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Introduction

Today, many scholars seek to reimagine the way academic scholarship is shared, discussed, and valued in our networked digital environment (e.g. Cohen 2012). Digital acts of disseminating and sharing scholarly and academic production leave traces of impact, in things like download and view counts, links and mentions in citation management tools, and content sharing across a suite of social networks. These traces are being collected, examined, and considered under the umbrella term altmetrics, defined as “the study and use of non-traditional scholarly impact measures that are based on activity in web-based environments” (“Altmetrics Collection” 2012). Researchers and librarians alike face new opportunities to engage and support the use of altmetrics tools and methods, and in doing so, can begin to re-examine how scholarship is defined, collected, documented, discussed, preserved, and used.

The Current State

Almetrics illustrate one aspect of a reimagined system of scholarly discourse that is based on open, transparent, democratic and inclusive practices and values. Because scholars are now able to easily share their work online, in an open environment, their work becomes available to the broader public to review, examine, use, or criticize. In addition to this transparency, altmetrics provide a responsive model that addresses the increasingly rapid pace of research dissemination and open discussion in which academics already engage (Priem et al. 2011).

Critical Opportunities

New publication methods extend and remediate the dissemination of research outputs beyond formalized and traditional journal publishing (e.g. Konkiel and Scherer 2013). Conventional methods of filtering and assessing the impact of scholarship and academic production no longer fully and accurately serve digital practices of scholarship. As a result, there is interest in, and active research around, revolutionizing these processes. A growing number of scholars today share the process and building blocks of their work, not merely the product. Datasets, algorithms, grey literature, classroom resources, and assets like videos, blog posts, and photos become part of this process. Institutions, funding agencies, and industry now have the opportunity to

incorporate these types of output into the evaluation of scholarly and research impact by employing altmetrics tools.

Altmetrics are one way to evaluate scholarly merit at the research and artifact level. For example, in 2012, a group of researchers, editors, and publishers from the American Society for Cell Biology drafted the San Francisco Declaration On Research Assessment (DORA), seeking to improve the ways in which scientific research outputs are evaluated. One of the major points raised in DORA is that research should be assessed on its own merits, not on the basis of the published location (“San Francisco Declaration on Research Assessment” 2012). We urge scholars and librarians to consider how well established, institutionally based metrics, such as the Journal Impact Factor, can coordinate with and complement these emerging altmetrics practices.

Critical Concerns

Altmetrics may offer a deeper, more contextually based way to understand and measure various forms of research dissemination and discussion. However, this inserts a host of unanswered questions about the complex nature of how scholars, institutions, libraries, and the public each determine different forms of impact and quality. A research artifact may be discussed and shared widely, perhaps indicating great public interest, but that artifact or the substantive ideas in it may not be of high quality.

Another great concern of many users and researchers of altmetrics continues to be that of standardization across different metrics. The value of certain kinds of metrics (presence in citation management reading lists, social media hits, downloads, citations in the literature, etc.) may vary across and even within disciplines. The National Information Standards Organization (NISO), has recently accepted the challenge of beginning the dialogue of standardization around altmetrics by announcing in June 2013 a two-part project to “study, propose, and develop community-based standards or recommended practices in the field of alternative metrics” (Herther 2013). NISO’s work will likely provide researchers and librarians alike with more measurable frameworks with which to base future investments and education around citation and dissemination practices.

Libraries, Librarians, and Altmetrics

Altmetrics offer opportunities for libraries and librarians to maintain currency in research and scholarly production processes and illustrate their value to researchers in new ways. Recently librarians have engaged in the discussion of precisely how libraries and librarians can facilitate the development of altmetrics and help to determine appropriate metrics evaluation and use at both the researcher and institutional levels (Galloway and Pease 2013; Roemer and Borchardt 2013). Scholars Lapinski, Piwowar and Priem have also participated in this conversation, stating

that “[l]ibrarians can provide this support in three main ways: informing emerging conversations with the latest research, supporting experimentation with emerging altmetrics tools, and engaging in early altmetrics education and outreach” (Lapinski, Piwowar, and Priem 2013).

Libraries’ investment in developing and fostering open access policies and infrastructure, developing institutional repositories, and supporting various forms of academic commons are complementary to the practices, perspectives, and purposes of altmetrics. For example, altmetrics have been used to illustrate the value of Open Access journals and practices, and the use of institutional repositories (Mounce 2013). Libraries are also well poised to facilitate the rapid development of multimedia and multimodal artifacts associated with the academic and research processes and can augment existing workflows, repositories and cataloging systems (i.e. critical infrastructure) to ingest, organize and preserve these artifacts for the scholarly record. As researchers experiment with social media and begin to play with emerging platforms and tools, opportunities emerge for librarians to continue to act as experts in navigating and evaluating quality information, making recommendations or developing systems to organize such information, and providing consultation on how to develop, organize, store, and share the process of research.

