Using the Web of Science to Populate Faculty Articles in an Institutional Repository

Maura Valentino & Daniel Levy
Central Washington University

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Abstract

Background: Faculty at Central Washington University (CWU) were not depositing and preserving their research articles in the University Institutional Repository (IR), so an alternative method to identify and include faculty scholarship in the IR was developed. Librarians used the Web of Science to discover articles published by the CWU faculty and then deposited them in the IR.

Analysis: Thousands of articles written by CWU faculty were located and deposited. This project increased interaction with the IR from outside the library and the university beyond any expectations.

Conclusion and implications: This was a successful project, but it required a useful interface to locate the metadata and librarians with highly technical skills.

Keywords: scholarly communications, institutional repository, mediated deposit, faculty institutional repository participation, faculty technical skills

Résumé

Contexte: Les facultés à Central Washington University (CWU) ne déposaient ni ne preservaient leurs articles de recherche au dépôt institutionnel, alors une méthode alternative d'identifier et inclure la bourse de la faculté dans ce dernier a été développé. Les documentalistes utilisaient le *Web of Science* pour découvrir les articles publiés pa la faculté de CWU et ensuite les déposer au dépôt institutionnel.

Analyse: Des milliers d'articles écrits par la faculté de CWU on été retrouvé et déposé. Ce projet a augmenté considérablement les interactions externes avec le dépôt institutionnel.

Conclusion et implications: Ce projet fut un succès mais nécessiterait d'utiliser une interface permettant de localiser les metadata et les documentalistes grâce à de grandes compétences techniques.

Mot clés: communication universitaire, arbitrage des dépôts institutionnels, compétences techniques des facultés, participation des facultés dans le dépôt institutionnel

Maura Valentino is Scholarly Communications Librarian at Central Washington University. Email: maura.valentino@cwu.edu

Daniel Levy is Digital Initiatives Technician at Central Washington University. Email: daniel.levy@cwu.edu

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Introduction

"The production of new knowledge through the practices of research and scholarship lies at the heart of the university's mission. Yet, without effective and ongoing dissemination of knowledge, the efforts of researchers and scholars are wasted. Dissemination is thus a core responsibility of the university" (Association of American Universities, Association of Research Libraries, Coalition for Networked Information, & National Association of State Universities and Land-Grant Colleges, 2009, p. 6). Those same researchers and scholars are often tasked with promoting and disseminating their own articles with very little help from the publisher or their institution.

There are many reasons why researchers often forgo posting their research, even with the proliferation of institutional and subject repositories. For instance, the publishers' policies may be confusing or restrictive, and the researcher may simply not have the time or legal knowledge to navigate the web of publisher and funder policies. They may not know of a trustworthy repository in which to post their research. Some faculty post their published articles on their own personal website, which they rarely have the authorization to do. Or, they simply may not have the time due to numerous other commitments. Additionally, efforts to increase faculty awareness of institutional repositories (IRs) have been met with indifference. As a result, the total scholarly output of an institution is generally much greater than the number of articles added to an IR.

To address this discrepancy and to circumvent the problem of faculty outreach, a long-term project was identified and undertaken within the library at Central Washington University (CWU) to harvest faculty citations from the Web of Science (WoS) database and publish them in the IR. Librarians and library student workers aggregated the citations along with publisher posting and embargo policies.

When the COVID-19 lockdown began, there was an overarching request across the CWU campus that no extra work be assigned to the faculty. This made it an ideal time to complete this project, as it involved no work for faculty members. Serendipitously, it was easy to complete work remotely with multiple contributors working from home.

Background

CWU is a medium sized state university. It is a teaching university, rather than a research institution. Teaching is considered more important than research, and professors are required to have only one peer-reviewed article to receive tenure and promotion. The university does not have an open access (OA) policy, nor does the library.

