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in the Academy

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at the University of Minnesota in 2012

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University Digital Conservancy: A Platform to Publish, Share, and Preserve the University's Scholarship

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Abstract

The University Digital Conservancy (UDC) is a web-based tool that provides free, worldwide access to research and scholarship contributed by faculty and staff at the University of Minnesota, including research papers, pre-prints, presentations and research data - often meeting funding open access mandates (ie. NIH, NSF). It is also a showcase for original student works -- such as dissertations, masters and professional papers, and honors theses -- increasing visibility to our teaching and learning outputs. Finally, the UDC is an institutional repository (IR) built to preserve digital university assets that have traditionally gone to the University Archives, such as department newsletters and administrative reports. The UDC software provides searchable, full-text access to deposited work that will rank highly in web search engines (like Google) and also ensures long-term access to content with permanent urls (no more broken links). This library-run repository began in 2007 and now contains over 23,000 digital works that have been downloaded over 1.5 million times. (Download stats as of May 1, 2012.)

Changing Scholarship in the Academy

Scholarly communication has undergone a rapid transformation in the digital age. Put simply, the intellectual exchange of research and scholarship in academia has exploded in volume and continues to diversify in format. Scholars publish articles as digital PDFs that can virally impact the discipline in a matter of days rather than years, books are formatted for our electronic devices rather than shelves, and researchers produce terabytes of digital data in the amount of time it takes to scribble one line in their old fashioned spiral notebooks. Who could have predicted five years ago that a "Tweet" could make or break citation impact (Eysenback, 2011)? Fortunately with all the advancements in scholarly communications, the library has advanced along with it. No longer does the University Library only house research statically on our shelves but we provide immediate access to the complex digital objects created for teaching and research, such as streaming videos and blogging tools, but also instant access to countless research articles and books from anywhere with a web connection.

All of these advances come at a cost, both technological and economical. Publishers have been the primary driver in these costs which annually rise at a pace that outstrips any market model for inflation - averaging between 7% and 9% (UMN Libraries, 2011). Rather than face a future where the University Library is unable to afford content that our faculty and researchers publish, we and other academic libraries began developing tools, called Institutional Repositories (IRs) to distribute free, worldwide access to the research and scholarship, thus leveraging the shift in publishing with modern digital library approaches (Lynch, 2003). This movement toward open access repositories has grown to include over 2000 digital repositories worldwide (DOAR, 2012).

Introducing the University Digital Conservancy

In 2007, the University Libraries launched the University Digital Conservancy (UDC). Our open access, web-based digital library was implemented with open source software called DSpace, originally developed by MIT. The UDC contains over 23,000 digital works that have been downloaded over 1.5 million times. There are currently 83 collections in the UDC representing a diverse array of schools, colleges, departments, centers, institutes and programs at the University of Minnesota. Two of these collections are profiled below as case studies to illustrate how the UDC supports the digital frontier of teaching, learning, and research on

campus.

The UDC provides three core services for campus:

(1) a venue for faculty to deposit copies of their works (articles, research data, conference proceedings) for long-term preservation and open access;

(2) a showcase for certain categories of student works, such as dissertations, Master's Plan A and professional papers, honors theses, capstone papers, and UROP projects; and

(3) a centralized, searchable mechanism to access institutional digital resources that would have traditionally gone to the University Archives.

Publishing work in the UDC provides many key benefits, including long-term preservation and far-reaching access and discovery. The UDC provides long-term preservation of digital works in several ways, such as a permanent url (PURL) for each item to guarantee no more broken citation links, and, a sophisticated preservation strategy to ensure that our digital objects remain accessible and usable over time. For example, the UDC makes a commitment to preserve PDFs if the format changes and a migration is necessary. Next, to facilitate discovery and access, the UDC allows for full-text searching of all of the digital objects in the repository, whether born-digital or digitized, through the UDC search interface. Our content is also indexed by web-based search engines, like Google and Google Scholar, making these Univerisity of Minnesota resources available to researchers around the world.

