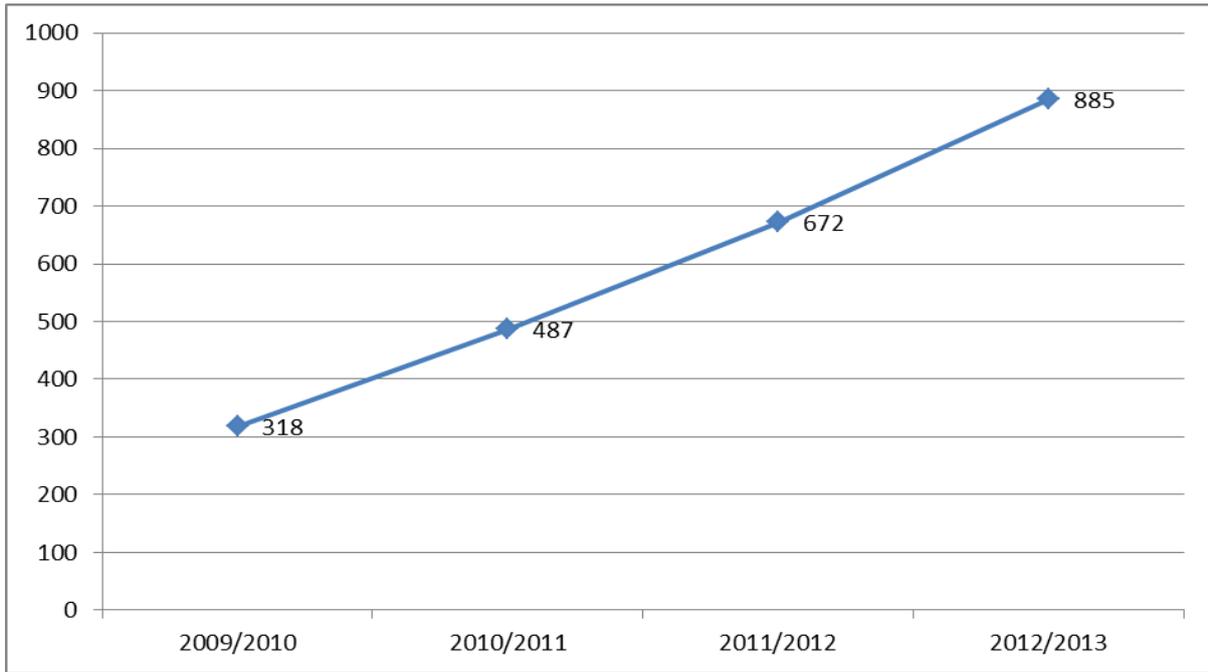
As stated in the introduction, students may not be fully aware of open access and the corpus of knowledge available to them. The number of requests by user status seems to support this assertion. Alternatively, or perhaps in addition, students may have greater difficulty with the discovery issues covered in the literature review. When taken in combination, IUPUI undergraduate and graduate student requests account for 70 percent of open access requests received in 2011/2012 and 2012/2013. If requests from Martin University students are added, then student requests account for 74 percent of open access borrowing requests. Figure 6 shows the number of open access borrowing requests by user status.

