FEATURE

A Census of Institutional Repositories at Regional Public Universities

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This study reports on the implementation of institutional repositories (IRs) at regional public universities (RPUs) in the United States and its territories. The author investigated repository platform choice, operation style, and content. More than half of RPUs have implemented an IR. The author discusses how these findings align with trends in previous research and explores the unique aspects of IRs at RPUs—particularly the prevalence of student works and special collections materials. For over two decades, institutional repositories (IRs) have been used at institutions of higher education to collect, preserve, and share the scholarly works of an institution. During that same time there have been an increasing number of studies looking at who has implemented an IR, the most popular IR platforms, and type and number of objects deposited in IRs. While some studies have looked at small or teaching-focused institutions, most of these studies have focused on IR implementations at large research-focused institutions.

The research reported here examines the implementation of IRs at regional public universities (RPUs) in the United States and its territories. The study analyzed quantitative data from IRs implemented at RPUs in order to observe patterns and trends that may be unique to these institutions and to identify where RPUs align with practices previously observed at other types of institutions. Data was gathered on IR software platform choice, whether the platform is hosted locally or is a vendor-provided service, if the IR is operated independently or as part of a consortium, the total number of objects and how they are organized, and the types of objects in the IR. Because there is no single "best" IR platform or strategy for managing an IR, having data on implementations of IRs is important when developing a new IR or revisiting policies for an established IR. This census adds to the profession's understanding of IR practices by examining specifically RPUs and, when in conversation with previous censuses of other institution types, provides a more holistic view of IR operations at institutions in the United States.

Literature Review

Defining the Institutional Repository

Many authors have provided definitions of an IR. An early definition comes from Crow, who defined IRs as "digital collections that capture and preserve the intellectual output of university communities."[1] Crow's definition focused solely on the management of digital objects produced by an institution and was expanded on by Branin, who defined IRs as "systems and service models designed to collect, organize, store, share, and preserve an institution's digital information or knowledge assets worthy of

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such investment."[2] Branin's definition includes the labor and cost associated with managing an IR through the inclusion of service models and the concept of *worthy* objects. An often-cited definition that encompasses the sentiments of the previous definitions while expanding with additional details comes from Lynch:

> A university-based institutional repository is a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members. It is most essentially an organizational commitment to the stewardship of these digital materials, including long-term preservation where appropriate, as well as organization and access or distribution. While operational responsibility for these services may reasonably be situated in different organizational units at different universities, an effective institutional repository of necessity represents a collaboration among librarians, information technologists, archives and records managers, faculty, and university administrators and policymakers. . . . An institutional repository is not simply a fixed set of software and hardware.[3]

Censuses

One way to analyze the landscape of IRs in the United States is through a census. The first major census was conducted in 2005 through a survey sent to the 124 member institutions of the Coalition for Networked Information (CNI) and an additional eighty-one liberal arts colleges associated with the CNI through consortial memberships. The survey found that 40 percent of the CNI member institutions and 6 percent of the liberal arts colleges had an IR in place, with 88 percent of the CNI members planning for future implementation of an IR. The publication of the study noted that IRs represented "a critically important new policy and operational role for research libraries, and one that renews their connection with the core academic processes of the university," placing the IR squarely in the realm of the library.[4]

In 2006, the Association of Research Libraries (ARL) issued a report of their findings of a survey on IR implementation sent to the 123 member institutions. The survey received responses from eighty-seven institutions, of which thirty-seven had an operational IR and thirty-one were planning to implement one.[5] Survey responses indicated that the majority of institutions self-hosted their IR software (forty-nine self-hosted and three self-hosted through a consortium), and the most commonly self-hosted platform was DSpace.[6] Seven institutions used the commercial solution Digital Commons. The ARL survey also found that the institution's library was "likely to have been the primary unit leading and supporting the IR effort, sometimes in partnership with the institutional information technology unit."[7]

A follow-up census to the 2005 CNI survey and 2006 ARL survey was reported on by McDowell. Broadening the census, McDowell reviewed IRs at institutions listed on the DSpace Instances wiki, the Digital Commons repository list, and the Registry of Open Access Repositories (ROAR). Additionally, McDowell performed Google searches for IRs at all the doctoral-granting universities and the top-ranked liberal arts colleges in the United States. The study found that implementation of IRs had increased in the two years since the CNI census, and not just at doctoral-granting institutions.[8]

In 2007, another survey-based census was sent to 2,147 library directors at four-year colleges and universities; distribution of the survey included "institutions not yet involved in the IR movement."[9] With 446 responses, the study found that 10.8 percent of the responding institutions had implemented an IR. For those institutions with an IR, 50 percent reported their IR contained fewer than 1,000 objects, and only 7 percent had more than 5,000 objects. The study also found that the most common object in an IR was research from faculty and graduate students, including theses and dissertations, journal articles, and raw datasets. In addition to research objects, the study found that 20.5 percent of the objects in the IRs were special collections and archival materials.[10]