1. Faculty and Staff Self-Deposit
All university faculty, researchers, and staff may self-deposited their scholarship into the UDC. To deposit published work where the copyright may be handed over to the publisher, faculty and staff are encouraged to use the Author's Addendum (University Libraries, 2007), approved by the University Senate in 2007, to retain the distribution rights to their published works. This allows authors to deposit the full-text article to the UDC after a short embargo period of six months.

The primary value for scholars is the broad dissemination of their work to the widest possible audience, free via the web. Content in open access repositories, like the Digital Conservancy, have long been shown to have greater impact and receive higher citations rates than those articles behind publisher paywalls (Wagner, 2010). Another benefit to researchers, the UDC has been shown to easily meet federal funder's sharing requirements, such as the need to satisfy National Institutes of Health's Public Access Policy for final peer-reviewed manuscripts (http://publicaccess.nih.gov/) or the National Science Foundation's Data Sharing Policy of research results (http://www.nsf.gov/bfa/dias/policy/dmp.jsp). Other efforts that aim to increase public access to research, such as the Federal Research Public Access Act (FRPAA) which is gaining support in Congress (Joseph, 2012), may provide future needs that the UDC is already prepared to fill.

Case Study: The Minnesota Geological Survey Collection

The Minnesota Geological Survey (MGS) has been affiliated with the University's geology department since the 1880's. Their mission is to research and provide information about the state's geology to the public. Today, as a small non-profit publisher, the agency found it increasingly difficult to support their print distribution of maps and reports. Rather than turn to a commercial e-publishing service to disseminate their complex digital maps and reports faster and more economically, the MGS approached the libraries to help. In 2007, we began a three-year scanning project, with the help of state digitization grants, that resulted in a digital collection of every map, bulletin, and report published by the MGS. All of the material is available in the Minnesota Geological Survey Collection in the UDC (http://conservancy.umn.edu/handle/708) and new publications are added continually thus creating a full-text searchable digital library and publication platform for all MGS publications. Additionally, using the UDC to it's fullest extend, the GIS data files for the born-digital map publications supplement the PDF maps for broad reuse potential in research, teaching and learning.

2. A Showcase for Student Work
Student work in the UDC consists of both graduate and undergraduate scholarship. Doctoral students are

given the option to publish a digital copy of their completed dissertation as are students completing Plan A masters degrees. Undergraduate scholarship is highlighted through the Undergraduate Research Opportunities Program (UROP) and the University Honors Program. Student work is also available through departmental collections including graduate Plan B theses and undergraduate work associated with research programs such as the Itasca Biological Station & Laboratories.