Figure 6. Open Access Borrowing Requests by User Status
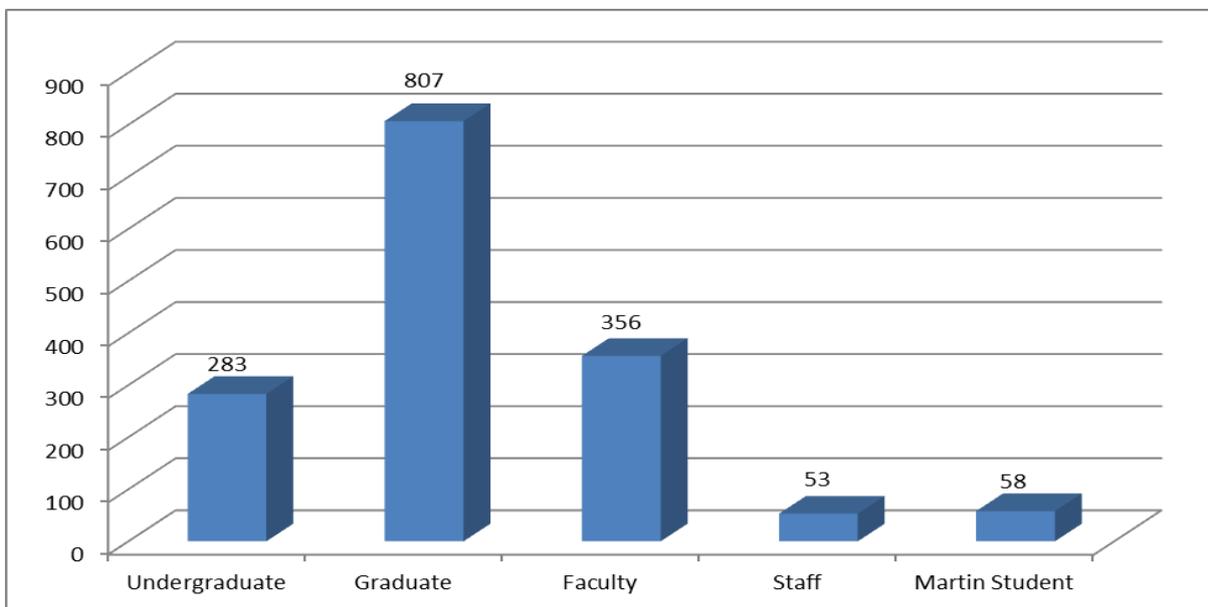
Users representing 63 unique departments or schools submitted open access requests in 2011/2012 and 2012/2013. Figure 7 shows the number of open access requests submitted by users from the top fifteen departments or schools. Of the top fifteen departments, seven are STEM or health sciences disciplines. The amount of open access materials available in these disciplines may relate to the public access policies enacted by the National Science Foundation and National Institutes of Health, which require that research funded by these federal agencies be accessible to the public.

Figure 7. Open Access Borrowing Requests by User Department or School

Open Access Document Types and Resources

The 1,557 open access requests received during fiscal years 2012 and 2013 represent a variety of material types (See Fig 8).

Figure 8. Open Access Borrowing Requests by Document Type

| Doc Type	2011/2012	2012/2013
Article	478	655
Book/Chapter	45	80
Thesis	65	75
Conference	32	22
Report	52	53
Grand Total	**672**	**885**
Percent change on previous year	*27%*	*24%*

Article Requests
Nearly three-quarters (n=1,133, 72%) of open access requests in fiscal years 2012 and 2013 were for articles. These requests were filled from a wide variety of both gold (open access journals) and green (self-archiving) sources. Though it is difficult to identify percentages with precision due to a variety of factors (i.e. language barrier, changes in access, multiple OA options), only 170 article requests (15%) can be clearly identified as gold OA. An additional 58 open access articles were retrieved from the sites of journals that still rely primarily on a subscription-based publishing model. Thirty articles requests were for public domain materials and were filled using HathiTrust, Internet Archive and library digital collections. Based on this analysis, the majority of open access article requests were filled via green (self-archiving) sources.

Within the administrative module of University Library's electronic resource management system, it is possible to activate "subscriptions" to open access journal collections. Access to these collections then becomes available in the e-journal portal (see Fig 4 above). The activation of open access collections within University Library's e-journal portal resulted in the location of 152 (13%) articles in open access journals and repositories (see Fig 9),

which is a decrease from 25% from the previous study. Another 49 (4%) requests were filled from open access journals not included in e-journal portal open access collections; while more than 50 (4%) requests were for open access articles included in journals that still rely primarily on a subscription model.