A few censuses have focused specifically on smaller institutions or those with lower research outputs than Carnegie Classification Research 1 universities. One such census looked at fifty master's and baccalaureate institutions and found that the majority of material in these institutions' IRs was student work, followed by special collections and archival materials. The most implemented IR at these fifty institutions was DSpace; the second most common platform was Digital Commons. The study also noted that thirteen of the IRs were operated under a consortium.[11] A similar census by Henry and Neville looked at only master's institutions; this study found that 190 of the 698 master's institutions in the United States had an operating IR. Henry and Neville took a narrower focus in their census, conducting a content analysis for faculty scholarship in IRs; they found that approximately 20 percent of master's institutions had faculty scholarship deposited in their IR. The study also reported on the total number of objects deposited, ranging from just seven objects to 57,649 objects. In a reverse of the previous census, the study found that Digital Commons was the most-used platform, with DSpace coming in second.[12]

In 2016, Tzoc reported on a census of IRs at undergraduate institutions. Using the Carnegie Classification "very high undergraduate," they identified 573 nonprofit, four-year undergraduate institutions, of which sixty-seven had an operating IR. Tzoc's study did not analyze the types of objects in the IRs, though they did note that eleven of the sixty-seven institutions included special collections and archival materials in their IR. In keeping with previous studies, the census found that Digital Commons and DSpace were the platforms with the greatest number of implementations.[13]

While the previous three censuses selected institutions based on their Carnegie classifications, Nykanen focused on institutions by student enrollment. Choosing to look at institutions with fewer than 10,000 students, they concluded that "though IRs are more prevalent in doctoral and large institutions, IRs in small institutions do in fact exist and not in as small a number as might be expected."[14] Nykanen's study analyzed only IRs registered with OpenDOAR, a directory of open access repositories, and they gathered data for comparison in two different years. The first dataset was compiled in 2007, where they identified nineteen small institutions with an IR. They performed the same search again in 2009 and found that the number of small institutions with an IR had grown to forty-nine, with twenty-one operating their IR independently and twenty-eight as part of a consortium.[15] In 2007, the average number of objects in a small institution's IR was 1,767; by 2009 that average number had grown to 2,968.[16] Most of the small institutions used Digital Commons as their IR platform.[17]

Another approach for narrowing a census focus is to look only at institutions within a defined region. In 2023, Clarke and Kim reported on a census of IRs in Connecticut. Of the thirty-seven institutions of higher education in Connecticut, eleven had an operating IR and ten of those IRs were registered with OpenDOAR.[18] The most commonly held object types in these IRs were scholarly articles and thesis and dissertations. Nine of the IRs included student works, with one IR composed entirely of student work. Four of the IRs included special collections and archival materials.[19] The most-used platform was Digital Commons, which was implemented at eight of the institutions.[20]

Through these previous censuses, common themes of IR operation have emerged. While IRs may be perceived as the realm of large, research-focused institutions, smaller schools and schools with a teaching emphasis have also implemented IRs. The most-used platforms were Digital Commons, a commercial solution, and DSpace, an open-source software program that an institution can host locally or contract with a vendor that offers it as a service. The traditional definition of an IR focuses on the scholarly outputs of an institution, but many of the IRs at smaller or teaching-focused institutions use their IR as a mixed space for scholarly works and digital collections (i.e., special collection and archives). This study adds to the previous research through a focus on IRs at RPUs and reports on observed patterns in choice of platform, operation style, and hosted content.

Methods

To conduct a census of IRs at RPUs, the researcher first compiled a list of RPUs in the United States of America and its territories. What constitutes an RPU has been defined in many ways. Historically, common methods used for defining an RPU included limiting them to non-research status, by shared challenges faced at institutions, or by Carnegie Classification.[21] In 2020, the Brookings Institution released a list of RPUs; Brookings factored in characteristics of the institutions and their impact on community and regional development when identifying institutions, looking beyond just their Carnegie Classification.[22] In a 2022 report, the Alliance for Research on Regional Colleges (ARRC) published a list of RPUs based on a cluster analysis and empirical studies on institutional characteristics.[23] The ARRC noted that many previous attempts to define a RPU were based on "what they are not—i.e., flagship research universities, private colleges, community colleges—instead of by the shared traits and missions that RPUs exhibit and the students that they serve."[24] While the Brookings Institution and ARRC reports produced two different lists of RPUs, there was significant overlap. The list of RPUs for this study was created by merging the "List of regional public universities in the United States" from the Brookings Institution and the "List of Regional Public Universities" from the ARRC.[25] After merging the two lists, duplicate entries and institutions that had closed or merged with another were removed, leaving 507 RPUs.