The libraries have eight to fourteen librarians to serve 11,500 students. The university libraries had no consistent leadership for scholarly communications until 2017, when a scholarly communications librarian was hired. The scholarly communications librarian has 0.2 full-time equivalent (FTE) for scholarly communications. Her other 0.8 FTE is spent on non-scholarly digital collections, such as the university yearbook collection, a student newspaper retrospective, and open educational resources; providing reference and liaison services; university service; research; and teaching in the library science minor. The IR, named ScholarWorks @ CWU, was created in 2014 but had no stable governance or administration. A lack of leadership structure within the library, due to

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staffing transitions and two interim deans, meant there was no approval process for large projects. Thus, without direction, only necessary and short-term projects and improvements were undertaken, including reviewing and improving the existing metadata, redesigning the marketing materials, and adding a book reader to the repository. Traditional outreach to promote awareness and the use of the IR was met with limited success. Faculty meetings of various departments were attended, as well as meetings of all the chairs of the various colleges. As a result of these efforts, a small number of faculty CVs were received, and some articles were uploaded to the IR after ensuring there were no copyright issues. Jennifer Solomon and Rebekah Kati (2019) described similar results for similar outreach. After assessing the reasons for this limited response, it was determined that although faculty understood and appreciated the benefits of including their work in the IR, faculty had numerous demands on their time and found it difficult to respond positively to outreach efforts with no university or department mandate to do so. This finding is similar to what has been found at other institutions, as seen in the literature review.

At CWU, the faculty's paid time is divided into 30-hour blocks, with each hour being assigned to teaching duties, service, or research. This is all strictly controlled by the faculty union. Posting to the IR and the work associated with that is not included in any of these blocks and may be considered unpaid work by some faculty (United Faculty of CWU, 2022).

Based on the above assessment, it was determined that an alternative way of identifying and including faculty output in the IR should be developed without placing an additional burden on faculty members. The scholarly communications librarian had previously worked at Oregon State University (OSU), a large research university, where a project was implemented to upload articles to the IR using metadata from WoS. As a result of the OSU project, 6,471 articles were uploaded to ScholarsArchive, the IR for OSU. This work was completed over three years (Zhang, Boock, & Wirth, 2015).

While the librarian was not directly involved in this project, she participated in many meetings in which it was determined that WoS was a good interface to export metadata in a usable format. Google Scholar was initially used to locate faculty articles on an individual basis, but its interface was unsatisfactory for exporting metadata for a search with a broad result. The librarian thought a similar project at CWU would solve the problem of faculty not actively participating in the IR. To this end, a project to actively seek out faculty scholarship using the WoS database was designed and implemented. A full-time staff member in the digital initiatives unit of the library who holds a Master of Library and Information Science did the work once the project was designed. This project resulted in 1,128 faculty articles uploaded to the IR without placing any additional burden on faculty members. It should be noted that it was decided to focus initially on the sciences, as the sciences tend to have more generous OA policies allowing upload to an IR, and it was believed that the College of the Sciences would provide a good pilot project for this effort.

Given the tepid response from faculty, it was unknown at the start of the project how many articles were published out of the university. Only one peer-reviewed article is

required for tenure, and five for promotion to full professor. There are also substitutions for these requirements. There were some faculty articles in the IR, and a few were downloaded hundreds of times, but with such a small data set, predictions were difficult.

Literature review

This article adds to the literature by including the step of finding the faculty articles as part of the mediated upload process in the case study. The literature agrees that it is difficult to get faculty to participate in posting to the IR, however, the literature on mediated uploading for faculty includes the step of having faculty submit their published articles to the library, with a mandate to do so. No such step was included in this process, and no OA mandate exists to support this project.

Lack of faculty enthusiasm

Difficulty in getting faculty to actively participate in the university IR is well documented in the literature. Joan Giesecke (2011) notes that "one of the challenges for libraries managing institutional repositories has been convincing faculty to self-archive their work in the repository" (p. 531). Many factors seem to be responsible for this, including "insufficient knowledge of copyright issues among faculty, [and] lack of time to secure permissions from copyright holders on the part of content contributors" (Hawwau, Omachi, Benson, & Dauda, 2019, p. 48).