Figure 9. Number of Open Access Borrowing Requests Filled through E-Journal Portal
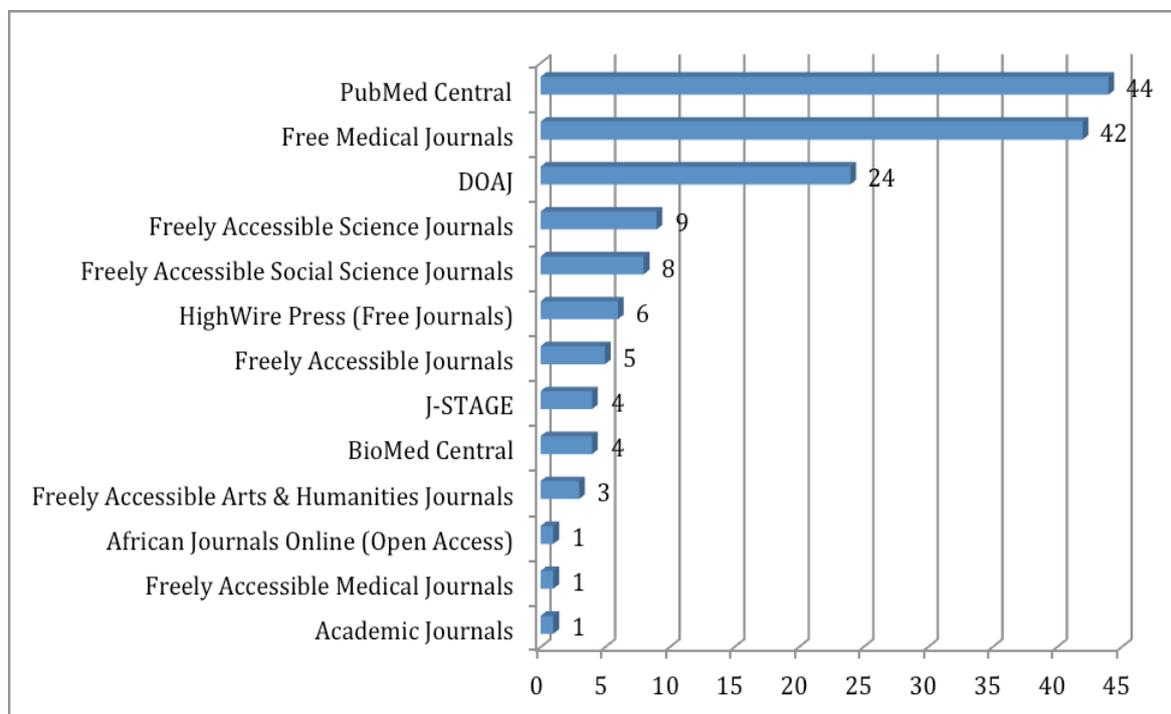
Open access repositories were a major source for articles. There are several types of open access repositories including subject, institutional, consortial, and national. Though no one subject repository was the location for a significant number of articles, subject repositories as a whole provided access to 83 articles (See Fig 10). Eighty-four open access article requests were located in institutional repositories, while consortial and national repositories such as Dialnet, REDALyC, and SciELO accounted for another 16 requests.[1] When taken together, these open access repositories represented 16 percent of total open access borrowing requests for articles.

Figure 10. Number of Open Access Borrowing Requests Filled through Subject Repositories (Including E-Journal Portal)

Subject Repository	Number of Requests
arXiv.org	10
CiteSeerX	11
Digital Library for Physics and Astronomy	1
Education Resources Information Center (ERIC)	8
Europe PubMed Central	3
Project Euclid	1
PubMed Central	44
Optics InfoBase	3
Organic ePrints	2
Total	**83**

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[1] Dialnet is the consortial repository of 80 Spanish libraries. REDALyC is a repository of Iberoamerican journal content based in Mexico. SciELO stands for Scientific Electronic Library Online and exists in a number of iterations to serve as the national repository of various South American countries.

Book and Book Chapter Requests
Books and book chapters represented only 8 percent (n=125) of open access requests, which is a decrease from 16 percent in the previous study. More than two-thirds (65%, n=81) of book and book chapter requests were published in the 19th and 20th centuries with another 7 percent (n=9) published in the 15th, 17th, and 18th centuries. Twenty-six percent (n=33) were published in the 21st century. One item had an unknown publication date. The majority (60%) of freely available books were located in HathiTrust (50) and Internet Archive (25). This is a shift from the previous two fiscal years when the most common source was Google Books, which is down to just two requests from 50. In all likelihood, this is due to the ability to automatically search HathiTrust and Internet Archive within the ILL management system. Though still a small percentage, four requests (3%) were for recently published open access e-books, which is a new development from the previous study.

Thesis and Dissertation Requests
Theses and dissertations accounted for 9 percent (n= 140) of total open access requests, which is a decrease from 13 percent in the previous study. However, a greater percentage (18%) of total thesis and dissertation borrowing requests (n=764) were filled using ETDs than in the previous study (10%). Not surprisingly, graduate students were the most frequent requesters of ETDs (71%).

Ninety-three percent of ETDs were located within an open access repository. The institutional repository of the granting institution was most common with 75 percent (n=105) of requests followed by the consortial repository OhioLINK ETD Center with 11 percent (n=16). The national repositories Theses Canada Portal (7) and EThOS (1) comprised 6 percent of the total ETD requests. One request was located in the subject repository, Education Resources Information Center (ERIC).

