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10 | The Simplest Explanation: Occam's Reader and the Future of Interlibrary Loan and E-Books

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ABSTRACT

In spring 2011, members at the joint meeting of the Greater Western Library Alliance Resource Sharing/Document Delivery and Collection Development committees discussed the growing “silo-ization” of e-books behind different universities’ local databases and access portals. The group formed a subcommittee to investigate the possibility of developing a software system that would allow the interlibrary loan (ILL) of e-books. Two employees of the Texas Tech University (TTU) Libraries explored the question: “What is the simplest way for libraries to lend e-books to each other?” Together, three members—Texas Tech, the University of Hawai’i at Mānoa, and the Greater Western Library Alliance (GWLA)—formed the Occam’s Reader Project. Each institution began developing different components of the software. Hawai’i designed the public viewer, and Texas Tech designed the software that would handle the e-book conversion, transmission, and hosting. Occam’s Reader offers a unique solution in which the intellectual content of the book is made available for the patron to read, but it is stripped of the additional features and links of the full e-book. The philosophy is similar to offering the level of access of printed books, but with quicker delivery. By spring 2014, the Occam’s Reader project entered a pilot program with the publisher Springer to test the Occam’s Reader software with other GWLA members.

BACKGROUND

The Greater Western Library Alliance (GWLA) is a consortium of 33 research libraries located in the central and western United States. At the 2011 GWLA annual meeting, the heads of collection development and resource sharing from member libraries held a joint session to discuss topics of mutual interest. The collection development librarians emphasized their growing collections of e-books; interlibrary loan (ILL) colleagues expressed concerns that e-books meant that large parts of the collections would be unavailable for consortial sharing. How could the tradition of ILL be maintained when increasing numbers of requested titles are locked behind local authentication barriers?

GWLA's Resource Sharing and Document Delivery (RSDD) Committee, comprised of interlibrary loan librarians, rose to the challenge of continuing their tradition of finding innovative solutions for interlibrary lending. The RSDD Committee historically has been very proactive; its members maintain close contact and are always ready to help during times of institutional crisis. For example, RSDD members assisted Colorado State University after a flash flood damaged parts of the library in 1997; this disaster resulted in the creation of the Rapid ILL service. The group rallied again after a flood at the University of Hawai'i at Mānoa in 2004. This history of cooperation and problem solving laid the groundwork to generate and support innovative ideas like Occam's Reader, a solution to the challenge of e-book lending.

As a result of the 2011 GWLA meeting discussion, librarians from Texas Tech University (TTU) pondered the question: "Why not develop a method to lend e-books via interlibrary loan?" A library-developed method for lending e-books had not been attempted before. Because libraries are sensitive to the issues of their profession, the GWLA members wanted to develop a system that remained true to the long-standing traditions of ILL, while simultaneously respecting the contracts and copyright issues that surround the use of and access to e-books. With these issues in mind, the TTU Libraries, led by the first two authors (the head of document delivery/interlibrary loan and the software development manager, respectively), along with colleagues at the initial group of Washington State University and the University of Hawai'i at Mānoa, formed a working group to create a method to lend e-books via interlibrary loan.

THE DEVELOPMENT HISTORY

In the initial development stages, the team at TTU discussed using existing library technologies to accomplish the task of allowing another university temporary, limited access to a specific e-book requested via the interlibrary loan process. Discussions centered on an existing system called EZproxy, which is used by many academic libraries to control patron access to their electronic collections. Investigation with EZproxy revealed an unintended consequence. It was possible to generate a URL that could be shared amongst institutions, but with one major flaw: although EZproxy is very good at granting access, it is very hard to restrict that access once it is granted. This approach failed to restrict access to only the single ILL request. A clever patron receiving the URL and allowed access to a single title at another institution could potentially backtrack along the URL to gain access to the entire collection or e-database. The team did not want to proceed down the potential rabbit hole of security issues, so it met with colleagues to discuss other options.