Case Study: The Graduate School Collection

The Graduate School was an early campus partner with the UDC. The Graduate School decided to provide an option for the depositing of electronic theses and dissertations (ETDs) directly into the repository in 2007. These submissions comprise the official, approved version of these works and serve as both the campus access copy and the permanently preserved local copy. Each ETD is submitted through the Graduate School with permission by the student to include a full-text, open access copy of their work. Submission statistics show that nearly 85% of all students elect to place a copy of their dissertation into the UDC. In many ways, this workflow has re-emphasized the role of the University Libraries in preserving the findings of original doctoral research conducted on campus as well as providing access and dissemination. For the previous fifty years, the Libraries held a physical circulating copy while the preservation copy was kept on microfilm elsewhere. In the digital world, the access copy and the preservation copy are one in the same. Since 2007, nearly 2,000 dissertations have been added to the UDC and since 2009 over 600 Plan A theses have been uploaded. These materials are available in the Dissertations and Theses Collection in the UDC (http://conservancy.umn.edu/handle/45272). Use statistics indicate this scholarship is widely sought after and well used. Total downloads of ETDs in April 2012 recorded 27,655 file downloads (Figure 1). This number comprised over one-third of 74,246 downloads from the UDC for the month of April (Figure 2).
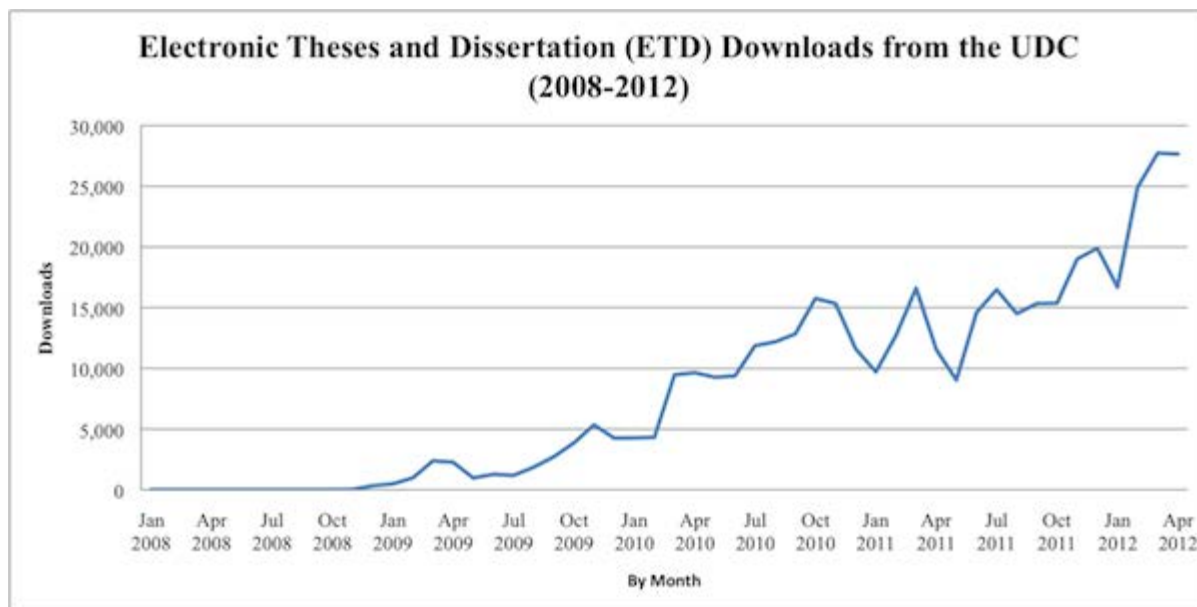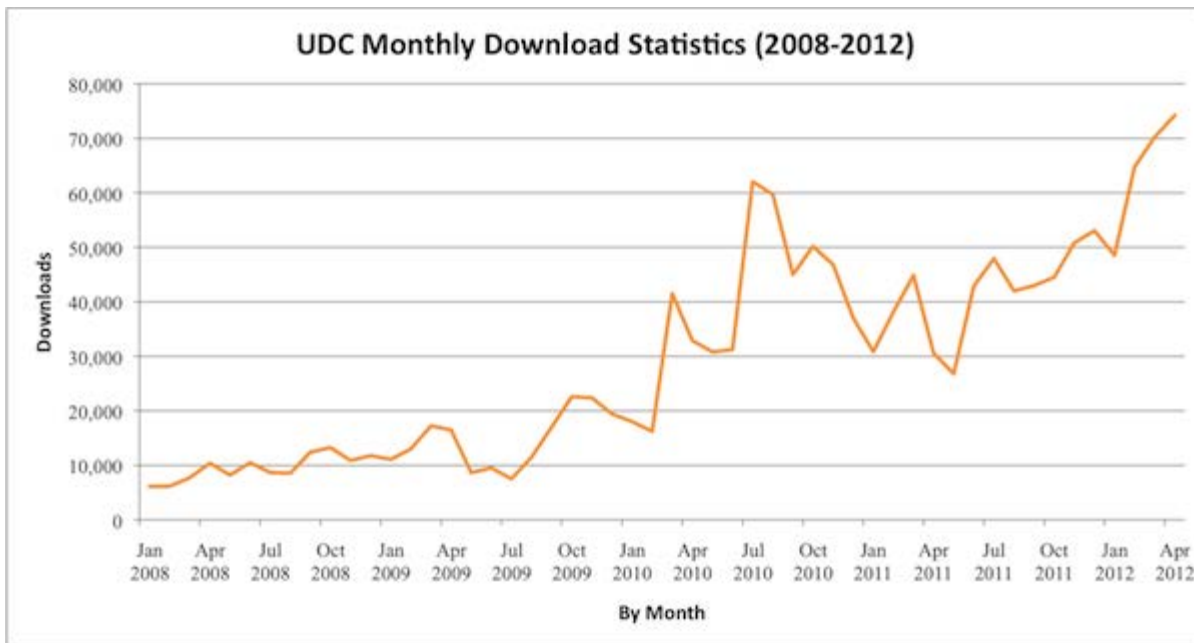