Following open access repositories was a new entrant to the ETD field, PQDT Open. Thesis and dissertation authors now have the option to publish their work as open access through ProQuest's UMI Dissertation Publishing service for a fee. These ETDs are available both through the ProQuest Dissertations & Theses subscription database as well as the public interface, PQDT Open (ProQuest, 2011). Six requests (4%) were filled with ETDs published as open access through ProQuest.

Conference Paper and Report Requests
Conference papers represented three (n=54) percent of open access borrowing requests, which is a substantial decrease from the previous study where conference papers accounted for 13 percent of the total. This is primarily due to changes with All Academic, an online conference management tool that was previously an excellent source for open access conference papers. In the previous study, 45 percent (n=46) of open access conference papers were located in All Academic or the related repository, Political Research Online, compared to 11 percent (n=6) in the current period under study. Linking within the All Academic site appears to have changed causing many dead links from Google Scholar. Once a search is re-executed in All Academic, the index page for a given paper can be confusing and frequently does not yield a link to the full-text. These changes have greatly reduced the usefulness of All Academic for locating conference papers. Instead, conference papers were located in a variety of repositories and websites including those of the conference or sponsoring organization.

In the previous study, reports represented such a small number (n=44) of open access borrowing requests that they were not discussed. However, report requests are now more numerous than those for conference papers at 105 (7%) of the 1,557 open access requests. Of these 105 requests, 33 percent (n=35) were located on the issuing institution's website and 27 percent (n=28) in ERIC. Other sources included government agency websites (9), open access repositories (9), and the National Criminal Justice Reference Service (7).

Conclusion

The discovery problems surrounding information retrieval do not align with users' need for convenience and ease of access and may result in a greater reliance on ILL to locate information. An example can be taken from IUPUI University Library's own document delivery service. RSDS offers document delivery of articles and book chapters from the library's print collection for all users. However, users do not limit their requests to items from the print collection. From July 2011 through June 2013, RSDS filled 7,626 document delivery requests of which 61 percent were available through the library's electronic holdings. Users clearly find it easier to request through ILL rather than completing the search process themselves even though this means a delay in access.

The data presented here show that this is clearly the case for open access materials as the number of ILL requests for such content steadily rises. The request volume and discovery problems may make open access feel

like a hindrance to resource sharing. ILL practitioners may themselves be overwhelmed or frustrated by the number of possible sources for open access materials. The growth in the number of requests for these materials also adds a manual workflow and the burden of filling requests that could have been located by the user.

Despite these potential drawbacks to the use of open access materials in ILL, the benefits are clear. Open access helps resource sharing in three ways. First is the increased ability to fulfill borrowing requests. Theses and dissertations as well as grey literature like conference papers and reports are notoriously difficult to obtain due to lack of holdings or unwillingness on the part of the owning library to lend. In these instances, open access is an enormous help to ILL practitioners in that it allows them to obtain materials for users that they may not be able to otherwise.

Second is speed. By utilizing open access materials, the turnaround time for these requests is greatly reduced. The requests do not need to be sent to other libraries or handled by lending library staff. A parallel can be drawn between the difference in turnaround time for borrowing versus document delivery requests since document delivery requests can be filled with material immediately at hand just as requests for open access materials can be. The RSDS department's overall turnaround times for borrowing and document delivery requests during the two years under study vary by 2.91 days. If you limit the comparison to items delivered electronically, the borrowing turnaround time was 2.9 days while the document delivery turnaround time was 1.75 days. Immediate access to the material requested saved 1.15 days, a clear benefit to ILL services and users.

Third is cost. Since open access materials are free of charge, libraries are saved potential borrowing and shipping fees that a typical ILL transaction could incur. During the two years included in this study, RSDS filled 1,557 borrowing requests using open access materials. The potential cost of borrowing these items through traditional ILL is $27,247.50 based on Mary Jackson's 2004 cost estimate of $17.50 per borrowing transaction (Jackson 2004, p. 31). By utilizing open access materials, the cost for these requests is reduced to a minimal amount of staff time.

These benefits will outweigh the potential pitfalls especially as open access continues to grow. If ILL practitioners want the number of requests for open access materials to decrease, we need to take an active role in the education of our users through our websites, electronic communications, and by working with our colleagues to embed information about open access in instruction. As expert searchers, ILL practitioners are also perfectly positioned to assist their colleagues in improving the discovery of open access materials. Users should be able to discover open access items with ease using intuitive, user-friendly systems and interfaces. In the meantime, ILL practitioners must embrace the idea that we provide a vital service in aiding users with the discovery of open access resources as well as the benefits this large body of literature provides us.

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