The next step was to identify whether each institution had an IR and, if they did, who provided the service. In February and March of 2023, repositories were searched for in three ways: the first was to look up each institution in OpenDOAR, the second was to conduct a Google search for an IR affiliated with the institution, and the last was to visit each institution's website to see if a repository could be

located. If a repository was identified, the link to the repository was recorded in a spreadsheet. Additionally, if a repository was in OpenDOAR, the associated URL, date of record creation, and the reported repository software were recorded in the spreadsheet. The final list of RPUs with an IR totaled 310, with all repositories offered as a service from the library.

Finally, in April and May of 2023, data was collected from each repository to determine operational specifications and content composition. Each institution's repository was reviewed to determine the software platform, if it was self-hosted or software as a service, and if the repository was a service of the individual library or part of a larger consortium. To determine the content composition, the number of total objects in the repository was recorded, and the content of each repository was reviewed and classified into the following categories:

- Faculty research: Works authored by the institution's faculty, with the exception of datasets and teaching materials
- Datasets: Packaged datasets produced by faculty or students for research or by the university for accreditation and assessment
- Patents: Patent applications and issued patents
- Learning objects and open educational resources: Textbooks, course assignments, and other material used in teaching, with the exception of course syllabi
- Course syllabi: Syllabi for courses taught at the institution
- Grant applications: Summaries and full applications for grants
- Student theses, dissertations, and capstone projects: Culminating student research projects
- Student research: Student research that is not a thesis, dissertation, or capstone project
- Yearbooks: Annual publications documenting the enrolled students and institutional activities of a school year
- Student newspapers: Media publications of students at the institution
- Student research journals: Institutional research journals focused on publishing student research, typically hosted out of a department or club at the university
- Institutional magazines and newsletters: Publications from institutional units intended to share unit or campus news internally
- Alumni publications: Publications intended for alumni or authored by alumni
- Course catalogs: Listing and description of courses taught at the institution

- Special collections, archives, and oral histories: Cultural heritage and institution archives materials
- Institutional annual reports: Annual reports published by the institution documenting budgets, student enrollment and achievement, fundraising efforts, or other institutional activities
- Working documents for administrative groups, support units, and campus committees: Meeting agendas and minutes, reports on committee activities, and other working documents
- Scholarly journals: Peer-reviewed journals published by the institution
- Conference proceedings and schedules: Schedules and conference proceedings of conferences hosted by departments, units, and organizations at the institution
- Campus-affiliated radio and television broadcasts: Audio and video recordings produced by institutionally affiliated radio or television stations
- Other: Objects that fall outside of the previously described categories as identified when reviewing the repository

Categories were defined based on careful examination of repository objects. At the beginning of the examination, the author's general assumption was that IRs would hold faculty research, theses and dissertations, university documents, and special collection materials. As the author examined repositories, however, additional categories were added to describe the type of content observed. For example, while the assumption that IRs would hold theses and dissertations was found to be true, other student works were also identified, and this led to the addition of the categories "Student research" and "Student research journals."

The author did not count the total number of objects by each category, but rather determined if an IR hosted at least one object that fit a category. When a repository had few objects, each item was reviewed individually. Objects in large repositories were reviewed based on categories and metadata to determine the types of objects included. The search function of the repository was also used to locate objects in each category. A single object could be counted as representing multiple categories; for instance, a student poetry journal published by an English department would be included in both the "Student research" and "Student research journal" categories. Likewise, if a university hosted a faculty research symposium, the proceedings in the IR would be categorized as both "Faculty research" and "Conference proceedings and schedules." However, publications in "Scholarly journals" would not be additionally categorized as "Faculty research," as these journals publish research from outside of the institution and not just research by the institution's own faculty.

In addition to classifying the content of the repository, how the content was arranged was documented using one of three categories: collections, communities, or tags. Repositories that arranged objects in a hierarchy by the type of object—faculty research, student research, yearbooks, etc.—were classified as a

collections-based repository. If a repository used a hierarchy based on the university structure, organizing content by academic units and service offices, it was classified as a community-based repository. Tag-based repositories did not employ a hierarchy structure; instead, these repositories allowed for searching and limiting by metadata tags.

Findings and Discussion

Census

In total, 310 (61 percent) of the 507 RPUs were found to host an IR. There were twenty RPUs that had more than one IR platform, for a total of 332 IRs. For analysis purposes, the 332 IRs were treated as distinct entities. Of those 332, 240 were registered with OpenDOAR. When reviewing the 240 that were listed in OpenDOAR, it was noted that some institutions had out-of-date information in the directory. There were six institutions with duplicate entries; of these, five of the entries directed to the same IR instance either through the same web address recorded in the entry or through link redirects. There were five OpenDOAR entries that directed to defunct websites, all of which had operational IRs at another web address. It was also found that eleven institutions' directory entries listed a different repository software than what was currently in use at that institution; this will be discussed further when looking at repository platforms in use at RPUs. There were two OpenDOAR entries for institutions that directed to a defunct website and that an IR could not be located for using either search process; these two institutions were not counted in the total 332 IRs or 240 OpenDOAR entries.