A new question inspired the vision for the whole project: “What is the simplest way to lend an e-book securely between one institution and another?” From this question was born the system known as Occam’s Reader. The name Occam’s Reader is a reference to the idea of Occam’s Razor—all things being equal, a simple explanation is preferred to a more complex one. The challenge was building a system that not only integrated with existing ILL procedures, but also allowed the exchange of e-books via secure interlibrary loan channels. By spring 2012, the team had assembled the first working model of Occam’s Reader (explained in the next section of this chapter), and in March presented a very early build of the system at the GWLA deans and directors meeting. Next, the team built a prototype to demonstrate at the fall 2012 meeting. At that meeting, the deans and directors saw the first working system of Occam’s Reader. The first test was a book sent from TTU to the University of Hawai’i at Mānoa and vice versa. With an effective working model, the team began to refine the programming and prepare for piloting.

PROGRAMMING AND WORKFLOW

During the development of the system, the TTU development team decided to build what amounts to a “neutral zone” for e-books, in which staff at the lending library use Occam’s Reader to take a photo of each page of the

e-book, compress the file, and send it to a web server. Staff at the borrowing library then access this server using password-protected authentication and are able to view each page of the e-book in a viewer designed by the University of Hawai'i at Mānoa. Creating a neutral system in this way allows the necessary flexibility to integrate with existing ILL workflows. Early versions were built to integrate with ILLiad, the popular Atlas Systems software product used by many academic libraries and by all GWLA libraries. Using a series of ILLiad add-ons, the team has been able to integrate the Occam's Reader system into the standard ILL workflow at consortial universities.

Simplicity in encoding and presentation of e-books was the focus throughout designing Occam's Reader. Most of what publishers or third-party vendors provide with e-books are "bells and whistles" beyond what can be done with a physical book. For example, native e-books and e-books scanned with optical character recognition (OCR) provide a means for electronic search of the full text. Full-text search is something unique to e-books, along with hyperlinked metadata such as in a table of contents, text highlighting, copy and paste of text, and other functions. Since these functions are not possible with a physical book, the development team decided to dispense with them in this simple e-book lending model. And, since the loans do not compete with their full e-book feature set, publishers and e-book vendors would likely adopt a friendly attitude toward the project as well. So far this has been the case.

The vision of mimicking a physical book as a simple e-book drove the core feature set selected for the Occam's Reader e-book viewer. Basically, the Occam's Reader e-books are collections of image files, one per page of the physical book. These image files can be rotated, zoomed, panned, advanced next and previous, and jumped to a specific page. In other words, the functionality enables one to do what one can do holding a physical copy of the book. The image file format Portable Network Graphics (PNG) was selected because of its high text readability, universal display capability in web browsers, good compression, capability for transparent backgrounds, and rich history as an image standard.

Behind the scenes on the interlibrary loan staff side of the system, the goal was to preserve the current ILL workflow with minimal disruption. To that end, the Occam's Reader System was written as an ILLiad add-on. All ILLiad add-ons consist of LUA script files and XML configuration files

written in a pattern determined by Atlas Systems. To learn the design patterns of the ILLiad add-on, the team at TTU consulted with staff at Atlas Systems and at the Information Delivery Services (IDS) Project, the developers of the popular Getting It Systems Toolkit ILLiad add-on. With advice from both groups, the TTU Libraries development team created one of the most sophisticated ILLiad add-ons available today.

Another compelling reason for the decision to create an ILLiad add-on rather than a standalone system is that all 33 GWLA libraries use ILLiad in their daily work. The ILL staff members at the GWLA institutions required training to install, configure, and practice using the Occam's Reader system, but they provided positive feedback regarding the minimal disruption to their workflow. Establishing this good working relationship early at the point of installation at each institution proved helpful during the test and production phases.

Additional configurations such as permissions, modification of the system path variable, and location of work folders are all guided by the initial training process after the software prerequisites are installed. The team at TTU spent a significant amount of time performing this initial configuration and training with participating institutions. The team at University of Hawai'i at Mānoa led the documentation effort to create a user manual for ILL staff. The time spent training and documenting was worth the expense to increase the adoption and use of Occam's Reader.