Nancy Fried Foster and Susan Gibbons (2005) add that enthusiasm for IRs may lie only with institutions, not faculty. "While their benefits seem to be very persuasive to institutions, IRs fail to appear compelling and useful to the authors and owners of the content" (para. 6). Jingfeng Xia (2008) agrees that "authors are indeed not enthusiastic about archiving their articles into their institutional repository even though they are familiar with self-archiving practice" (p. 494). Brian Quinn (2010) summarizes by saying that faculty felt they did not have the time, did not see the value of the repository, and were reluctant to learn new technology. Tomasz Neugebauer and Annie Murray (2013) agree that it is difficult to get faculty to participate in the IR.

It can be seen in the actions of researchers that even when copyright allows, they do not post to their university's IR. A study by Ángel Borrego (2017) of published articles at a university compared IR postings to permissions that allow those publications. The results show that

> just 11.1% of the articles published in 2014 by researchers at these universities were available in their institutional repository in the first quarter of 2016. However, most of the articles that were not available in institutional repositories (84.5%) were published in journals that allow the deposit of the article in some form. (p. 185)

Faculty's lack of comfort with technology may also be a contributing factor. Research exploring faculty's use of technology in other areas shows that performance anxiety is a contributor to faculty reluctance to use a learning management system. As the results of a faculty upload are publicly visible, this may well contribute to the lack of participation (Bousbahl & Alrazgan, 2015). Evelynn Ellis (2000) adds that the time commitment to learn new technology often prevents faculty from using it. Not only do faculty feel it

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takes time they do not have to learn new technology, they also do not know where to go for help (Butler & Sellbom, 2002).

Mediated upload projects

There is less literature on projects in which the scholarship of the faculty is uploaded into the IR without the faculty being involved in the process. Hui Zhang, Michael Boock, and Andrea Wirth (2015) conducted a study showing that mediated deposit increased publication in the IR much more than OA mandates do. However, they did not include information on how to implement a mediated deposit project. Christine Antiope Daoutis and Maria De Montserrat Rodriguez-Marquez (2018) wrote a case study in which faculty were required to send the library their accepted manuscript upon acceptance and then the library completed the upload. Neugebauer and Murray (2013) and Mariya Maistrovskaya, Stephanie Orfano, and Teodora Naydenova (2017) also discussed mediation, but again faculty were assisted in uploading articles that they sent to the library. William Roy and Chris Gray (2018) discuss manipulating metadata from the WoS using a Python script, but they offer no information on what was uploaded into the IR. Solomon and Kati (2019) described a project to extract metadata from WoS, but found it too labor intensive to complete the project and upload the articles.

Michelle Armstrong (2014) agrees that libraries should help "examine the needs of their local research community and find ways, often on an individual basis, to support them in sharing their Scholarship" (p. 1). However, "placing all dissemination responsibilities on faculty can limit the reach and impact of their research" (p. 1). Although the mediated upload model "benefits both the author and the library staff, it does require an infrastructure, consisting of both human and technological resources, to be in place" (p. 4). Borrego (2017) adds anecdotal evidence from a faculty member, showing that faculty like an automated process: "I am not especially interested in ResearchGate. If my university had a similar service, I guess I would also use it" (p. 190).

Automated upload projects

Similar projects to populate the IR with batch uploads focus mainly on automating the process as much as possible. Many of these projects require technical expertise and knowledge of computer coding, especially XML and XSL. Automation projects, such as the one done at Princeton University, acknowledge that "someone without a solid technical background would need help from IT support personnel as well as technical support" (Li, 2016, p. 1). In addition, automated processes still require human input due to incomplete metadata, and many of the automation processes utilize third-party programs, such as Zotero and Google Sheets, which can leave the library "at the mercy of any changes made to these programs" (Bull & Schultz, 2018, p. 13) by those companies.

Methodology

After discussion between the two librarians, a decision was made to use WoS to locate articles written or co-written by CWU-affiliated authors. An advanced search was created in WoS to gather citations for scholarly works with CWU-affiliated authors. WoS advanced search operators (Clarivate Analytics, 2020) for Organization (OO) and Organization-Enhanced (OG) were used: OO = (Central Washington University OR CWU) OR OG = (Central Washington University OR CWU). Articles from all years

were included in the results. The results of the search were exported from WoS in maximum batches of 500 at a time and condensed into one large Excel spreadsheet. The search was also added as a saved search alert that emailed the librarians each week with new results to be added to the list.