IRs for all 507 RPUs were also searched for using Google search; these searches were conducted through searching ("name of institution" AND "institutional repository"). If an IR was not located through a simple Google search, the institution's website and library website were manually reviewed. Website pages for an institution's provost, division of research, or similar entities were reviewed for any mention of an IR or open access policies. An institution's library website was examined, looking for sections titled "services for faculty," "scholarly communication," "open access," and "digital collections." Additionally, if the library used the LibGuides platform, that platform's native search tool was used to look for the following terms: "institutional repository," "repository," "open access," "archives," and "digital collections." These searches returned ninety-two IRs hosted by RPUs that were not registered with OpenDOAR.

This census found that twenty institutions hosted more than one IR each. The IRs at each institution were reviewed in comparison with each other and were found to fall into three groupings:

- Unique instances: Objects in the IRs were unique to each instance and did not overlap with the other instance.
- Overlap of objects, with some unique objects: Some objects appeared in both IR instances, whereas other objects were unique to an instance.

- Probable migration: One instance was clearly labeled as in process of migration to the other instance; all objects in an instance redirected to another instance; or one instance had objects, whereas the other was empty.

Migration is an assumed reason for running multiple repositories at a single institution; however, only six RPUs with multiple IRs fit in the "probable migration" group. The six institutions in the "overlap of objects, with some unique objects" group all had multiple repositories with both unique objects and duplicate objects. It is possible that these IR instances could be migrating; however, there was no indicator in the repositories that would confirm them as such. There were eight institutions that ran multiple IRs as "unique instances"; six of these institutions had the same category of objects in their IR instances—i.e., theses and dissertations were held in both IRs, but duplication of a single thesis or dissertation title did not exist in both instances. For all six of these repeating object category instances, there were recently deposited objects in both repositories, indicating that both IR instances are in active use. The other two institutions in the "unique instances" group had two fully unique IR instances, with no duplication of objects or object categories, indicating that policy divisions had been made for the category of objects hosted in the different instances: the first institution had a separate IR for open education resources and the second had a separate IR for theses and dissertations.

In addition to looking at the currency of information listed in OpenDOAR, the date of the directory record's creation was captured. While this data does not represent the date an institution first implemented their repository, it does represent a snapshot of the date of earliest possible operation that otherwise would be unobtainable without contacting each institution directly or searching for historic press releases announcing the launch of the IR. The earliest year that an IR at an RPU was registered was in 2005 and the most recent in 2022. Table 1 shows the number of repositories registered by year; because there were six repositories with duplicate entries, the number of repositories by year exceeds the total number of repositories registered with OpenDOAR. It was not possible to gather data related to initial date of operation for the ninety-two repositories that were not registered with OpenDOAR.

OpenDOAR launched as a service in 2005 with a total of seventy-five IRs registered by the end of the year.[26] In that inaugural year, two RPUs registered an independent IR with the directory. Although table 1 shows seventeen IRs registered in 2005, fifteen of those are RPUs whose IR is part of a consortium platform hosted by their system flagship campus. A limitation of the OpenDOAR registration dates for consortium IRs is that the date corresponds to the registration of the IR with the directory and not each individual institution's date of joining the consortium. It is likely that the dates for consortium instances align to the flagship or other entity that first implemented and registered the IR, not the RPU's adoption of the IR.

Table 1. Number of IRs Registered with OpenDOAR by Year.

Date of Registration with OpenDOAR	Registered RPU IRs (*N* = 240)	Registered RPU IRs that Operate Consortially
2005	17*	15*
2006	34	28
2007	4	1
2008	7*	0
2009	7	0
2010	3	1
2011	5	3
2012	6	0
2013	13	4
2014	6	3
2015	18	12
2016	3	0
2017	4	0
2018	1	1
2019	96*	26*
2020	0	0
2021	20	17
2022	2*	0

*Count reflects institutions with duplicate directory entries registered on separate years.

IR Platforms

For all 332 repositories, the researcher recorded the repository platform in use; the total number of implementations of platforms is reported in table 2. As previous censuses found, Digital Commons and DSpace were the most implemented platforms.[27] The most popular platform in use at RPUs was Digital Commons, used by 130 (39 percent) of the institutions; DSpace, used by 119 (36 percent), was the second most used. Notably, twelve institutions (4 percent) used a locally developed platform. In addition to using platforms designed purposely for use as an IR or for hosting digital collections, two institutions had adapted non-IR platforms for hosting their IR content. The first was using Springshare's LibGuides for their IR, having a main guide that described the purpose of the IR and the policy and submission guidelines, and then linking to other guides that organized the IR content into collections. The second instance of using a non-repository platform was an institution that created a Zotero group; metadata for objects in the IR were entered into Zotero and tagged for filtering by subject, event, and authors. Access to the actual object files was not made available through the Zotero attachments feature, though links out to online objects were included, and notes were used to reference the location of objects physically held by the library or accessible through library subscriptions.