The actual image conversion process is accomplished through an external program launched from the ILLiad add-on that runs on each ILL staff computer. The ILLiad add-on and the image conversion software communicate important information to each other, such as a unique number identifying the ILL request. This is true generally within the Occam's Reader system; it contains many distinct parts that must communicate with one another without ambiguity.

The image conversion software is a .NET executable written by the TTU Libraries development team, and it requires three open-source software prerequisites, all freely available online. ImageMagick, Ghostscript, and 7-Zip must be installed on each ILL staff machine that processes Occam's Reader requests. The image conversion software takes input from the user regarding which e-book file to convert and what image conversion settings to use and returns a single archive file of PNG images for uploading

to the Occam's Reader web server. The currently available image conversion settings include image quality settings and an option to do grayscale or full color images. Notably, the current ILL industry standard for electronic items is grayscale. Occam's Reader users are happy to have a full color option for electronic items.

The converted e-books are uploaded to the Occam's Reader web server through the ILLiad add-on interface. This portion is a PHP webpage rendered within ILLiad by the add-on. The upload page returns a confirmation that the file was received along with an automatically generated e-mail for the lending library to pass along to the borrowing library. This e-mail will be sent from the borrowing library to the end user who placed the request; the e-mail contains instructions for the customer, a copyright notice, and a link to the Occam's Reader web viewer with a randomly generated token that grants access to the book while it is still on the server. Currently, e-books remain on the server for 14 days, after which they are automatically deleted.

The customer accesses the e-book from the link in the e-mail sent by the home institution, the borrowing library. Developed by the team at University of Hawai'i at Mānoa, the viewer implements the feature set of basic e-book navigation described earlier: rotate, zoom, pan, previous, next, and jump to page. The viewer is built on the widely used technology stack of PHP, HTML 5, and JavaScript. The main reason for selecting these technologies is to create a viewer that works well in most combinations of browser, operating system, and hardware device. As consumers move more toward tablets and phones as their primary reading devices, this goal becomes even more important to meet.

The Occam's Reader web viewer went through one major revision on its path to the current product. It was rewritten to use the open-source OpenSeaDragon image display tool that the developers learned about at the Code4Lib 2013 conference in Chicago. The result is a faster and more stable image viewer than the previous attempt. The viewer also automatically detects every page in the book to create the navigation. The thoughtful team at University of Hawai'i at Mānoa also created a feedback form to solicit comments from users of the viewer. Some users lament the missing bells and whistles like metadata, full-text search, and copy/paste of e-book text. The occasional complaint about image quality points to the inevitable time/quality tradeoff at the point of image conversion at the lending

library. However, most customers are simply happy to read a good quality copy of the book they sought. Data collected through December 2014 suggest that customers actually are reading the e-books they borrow through Occam's Reader.

TESTING AND PILOT PROJECT

The first round of testing began with the University of Hawai'i at Mānoa in fall 2012. This testing gave the team an opportunity to address critical errors and streamline the process so as to be ready for a large-scale deployment. In fall 2013, GWLA brought the system to the attention of the Springer International Publishing Group. The history between Springer and GWLA has been positive, and licensing agreements were in place for a pilot project.

The licensing history is worth examining in detail. When GWLA launched a fledgling Collection Development committee in 2000, members emphasized that fair use should never be surrendered in electronic content negotiations, licenses, or contracts. In negotiating for electronic content with publishers and content providers, GWLA staff has never waived the right to provide interlibrary loan and has in fact walked away from several offers when publishers refused to allow resource sharing in their licenses.