Fig 1: ETD Downloads

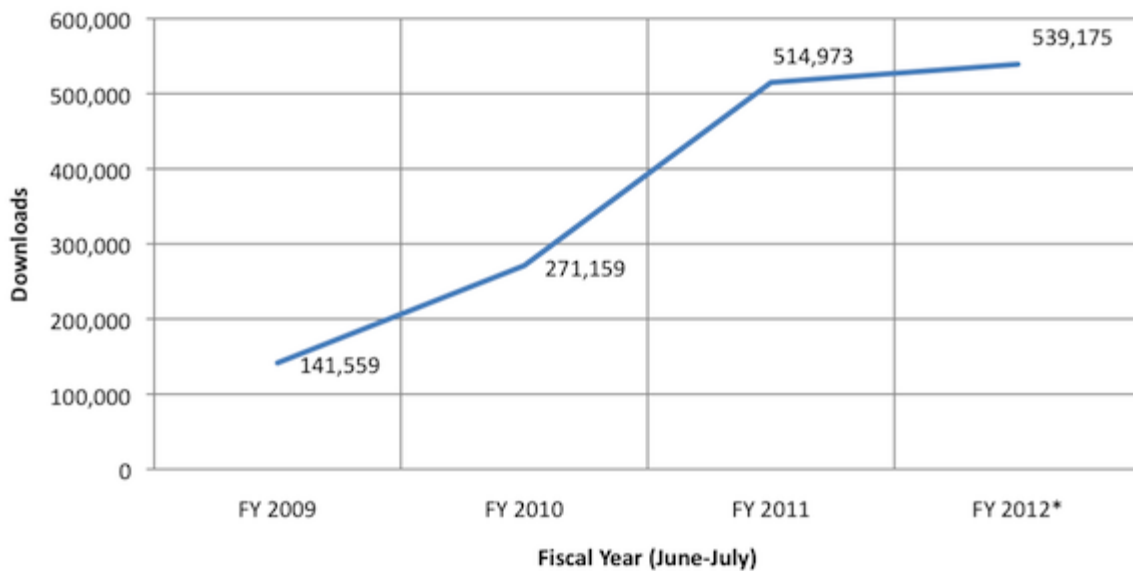*Fig 2: UDC Monthly Download Statistics, 2008-2012*

3. The "Digital Arm" of the University Archives

The UDC serves as the digital arm of the University Archives, which is mandated by the Board of Regents to collect, preserve, and provide access to the historically significant and institutionally valuable documentation of University administrators and faculty. The UDC preserves and provides access to core institutional documents traditionally collected by the University Archives in paper format, but now created in digital formats. In 2005 a Presidential Emerging Leaders (PEL) report warned of the growing problem of "little archives everywhere" and their significant threat of loss for institutional records (Dunnam, 2005). The UDC emerged partially as a response to this problem as a way to allow for the distributed nature of records creation to feed into the University Archives. Examples include the direct submission of official University Senate minutes, reports by research laboratories such as St. Anthony Falls Laboratory, and departmental newsletters and bulletins. The Conservancy also provides a central access point for a selection of high-use historical materials that have been digitized to enhance access and functionality. To date, the University Archives have digitized 800,000 pages of archival material that was previously accessible only by visiting the Archives' reading room. Many of these digitized material are paired with their born-digital counterparts to create a single access point to the institutional content regardless of the original format. The University Archives Collection in the UDC (http://conservancy.umn.edu/handle/3) has over 8,500 documents available for use. Examples include digital access to the full run of The Brief, the news digest for faculty and staff, and many long-standing committee minutes.