Table 2. IR Platforms and Number of Implementations (*N* = 332)

IR Platform	All IRs	IR Platform	All IRs
Digital Commons	130 (39%)	SobekCM	2 (1%)
DSpace	119 (36%)	Drupal	1 (0.3%)
Samvera	18 (5%)	Internet Archive	1 (0.3%)
ContentDM	13 (4%)	Invenio	1 (0.3%)
Islandora	13 (4%)	LibGuides	1 (0.3%)
Locally Developed	12 (4%)	Preservica	1 (0.3%)
Eprints3	5 (2%)	TIND IR	1 (0.3%)
Esploro	5 (2%)	Veridian	1 (0.3%)
Hyku	3 (1%)	Zenodo	1 (0.3%)
Omeka	3 (1%)	Zotero	1 (0.3%)

*Totals not equal to 100% due to rounding.

There are three options for implementation of an IR: paying for a commercial service, locally hosting open-source software, or paying for open-source software as a service from a vendor. To document how institutions hosted their IR, data was collected on whether the platform was self-hosted—meaning the institution runs and maintains the service themselves, or hosted—meaning they pay another entity to manage running and maintaining the software. Of the 332 IRs, 114 were self-hosted by the institution, and the other 218 used a hosted software solution. Digital Commons, ContentDM, Esploro, LibGuides, Preservica, TIND IR, and Veridian are only available as vendor-hosted commercial services; the other IR platforms in use at RPUs are open-source and either hosted locally by the institution or offered as software as a service by a vendor. For institutions that had implemented DSpace—the most-used open-source platform—for their IR, fifty-eight (49 percent) self-hosted, whereas the other sixty-one (51 percent) contracted through a vendor to provide the software as a service (figure 1). Regional public universities only used four vendors for their DSpace instances—Atmire, Texas Digital Libraries, Lyrasis, and 4Science—with Atmire being the most common. Institutions were also split on whether their repository operated as part of a consortium, with 135 repositories operating as part of a larger consortium—under the flagship campus in their system, a statewide effort, or a regional consortium. These 135 repositories were operated under twenty-seven consortiums.

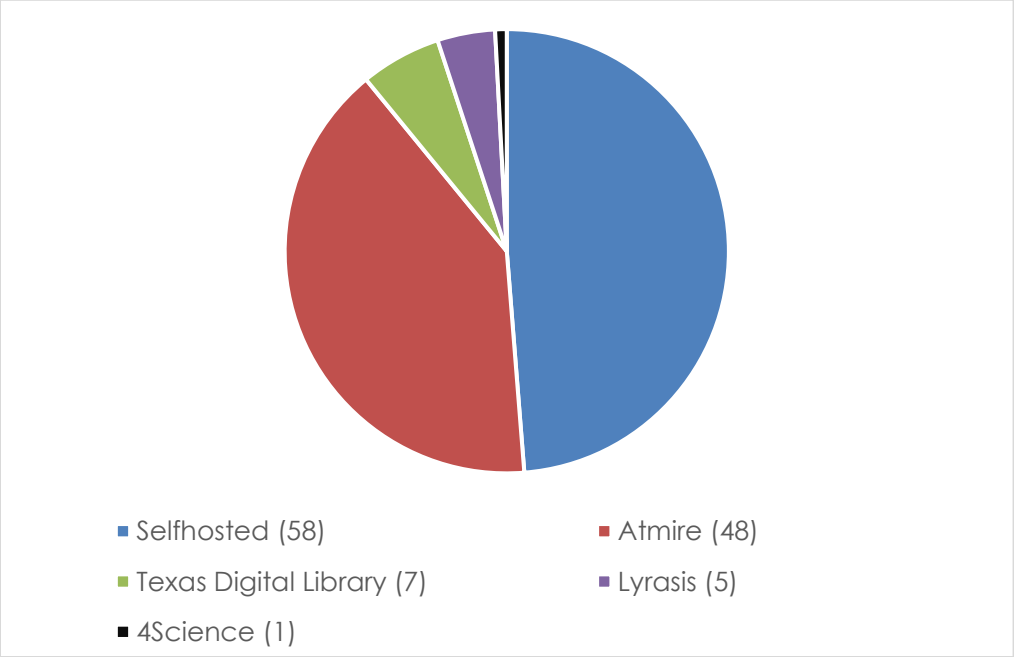

Figure 1. DSpace Hosting (*N* = 119).

A total of eleven institutions had a different IR platform listed on their OpenDOAR entry than what was in use at the institution (figure 2). Of these eleven, five had migrated from a commercial product to an open-source platform, although three of those used a vendor service for the open-source platform. Four institutions migrated from Digital Commons to an open-source platform, one to a self-hosted DSpace, two to a vendor-supported instance of DSpace, and one to a vendor supported instance of Hyku. The other two migrations to an open-source platform moved from ContentDM to a self-hosted DSpace and from DigiTool to a self-hosted Islandora. Three institutions had migrated from open-source platforms to commercial platforms; all migrated from DSpace to Digital Commons. Instances of migration from commercial to commercial, open-source to vendor-supported open-source, and open-source to open-source were uncommon, with one occurrence of Digital Commons to ContentDM, DSpace to a vendor supported instance of Islandora, and DSpace to Samvera, respectively.