Balancing the philosophical demands of the members with the proposed licensing terms from vendors meant that the first few years in GWLA's licensing programs were rocky ones. Thus, the GWLA program officer, in consultation with the RSDD Committee, developed a key phrase that is used in all GWLA licenses: "The Consortium may supply a single copy of an individual document, chapter or book derived from the Licensed Materials to an Authorized User of another library utilizing the prevailing technology of the day." It was a natural progression to begin using this clause in all licenses for electronic content, regardless of the medium. When presented with this wording for e-books, the publishers would frequently chuckle and say, "But there is no platform to enable ILL for e-books." One day in November 2013, GWLA's program officer asked the Springer representative, "But what if there were such a platform?" Springer showed a keen interest and suggested a pilot project among the GWLA libraries for one calendar year using Springer content within the Occam's Reader system. Some of the key points of the agreement with Springer actually laid the groundwork for important lessons learned from the pilot.

One of the first terms negotiated was the length of time that e-books would be available to patrons. Since no one had ever sent an e-book via interlibrary loan, no one was sure what would be an appropriate amount of time to read an e-book. The team eventually settled on 14 days. In many ways, this is an arbitrary number and is still debated amongst the group.

A second key point in the negotiations was sharing e-book lending statistics with Springer. This has turned out to be one of the most important and interesting components of the agreement. When librarians read about sharing the lending data with a publisher, they are understandably worried about patron security and patron confidentiality. They can rest assured that no patron information is shared between the Occam's Reader project and Springer International. The data shared with the publisher are limited to information about the titles requested by each library and which libraries supply those books. This type of business intelligence is a level of detail yet to be provided to publishers, but it can be a powerful purchasing and selling tool.

A third important feature of the agreement with Springer describes how the e-books are displayed to the patron. One of the balancing acts is remaining faithful to the tradition of interlibrary loan while also allowing universities access to e-books they could not previously share and to a type of content where even the very nature of ownership is still hotly debated. When beginning to build the pilot system, it was necessary to decide how much of the content of the e-book to send in the transmission to the web server. Discussion centered primarily on whether or not the metadata (hyperlinks, OCR, bells and whistles) would accompany the Occam's Reader e-book. As part of the negotiations for access to lend the content, an agreement was reached to remove any metadata or extra content provided by the publisher. This is certainly a compromise. However, the arrangement still maintains the ILL tradition of sending a "book in a box" to another university. One of the interesting aspects of the development of Occam's Reader is that it has expanded the discussion about the meaning of "ownership" of e-books and whether or not that includes metadata.

By the time the terms of the agreement were reached, the team had developed a very good working relationship with Springer that helped immensely when the pilot project encountered its first big problem. It was very difficult for users to find the e-books they wanted to borrow. Discoverability is a real issue for lending e-books, due to the innumerable ways in

which individual libraries catalog their e-books. Some add records in OCLC while others do not; some include them in their local catalogs while others keep them within their e-databases. It often is difficult for library staff to know which e-books their own institution holds.

The need to come up with a way to make discoverability as simple as possible led to the second most interesting innovation to come from the pilot: the shared discovery layer using data files provided from Springer. In exchange for the previously mentioned ILL data, Springer was willing to provide the Occam's Reader project with lists of which universities owned which Springer titles. This was exactly the boost needed to make a functional pilot system. Using the Springer data files, the team was able to construct a discovery layer that integrates into ILLiad, so that ILL staff can locate the Springer e-books for which they are searching. The discovery tool is a PHP webpage embedded in the Occam's Reader ILLiad add-on; it is powered by a Microsoft SQL Server database hosted at TTU. The discovery tool supports searches by title and ISBN, and it returns basic bibliographic information along with a link to the e-book at the host institution and a lending string necessary to generate the borrowing request in ILLiad. The discovery layer also alerts ILL staff if their library already holds a particular e-book. This approach has worked well for the Springer e-books held by GWLA libraries, and could potentially work with other libraries and publishers in the future.