Several columns were appended to the spreadsheet to include information on the publisher's OA policies for each individual citation. These included publication type (whether it was possible to post the published, accepted, or submitted version of an article), the embargo period, the creative commons license type (if applicable), conditions accompanying the deposit in an IR (such as "non-commercial use only" or "set statement must accompany deposit"), and general notes and URLs for the publisher's policies. The data in these columns were populated by manually looking up the journal title or ISSN in Sherpa Romeo, an online tool by the Joint Information Systems Committee that aggregates publisher copyright and OA policies, and by scouring each publisher's website for the same information. The time to complete each record varied widely due to the ease or difficulty of finding publishers' policies, difficulty in tracking down CWU-affiliated authors' contact information, technical difficulties getting PDFs for OA articles, and other issues. This process utilized student workers from the circulation and help desk who needed additional tasks that could be completed online due to the lockdown at the beginning of the COVID-19 pandemic.

After linking publisher OA policies to each citation in WoS, each citation was uploaded individually during the upload process to the IR on DigitalCommons. Batch upload of the information from the spreadsheet was possible, but each citation had to be reviewed individually to determine the information for some fields of the metadata that were not included in the data downloaded from WoS. This included the college or department of the CWU-affiliated author, whether they were a student or not, and keywords and corresponding disciplines from the Bepress (2021) Three-Tiered List of Academic Disciplines. In some instances, crucial metadata and identifiers, such as a working DOI, were not included in the WoS data, which warranted further scrutiny for individual citations. Other parts of the metadata that had to be crafted individually for each citation include a copyright notice, a creative commons license (if needed), and a citation in APA style. (DigitalCommons automatically generates a citation for citing the repository webpage, not the article housed on that webpage.) Current faculty members' email addresses were also included, so they would be notified of their research being uploaded.

For some older articles, the CWU-affiliated author was no longer an employee at CWU, and very few clues existed as to where and when they worked at CWU. In some cases, author names were sent to CWU's human resources department to determine the author's affiliation with the school. Individual uploads of each article using the DigitalCommons single upload form also allowed the metadata and the publisher policies to be double-checked at the time of upload.

To ensure the accuracy of the data being entered into the single upload form on DigitalCommons, citations from the spreadsheet were searched using Google Scholar. In some instances, the full version of record was discovered in places other than the publisher's websites. This included author-sharing sites, such as Academia.edu and

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ResearchGate, as well as preprint repositories, such as arxiv.org and CiteSeerX digital library. While this was helpful in some cases where the full-text article was not available through the CWU library, most publishers consider Academia.edu and ResearchGate to be private, for-profit social media websites and disallow the posting of articles to those sites. In many cases, the version of record was readily available from legal sources and the inclusion of the preprints on other websites went against the publisher's posting policies. Therefore, the librarians refrained from linking directly to these other sources from the IR.

Since there was no access to the majority of the author-submitted manuscripts due to the lack of engagement by the CWU faculty, many of the citations could have included an accepted version of the publication but did not. In these cases, the upload to the IR included the DOI in the comments field alongside the following statement: "Due to copyright restrictions, this article is not available for free download from ScholarWorks @ CWU." If the library had access to the full-text article through online database and journal subscriptions, the IR additionally linked to the full text through a CWU proxy server. This ensured that some version of the text could be reached by CWU-affiliated users, and a standard DOI link to the publisher's paywalled version would still exist for the general public. There is controversy in the field of scholarly communications as to whether metadata for an article that is not fully open should be uploaded into an IR. Providing access to scholarly work authored by CWU faculty was the project's first priority, and some literature is in agreement, "a repository may also create metadata-only records for any faculty publication they cannot include in their collection, such as works published in journals with restrictive copyright policies" (Armstrong, 2014, p. 2).

Results

The advanced search on WoS and the weekly saved search notification of new articles resulted in 1,527 citations generated between February 20, 2020, and January 19, 2021. Of these, 294 articles (19%) were uploaded with a PDF of either the version of record, an accepted version, or an author's submitted manuscript.