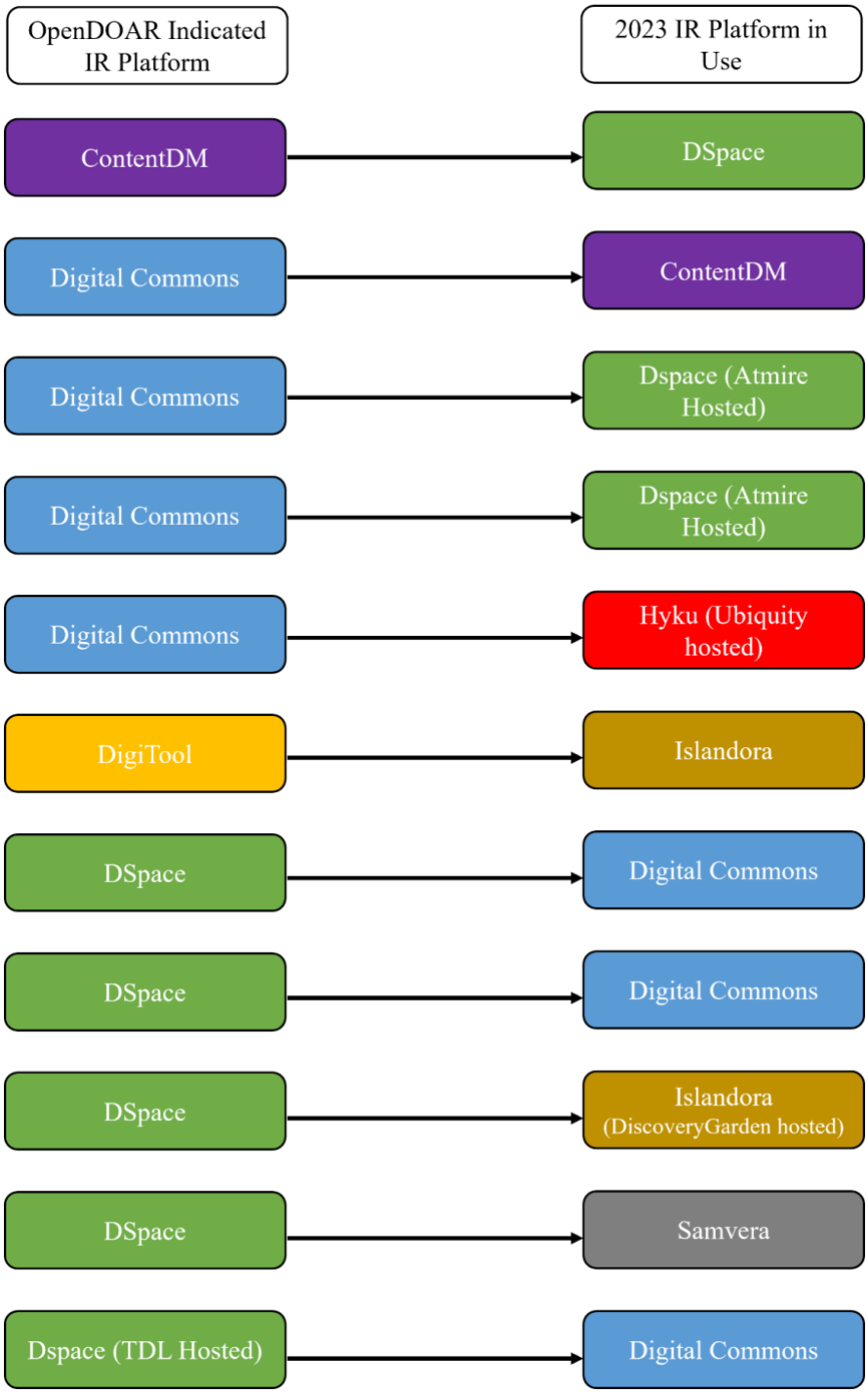

Figure 2. Migration of IR Platform

The large number of RPUs that have implemented a commercial IR or vendor supported open-source IR is perhaps due to RPUs lacking a dedicated team of IT professionals and software developers in their library to stand up, maintain, and develop open-source solutions like their larger, research-focused university counterparts. It is even less likely for the smaller RPUs—where staffing of the library and its

services can be as few as one full-time employee—to have the time and funding for locally managing the software powering the IR. Additionally, the benefit of customer support through a vendor solution can allow libraries without in-house IT knowledge to successfully provide an IR solution for their institution. Similarly, joining a consortial IR provides similar benefits to an RPU, removing the need to self-host, maintain, and troubleshoot. Additional research on IT staffing and responsibilities at RPUs is necessary to understand the prevalence of choice for a vendor-hosted solution but were excluded from the study at hand as out of scope.