While librarians have done a good job documenting players involved in altmetrics, for example “Internet Resources” in *College & Research Library News* (Roemer and Borchardt 2012), this is a very dynamic space. New organizations are constantly arriving on the scene and several who have drifted away into obscurity, often creating difficulties for librarians to maintain updated Research Guides. The dynamism is expressed by a growing number of altmetrics companies developing tools and social media-style platforms, but also by publishers, who are already well-integrated into library services. Reference services like Mendeley and publishers like Wiley and EBSCO are including altmetrics approaches in their services. For example, EBSCO recently announced their acquisition of Plum Analytics, a highly successful altmetrics provider (McEvoy 2014).

To illustrate how libraries can engage with altmetrics in practice, we provide a short case study of the University of Pittsburgh on their collaboration in a pilot project with Plum Analytics.

Micro-Case Study: University of Pittsburgh Library System

In June 2012, the University of Pittsburgh Library System (ULS) partnered with Plum Analytics to pilot ways to assess the impact of their university’s research in less traditionally established venues, like institutional repositories and social media platforms. In July 2013, we spoke to Tim Deliyannides, Director of the Office of Scholarly Communication and Publishing and Head of Information Technology at the ULS about their partnership with Plum Analytics. The administration at ULS views their experimentation with altmetrics as another way to connect

scholarly communication directly to emerging needs of and opportunities for their researchers. The ULS also has a strong commitment to supporting open access on its campus and the partnership with Plum Analytics is one way of increasing this commitment, illustrating value, and providing tools for faculty to engage easily in open access practices (Deliyannides 2013).

Mr. Deliyannides acknowledges the experimental nature of this partnership and believes it illustrates ways in which libraries can participate in low-risk experimentation with new tools and emerging scholarly practices. The ULS pilot started with a set of handpicked faculty who provided librarians with a current CV. Librarians and student workers deposited publications and other research artifacts from the faculty CVs into the university's institutional repository. Based on the metadata from the CVs, the PlumX interface then aggregated and displayed all of the altmetrics data to the participating faculty and ULS team.

Three lessons learned emerged from this pilot: (1) if faculty members provide an outdated CV, recent materials were not captured; that is, if faculty want to successfully participate in these endeavors, their citations must be current and accessible to altmetrics tools like PlumX; (2) while faculty found it helpful to have the information aggregated by PlumX all "in one place," respondents were of mixed opinions regarding the value of altmetrics to them (Miller 2013); (3) more technical and institutional infrastructure must be developed at both the library and university level to scale up and efficiently offer this kind of service to the entire university community of researchers and faculty.

Engaging Researchers

Deliyannides suggests that overcoming skepticism about altmetrics may require more outreach to faculty, both to better understand their data needs and publication patterns to more broadly educate them on the value and use of these data and tools. Understanding the nuances of how research is used within academic communities and outside them have the potential to be very useful to both the researcher, the institution, and funders in determining what projects to fund or even which components of projects to fund and disseminate.

Faculty movement between institutions is becoming increasingly fluid, and, increasingly, many researchers are employed on an annual or contractual basis. Through tools that integrate altmetrics philosophies and practices, researchers now have the ability to create dynamic CVs that can capture contributions regardless of institutional affiliation. Additionally, as more scholars move their conversations from "dark" social spaces (Madrigal 2012) like listservs and closed research networks to open social spaces like public blogs, social networks, and Open Access journals, this discourse and its impact becomes traceable and measurable (Priem, Piwowar, and Hemminger 2012). Even professional organizations such as the American Society for Cell Biology, the Association for Information Science and Technology, and the Association

of Learned and Professional Society Publishers are investigating the use altmetrics in their fields, an indication of the growing importance of this topic to scholars across disciplines and institutions. Finally, the public access mandate from the National Institutes of Health (2008) and the data management plan requirement from National Science Foundation (2011) are both examples of the growing value placed on disseminating and enabling engagement with the results of publicly funded research.

Conclusion

Librarians will continue to vet, organize and add value to information pulled from altmetrics practices and libraries should consider actively engaging this space to help shape it. Two ways in which libraries and librarians participate in this conversation are (1) to conduct more research about use of alternative metrics in determining value, quality, and impact in the research process and (2) to start building infrastructure and developing ways to expose metrics at, for example, the dataset level (Konkiel 2013) that can support the archiving, reuse, and evaluation of an array of research artifacts. Academic research libraries are well poised to develop or enhance metadata systems, repositories and bibliographic workflows that capture the non-traditional artifacts being developed and disseminated as part of the scholarly and research lifecycles. Alongside investigating or developing workflows to support new digital identifier resources such as ORCID for researchers or DataCite for datasets, librarians can engage researchers to teach them how to preserve, or reuse research assets within disciplinary or institutional repositories. More research is also required to understand the relationships between established metrics of success and emergent metrics within disciplinary or specific scholarly communities and how these metrics can be standardized. Libraries and librarians can be makers, doers, and important partners in developing infrastructure for platforms, raising awareness and literacy around these new measures of scholarly reach.

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