The pilot project launched in March 2014. It has produced some very interesting results. From the beginning, the pilot included a usability feedback survey in both the e-mail that goes to the patron and as a sidebar link on the viewer. By December 2014, approximately 700 e-books had been shared via Occam's Reader and there have been over one million page views. The analytics for OccamsReader.org demonstrate interesting facts about the viewer and the webpages. Once again, there is no tracking of individual patron information. There are only typical web analytics such as page views and time spent on each page. The most-viewed page in terms of total number is the discovery layer, which is not surprising given the heavy use of the system by ILL staff. The second interesting analytic is the behavior of a typical user. The data show an average of about 35 minutes spent per visit to OccamsReader.org. The average user views 15 pages per session at just over two minutes per page. These metrics demonstrate that visitors are

actually reading the e-books through the viewer. So far in the pilot project, which will conclude in March 2015, both staff and patrons are successfully using Occam's Reader to lend and read e-books.

FUTURE DEVELOPMENTS

The piloting and testing of Occam's Reader suggest new avenues of research and exploration. Libraries have an opportunity to address matters that were only theoretical until the creation of a working model of ILL for e-books.

The first new avenue of research is what the Occam's Reader project team calls "content collaboration." Content collaboration means using publisher-provided content in a library-developed system. Why is this a new field and something that is important for librarians to talk about? First, libraries must leverage the long tradition of respecting patron confidentiality to fulfill their role in society by providing a secure place for patrons to view e-books unhindered by potential marketers. The recent news about Adobe Digital Edition eReader user data being gathered and used by Adobe demonstrates the importance of this trust (Coldewey, 2014). Second, if libraries continue to allow third-party vendors to provide the viewer platforms for their digital content, eventually patrons may ask themselves, "Why use a library at all when I can get an individual account from a vendor like OverDrive?" With content collaboration, libraries can use their tradition of patron security to provide a trusted viewer through which publishers can provide content to patrons. This is a win for users, libraries, and publishers.

The pilot phase also identified the need for a standalone version of Occam's Reader as an area of future investigation. The team initially developed Occam's Reader as a system integrated with both ILLiad and OCLC. Although this worked well for the GWLA libraries, there is a need to establish a version that can function across a variety of platforms as the project expands beyond one consortium. A standalone system can also help both international and American users. With these goals in mind, the team has begun to brainstorm a standalone version of Occam's Reader to meet the needs of a larger user base.

A third avenue of future research centers on the idea of the relationship between the publisher and the library. Occam's Reader has shown a type of relationship that can be beneficial both to libraries and to publishers, a

relationship that is more collaborative and less vendor-and-buyer. Through this model, libraries can approach publishers with a collaborative mindset and work with them to establish a way to leverage the fair use of digital content. Although librarians recognize that publishers are generally for-profit businesses and libraries are usually non-profit, there are still areas of possible collaboration. Occam's Reader demonstrates a successful collaborative approach with both the discovery layer and the web viewer.

The final avenue of research is the discussion of policies and procedures that govern the e-book ILL exchange. Because the fair use questions encountered during the project remain unanswered, many e-book interlibrary loan policies and procedures remain in flux. How long should a patron have access to a borrowed e-book? GWLA members choose 14 days, but is that enough? Should content license agreements be rewritten to include lending e-books? Are there certain national or international standards relevant to the system that need to be developed or adapted? Many of these questions remain unanswered. They can be solved as e-book ILL grows in popularity.

CONCLUSIONS

Occam's Reader's success is a watershed moment at the intersection of interlibrary loan and e-content. It has brought to the forefront many of the issues libraries currently face when thinking about e-books and their role in the libraries of the future. The authors hope that it is the beginning of a conversation demonstrating that it is possible for libraries to remain true to their traditional core values while at the same time embracing new ideas and new ways of providing services in a digital environment as successfully as they have done for decades by mailing physical books to meet the learning and research needs of other libraries' users. Occam's Reader demonstrates the usefulness of publisher and library collaborative partnerships. The Occam's Reader developers think that they have accomplished that goal and, as they move forward to Phase 2, they see a bright future in which libraries continue offering information services in new ways using innovative technology.

The Occam's Reader web viewer is the most widely known piece of the Occam's Reader system. View a demonstration of the web viewer at OccamsReader.org.

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