Objects: Number, Type, and Organization

Finally, the number and category of objects in each repository was recorded. There were five institutions that had no objects in their repository: four of these were part of a consortium repository setup, and the fifth had implemented an instance of Digital Commons. Thirty-nine repositories had between one and one hundred objects. The largest repository had a total of 222,346 objects; more than 200,000 of those were photographs of university events and campus life from the university photographer. The average number of objects in a repository was 10,952, and the median number of objects was 3,230. There was not a correlation between OpenDOAR registry dates (when available) and number of objects in the IR. Looking at just independently operated IRs, the repositories with the least number of objects had OpenDOAR registration dates of 2008 (forty-three objects), 2019 (385 objects), and 2021 (204 objects).

In 2011, Nykanen found that IRs that operated as part of a consortium tended to have smaller repositories, positing that "[p]erhaps these institutions have less of an investment in the repository and, therefore, less of an impetus for increasing the number of items quickly."[28] This census had the same finding: the average number of objects in an IR operated as part of a consortium was 2,546, whereas IRs operated independently averaged 16,325. The largest repository operated as part of a consortium had a total of 52,095 objects; there were four IRs with no objects, and sixteen with ten or fewer objects. In comparison, the largest independently operated IR had 222,346 objects, whereas only one had no objects, and no independent IR had ten or fewer objects. RPUs operating IRs as part of a consortium may represent campuses with a larger focus on teaching and less weight put on research output and the associated need to document it. Additionally, these institutions may have limited staffing. When library personnel are responsible for a variety of tasks, the potential for the IR to be just one duty among several may lead to less time to focus on the IR.

There were twenty predefined categories under which objects could be classified; objects that did not fall under one of these categories and only appeared in one institution's repository were recorded and described in an "Other" category. The most common category of objects found in the repositories were "Faculty research" (found in 274 IRs), "Theses, dissertations, and capstone projects" (found in 267 IRs), and "Student research" (found in 212 IRs). The full breakdown of categories is reported in table 3. Four institutions included objects that fell outside of the predefined categories. These object types only

appeared at the individual institutions: a software application, National Register of Historic Places nomination forms, faculty curriculum vitae bank, and a tenure dossier bank.

Table 3. Categories of Objects in RPU IRs (*N* = 332)

Object Category	At Least One of Object Type in IR
Faculty research	274 (83%)
Theses, dissertations, and capstones	267 (81%)
Student research (non-TDs)	212 (64%)
Special collections, archives, and oral histories	199 (60%)
Conference proceedings and schedules	178 (54%)
Student research journal	137 (41%)
Institutional magazines and newsletters	130 (39%)
Student newspaper	123 (37%)
Institutional annual reports	122 (37%)
Working documents	112 (34%)
Yearbooks	109 (33%)
Scholarly journals published by institution	100 (30%)
Course catalogs	95 (29%)
Learning objects/OERs	94 (28%)
Datasets	76 (23%)
Alumni publications	69 (21%)
Patents	9 (3%)
Grant applications	8 (2%)
Radio and news broadcasts	4 (1%)

Unlike previous censuses documenting IRs at other types of institutions, “Faculty research” was not the most common type of object held in an IR. Although research by faculty at the institutions was found in 85 percent of the IRs, student scholarship—including “Theses, dissertations, and capstones” and “Student research”—was found in 89 percent of the IRs, making it the most-held object type at RPUs. Consistent with previous censuses, the most popular type of student research objects were theses, dissertations, and capstone projects.[29] It is clear thar RPUs are providing support and encouragement for students to deposit their work individually or have created procedures for mandatory inclusion of student research.

Past studies had noted the inclusion of special collections and archival materials in IRs; however, the prevalence of their inclusion in RPU repositories—60 percent included these objects—highlights the double duty the platforms provide for these institutions. Using a single platform to host all digital content decreases the costs and may reduce labor needs. Rather than paying for multiple services or hosting multiple services locally—and then having to learn and manage multiple platforms—institutions

are choosing to utilize a single platform for serving a variety of digital content. Additionally, having a single repository of all digital content may improve access and use by the campus community and public due to having a central location of discovery.

Institutions took one of three approaches in organizing their repositories: organizing based on communities, organizing as collections, or organizing through searchable tags. There were 196 repositories organized by communities, 115 repositories organized based on collections, and twenty-one that used searchable tags. Ninety-six percent of Digital Commons instances were organized by communities, the other 4 percent by collections, and ContentDM institutions favored organizing by collection (92 percent), with the remaining instance organizing by community. There were several platforms where all institutions using that platform organized in the same approach: EPrints3 instances by communities, Omeka by collections, and Samvera by tags. Organization of DSpace instances was split almost evenly between communities (52 percent) and collections (48 percent); likewise, Islandora instances were split between collections (69 percent) and communities (31 percent). In looking at how objects were organized in each IR, it was apparent the choice of platform played a role in flexibility of choice for approach to organization. Commercial platforms had the most uniformity of organization across institutions using the same IR platform, with institutions heavily favoring one approach to organizing over another. This may be due to how the commercial provider of the software has programmed the platform or how they provide training for the platform. Institutions that had implemented open-source IR platforms exhibited more flexibility in deciding how to organize objects, aligning with the ability to modify open-source software to fit a user's needs.