In total, 1,009 citations were uploaded to the college of science faculty repository over an 11-month period. Due to the interdisciplinary nature of academia, 44 citations were also added to the arts and humanities faculty, 33 to the college of business faculty, 39 to the college of education and professional studies faculty, and three to the library faculty. The WoS project also resulted in the discovery and inclusion of 37 works published by CWU students and led to a new student collection that provides a showcase for work and scholarship by CWU students. In addition, 339 citations were not uploaded because they were not articles but meeting abstracts for conference lectures and poster presentations, corrections to articles, short commentaries, responses, letters to the editor, or book reviews. Since these were not full text articles, were associated with another article already included in the project, or were opinions or responses to other scholarly works, they did meet the project's policy and scope. Five citations have yet to be uploaded due to a journal embargo period. Finally, 18 citations were not uploaded due to falsely being identified by WoS as having a CWU-affiliated author (see Table 1).

Table 1: Total uploads to the institutional repository from Web of Science citations between February 2020 and January 2021

Citation type	Number of citations
Science faculty	1,009
Arts and humanities faculty	44
Business faculty	33
Education and professional studies faculty	39
Library faculty	3
Student publications	37
Not uploaded: did not fit mediated upload content policy	339
Not uploaded: journal embargo still in place	5
Not uploaded: not affiliated with CWU	18
Total citations	**1,527**

Not only was this scholarship uploaded to the institutional repository but because the metadata was created by librarians, it is consistent and correct and will result in better search results in the repository. "Although most archiving systems have instructions on how to create the basic metadata for a record, studies are finding that faculty are not necessarily very accurate in filling in these fields" (Giesecke, 2014, p. 533).

Discussion

This project would have been even more successful if faculty were willing and able to provide their pre- and post-prints. The scholarly communications librarian repeatedly reached out to faculty, through faculty meetings, chair meetings, and campus-wide presentations, but faculty routinely ignored requests for post-print articles, mostly never answering the emails, but occasionally giving reasons such as not wanting a post-print in the repository. These faculty attitudes are supported in the research by Neugebauer and Murray (2013), which found that faculty were reluctant to participate in the IR for a myriad of reasons, including not wanting a post-print published. The pandemic exacerbated this outlook. Faculty were overwhelmed with re-writing their courses to be taught in an online format, the stress level of their students, and their own health concerns. Many burdens were taken away from faculty during this period, including assessment obligations and evaluation by student reviews. The librarians were not comfortable adding additional burdens to faculty and thought this project could relieve them of all burdens of OA publishing.

The Sherpa Romeo tool was incredibly helpful in compiling publisher policies, as the policies on the publisher websites were difficult to find and are called different things by different publishers. Table 2 lists some of the larger publishers that CWU's authors frequently publish with and the names of their policies. Many smaller publishers, and particularly independent publications, magazines, and trade journals, do not publicly list any policies at all. In addition, many publishers have their own definitions for what constitutes different versions of the author's work. Terms such as *pre-print*, *post-print*,

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author-prepared manuscript, *peer reviewed manuscript*, *formatted for print*, *submitted version*, and *version of record* can create confusion and oftentimes have overlapping meanings. While some clearly define and differentiate this nomenclature with a glossary on their policy page, many do not, and it is left up to the author to discern which version of their work can be uploaded. With such a plethora of different types and styles of article sharing and copyright policies, it is clear why some faculty are so hesitant to self-archive in institutional repositories.