Future Roles of the UDC

Although most Americans (75%) still think of the library as synonymous with physical books, in academic libraries, e-books and online journals are becoming the norm, and library users increasingly request them over print titles (De Rosa, 2011). Academic libraries are also making more investments in online IRs like the University Digital Conservancy, for content creation as well as preserving scholarship. In a report by the Association of Research Libraries, it is noted that "A new role is emerging—that of digital curation, or attention to the lifecycle management of digital objects and collections" (Walters, 2011). While many library users may not recognize this shift, use statistics illustrate the changes, for example: in 2011 the UDC had a total of 514,973 downloads (Figure 3), while traditional print books and journals from the UMN Libraries had 296,743 checkouts (University of Minnesota Libraries, 2011). And as the UDC collections grow, download stats increase.

Figure 3. Total UDC Downloads by Fiscal Year, FY2009-FY2012.

As academic research changes and technology evolves, the University Digital Conservancy will take on new roles. The UDC will continue to be an online space for the public to peruse content, a platform for long-term preservation, and a venue to showcase the University of Minnesota's administrative and scholarly works. At the same time, the Libraries will invest in the UDC to provide an improved user interface, new ways to showcase research, and utilize the latest digital preservation techniques.

Not only the UDC, but IRs all over the world are experimenting with new roles. Some examples of new roles include: research data archiving, open access publishing (at times supporting university-wide open access mandates), interoperability with partner institutions' IRs, and social networking add-ons (Jain, 2011). The UDC is already delving into some of these areas, for example, the UDC contains archived datasets from the geosciences, aerospace engineering, and more. As digital humanities programs take root in academic departments, services like the UDC will become a sought out partner to provide a research sandbox. In addition, a new software platform is in development and the UDC staff hopes to add more capabilities, services, and a more streamlined, intuitive interface.

Tracking Article Level Impact
Another area in which academia is changing, and where IRs are well positioned to contribute, is research impact measures. Impact measures have been used in tenure and promotion for decades. However, many researchers are seeking alternatives. The topic is being discussed at conferences, in journals and online in recent years. The creators of the website Altmetrics.org note that a researcher's influence cannot be shown with H-index or other citation measures alone (Priem, 2010). Research impact should be calculated by including other factors, such as pre-print/post-print download counts; data citation; social media participation; Mendeley, Zotero or other PDF sharing, and more. According to Priem, expressions of scholarship are becoming more diverse.

> Articles are increasingly joined by: the sharing of "raw science" like datasets, code, and experimental designs, semantic publishing or "nanopublication," where the citeable unit is an argument or passage rather than entire article, widespread self-publishing via blogging, microblogging, and comments or annotations on existing work.

Altmetrics.org is not the only organization promoting this idea. New tools are gaining popularity, such as Total Impact (http://total-impact.org/), Publish or Perish (http://www.harzing.com/pop.htm), and Altmetric Explorer (http://www.altmetric.com/aboutexplorer.php).

The UDC is the perfect partner to work with academics to provide alternative metrics. First, all visitors to the UDC website, http://conservancy.umn.edu, can view monthly UDC download statistics at the individual article level, or collection level, by clicking on the "Stats Display" button. Second, researchers can post certain kinds of supplemental material to the UDC, such as data sets, presentations, and posters, and the permanent URL (PURL) that all UDC items receive will allow citation of the alternative scholarly output. And finally, as an Open Archives Initiative (OAI) (http://www.openarchives.org/) compliant IR, the UDC can publish metadata to digital libraries such as Mendeley (http://www.mendeley.com/) and other sites that combine use statistics to help track the popularity of the item.

Conclusion

In conclusion, the UDC is well-positioned to supporting a new era of scholarly communication and publishing, one in which libraries are digital, social networking is prevalent, research data is open, and alternative metrics are used for tenure and promotion in academia. With platforms like the UDC, the University Libraries will continue to seek out new roles while maintaining its founding principles of long-term preservation, open access, and dissemination of University of Minnesota research and education output.

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