Limitations

RPUs are a diverse class of higher-education institutions without an agreed-upon definition for the type of institutions that receive the label. This study relied on two previously compiled lists of RPUs; each used their own definition and unique methods for compiling their lists. As such, each list made choices on institutions to exclude, and for this study, many of those exclusions were carried forward. United States military service academies, Tribal Colleges and Universities, and global campuses (or exclusively online campuses) were excluded from both the ARRC and Brookings lists and were also excluded from this study as they are distinct institutions with different missions and funding models than an RPU. There were institutions excluded from one list but not the other that were included in this study: these were RPUs located in US territories (excluded for the ARRC list) and two-year upper-level colleges (excluded from the Brookings list).

In addition to excluding military service academies, Tribal Colleges and Universities, and global campuses from the list of RPUs, campuses that are part of the Pennsylvania State University Commonwealth system were not included in this census. That campus system is organized so that all locations operate as a single entity. The Pennsylvania State University IR is also organized as a single entity, with all campus locations able to submit and no differentiation of which campus location a deposited item represents, making institutional-level analysis burdensome if not impossible. Creators

of objects could be looked up using the university directory to determine the campus where they were located; however, spot-checking the directory found that not every creator's directory entry included campus affiliation, and not every creator with an object in the IR existed in the directory. The Pennsylvania State University campuses were included on the Brookings list but were excluded from the ARRC list for similar reasons as they were in this study.

This study relied on information publicly available on the internet, limiting the study to what could be accessed through an institution's website or IR and the accuracy of entry data in OpenDOAR. This data is useful in documenting the number of repositories, the number and type of objects in repositories, and how IRs are organized. Limitations of this study suggest areas for future research; survey data could provide insights into why an institution has decided to implement an IR, their management practices, or how objects are collected for an IR. Additionally, this study was undertaken by a single individual and data collection took place over a period of several months—while methods were put in place to ensure accuracy of data collection, human error cannot be ruled out.

Conclusion

This study provides a census of IRs at RPUs in the United States and its territories. The full list of IRs at RPUs—including the web address of the IR, the IR platform in use, consortium membership, and total number of objects in the IR—is included in the Appendix to this study. Institutions operating more than one IR will have each unique IR instance recorded in the Appendix. This is the first study to focus specifically on RPUs, making it difficult to report on temporal trends within this specific classification of institutions. However, when looking at the data in relation to previous censuses, RPUs have followed many of the trends identified at other types of institutions: Digital Commons and DSpace are the most implemented IR platforms, scholarly output of faculty and students compose the majority of IR content, special collections materials are included in IRs, and smaller institutions are likely to participate in an IR through a consortium. However, RPUs were unique in the prevalence of student works, special collections, and archival materials found in their IRs, as they are more likely to hold these objects than other institution types reported on in previous censuses. This is likely due to the shared RPU characteristics of a focus on teaching and regional impact.

Capturing a snapshot of IR implementation at RPUs is useful for other institutions, both those who have implemented an IR and those who have not. This census can help with decisions through identifying trends and growth of IRs, especially when compared to earlier censuses. For smaller or less funded institutions, using a single platform for hosting both traditional IR content and special collections and archival materials may provide a cost- and labor-effective means of increasing the library and university online presence. The large number of student works held in IRs at RPUs illustrates a successful model for recruiting student content that could serve as a model for other types of institutions looking to grow in this area.

Although this study looks at the "what" aspect of IRs at RPUs, further studies are needed to understand the "why." Through surveying IR managers at RPUs, future research could compile data on initial implementation dates of IRs and the reasoning behind implementing one, the level of local management and decision-making for IRs operated as part of a consortium, and policies and recruitment practices for student works. Future studies of repositories at RPUs could explore the following questions:

- What motivations do RPUs have for operating an IR?
- Why would an RPU switch IR platforms or stop operating an IR entirely?
- In the future, will RPUs see an increase or decrease in hosting of their IR by a commercial service or through a consortium agreement?

Overall, the number of IRs around the world is increasing, and RPUs are an active part of that trend. At the time of this study, there were 924 United States–based IRs registered with OpenDOAR, and 26 percent were operated by an RPU or had RPU participation through a consortium. With more than half of the identified RPUs operating a repository, IRs are not just the realm of large research-focused institutions. While faculty research is still a major component of an RPU's IR, preserving the scholarly output of students and documenting regional history is clearly of high importance to these institutions. RPUs have redefined what an IR can be at their type of institution in relation to their missions of teaching and regional impact.

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