Table 2: Policy names and locations for some of the larger publishers

Publisher	Policy name
Cambridge Core (n.d.)	Green Open Access
Canadian Science Publishing (n.d.)	Author Rights
De Gruyter (n.d.)	Repository Policy
Elsevier (n.d.)	Article Sharing
Emerald Publishing (n.d.)	Green Open Access/Author Rights
IEEE (n.d.)	Post Publication Policy
SAGE Publishing (n.d.)	Green Open Access
Springer (n.d.)	Self-archiving Policy
Wiley (2021)	Self-archiving Policy

With more uploads, the repository becomes more diverse in content, which may lead to more user downloads and engagement. Increased uploads of faculty scholarship have led to more viewership. Due to this project, the number articles in the repository authored by CWU-affiliated faculty increased 2,793 percent over 2018–2019 and 885 percent over 2019–2020. Downloads of articles from the repository of articles authored by CWU-affiliated faculty increased 255 percent over 2018–2019 and 150 percent over 2019–2020. This averages out to 108 downloads per article posted as part of this project, and several articles have more than 1,000 downloads. These downloads come from all over the world, showing the reach of scholarly output of the university. Daoutis and Rodriguez-Marquez (2018) also found increased uploads, but as the OA mandate was strengthened simultaneously, it is difficult to pinpoint why uploads increased (see Figures 1, 2, and 3).

Figure 1: ScholarWorks downloads

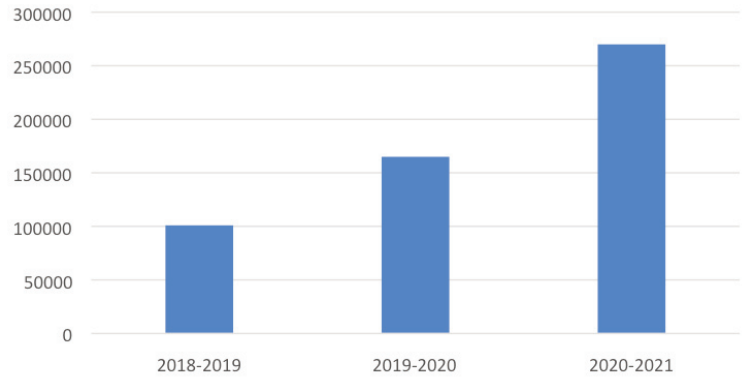


Figure 2: Faculty articles posted

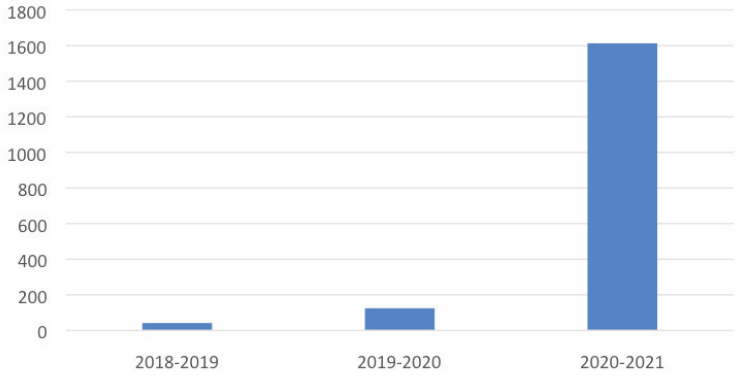
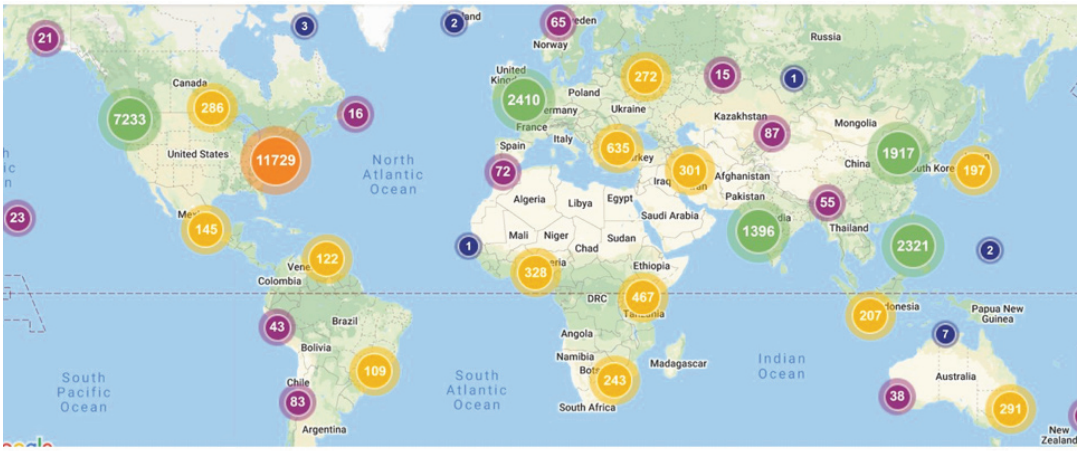


Figure 3: Geographical representations of faculty article downloads from the repository from 2020–2021



This project also found 64 authors who had published at least four articles with either bronze or gold OA. Unfortunately, two turned out to be deceased, but with their articles being re-posted and preserved in the IR, their scientific legacy will live on. A reception was held in the library for the other 62 authors to celebrate their contribution to OA. This reception was sponsored by the provost's office and faculty felt honoured and celebrated for their contribution to OA. There was only positive feedback from authors included in this project.

Limitations

WoS provides an excellent interface to extract the metadata for articles written by CWU faculty and the CWU library has a subscription to it. This project had several starts and stops. The scholarly communications librarian was concerned that WoS would be limiting for a university that is not primarily a science institution. However, after a few other databases were tested, the results were unsatisfactory and there were so few results that they were deemed incomplete. In the end, the WoS interface located articles across all the colleges in the university.

The second false start occurred when this project was attempted with a different staff member who did not have the necessary technical expertise. This project requires detailed data management within Excel, including column and row manipulation, sort-

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ing and grouping, and data presentation. It is necessary to have a high level of technical expertise in a department to embark on such a project, especially if uploading in bulk is part of the process. Solomon and Kati (2018) describe the inability to complete this process with a much larger staff. The time on this type of project can be reduced by using the features of Excel, for example, sorting by publisher and filling in the publisher rights once for each publisher and then copying. The two librarians who worked on this project are both highly technical and facile with spreadsheets, metadata, databases, and the institutional repository.

Though other projects utilized computer programming to automate the harvesting of data from the Sherpa Romeo API, neither author had prior experience implementing this type of automation. Furthermore, Sherpa Romeo is not definitive and does not include every journal title in its database. Many humanities journals, particularly small, independently published ones, are not represented in the database. This necessitates manually researching publisher policies for those publications regardless of additional automation and in some cases, submitting corrections or additions to Sherpa Romeo's moderators.

Due to the nature of the COVID-19 pandemic and the unique work-from-home opportunities provided by it, this project really flourished as a solution to library workers looking to fill their time away from in-person tasks, such as circulation and shelving. It may be more difficult to acquire the necessary labour hours to complete a similar project under normal circumstances.

Lessons learned

CWU and OSU both had dedicated librarians or staff members who could devote a majority of their time to this project. It might be difficult to complete this project if a librarian or staff member had to go days without working on the project because the process and the metadata are complicated. Also, it would take many years without a dedicated person working on the project. Even with dedicated people, the OSU project ran for three years and this project, 11 months. This project was also timely because of the mandate not to place additional burdens on faculty during the COVID-19 pandemic. Creating mediated uploads meant that faculty would be minimally involved but still reap the benefits of having their articles discoverable in the IR.

One cannot predict which articles may be useful, and so an effort should be made to post as many as possible in the IR. This promotes the IR and the university. CWU is not a research university, yet the interest in the faculty scholarship is high and ongoing.

Next steps

Based on the success of the WoS project, similar projects involving arts and humanities and social sciences are in the planning stages. Humanities faculty output is much more diverse and more frequently appears in smaller, independent journals and magazines. Many of these humanities journals are not indexed by major databases such as WoS or EBSCO, which may lead to their unintentional exclusion in the IR using this methodology. A project to encourage faculty to provide post prints for publication would magnify the success of this project, but so far one has not been conceived.

Conclusion

This was a highly successful project, highlighting new research from the university and renewing interest in older research. With faculty being so overscheduled and that burden increasing during the pandemic, this project was a successful method to increase faculty participation in the IR without requiring any work from the faculty.

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ResearchGate, researchgate.net
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Sherpa Romeo, v2.sherpa.ac.uk/romeo
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