Purdue University
Purdue e-Pubs

Charleston Library Conference

Overview of the Altmetrics Landscape

Richard Cave
Public Library of Science, rcave@plos.org

Follow this and additional works at: http://docs.lib.purdue.edu/charleston

Part of the Library and Information Science Commons

An indexed, print copy of the Proceedings is also available for purchase at: http://www.thepress.purdue.edu/series/charleston.

You may also be interested in the new series, Charleston Insights in Library, Archival, and Information Sciences. Find out more at: http://www.thepress.purdue.edu/series/charleston-insights-library-archival-and-information-sciences.

Richard Cave, "Overview of the Altmetrics Landscape" (2012). *Proceedings of the Charleston Library Conference.*
http://dx.doi.org/10.5703/1288284315124

This document has been made available through Purdue e-Pubs, a service of the Purdue University Libraries. Please contact epubs@purdue.edu for additional information.

Overview of the Altmetrics Landscape

Richard Cave, Director of IT and Computer Operations, Public Library of Science

Abstract

While the impact of article citations has been examined for decades, the "altmetrics" movement has exploded in the past year. Altmetrics tracks the activity on the Social Web and looks at research outputs besides research articles. Publishers of scientific research have enabled altmetrics on their articles, open source applications are available for platforms to display altmetrics on scientific research, and subscription models have been created that provide altmetrics. In the future, altmetrics will be used to help identify the broader impact of research and to quickly identify high-impact research.

Altmetrics and Article-Level Metrics

The term "altmetrics" was coined by Jason Priem, a PhD candidate at the School of Information and Library Science at University of North Carolina-Chapel Hill. According to the Altmetrics Manifesto, altmetrics is "the creation and study of new metrics based on the Social Web for analyzing and, information scholarship" (Altmetrics.org, http://altmetrics.org/about).

Altmetrics is data points that are generated more rapidly than traditional metrics, such as citations, so researchers do not have to wait years to show their worth. Altmetrics attempts to provide timely measures of an impact through the use of metrics from HTML views and downloads of scholarly articles, blog posts, Tweets, bookmarks, etc. By providing real-time (or near real-time) information, altmetrics can be used to show the merit of scientific research not just by researchers (through citations) but also the impact of the research to the public (through social media channels).

The altmetrics movement builds on previous work by other researchers. Johan Bollen has been studying usage on articles for over a decade. He started MESUR (http://mesur.informatics.indiana.edu/) in 2006 as a large-scale usage data collection for scientific research. The MESUR database currently contains over one billion article-level usage events obtained from publishers, institutions, and aggregators. Eigenfactor is a rating of the total importance of a scientific journal. It was created in 2007 by Jevin West and Carl Bergstrom of the University of Washington as an academic research project to rank journals based on a vast network of citations (Eigenfactor.org, http://www.eigenfactor.org/whyeigenfactor.php).

Article-Level Metrics (ALM) are a comprehensive and multi-dimensional suite of transparent and established metrics at the article level (http://article-level-metrics.plos.org/alm-info/). Article-Level Metrics includes many of the same data points at altmetrics, but also includes usage statistics and traditional metrics such as the number of citations to an article. Article-Level Metrics are typically associated with the publisher PLOS (Public Library of Science) who introduced the metrics on all PLOS articles in 2009.

Measured Metrics

The use of altmetrics aims to capture a broader view of scholarly research by tracking the activity of this research as it is viewed, shared, critiqued, cited, and built upon. Some metrics are primarily used to track scholarly activity while other metrics are used to show the public interest in scholarly research. Altmetrics are generally categorized in the following ways:

- Usage—HTML views, PDF/XML downloads, book holdings, etc.
- Captures—Bookmarks, favorites, readers, groups, etc.
- Mentions—Blog posts, news stories, Wikipedia articles, comments, reviews, etc.

Copyright of this contribution remains in the name of the author(s).
http://dx.doi.org/10.5703/1288284315124

- Social Media—User activity from Twitter, Google+, Facebook, etc.
- Citations—CrossRef, PubMed Central, Web of Science, Scopus, Microsoft Academic Search, etc.

Models for Providing Altmetrics

There are a number of organizations currently collecting altmetrics and making the data publicly available. These organizations follow two models for providing altmetrics: the service provider model and the publisher model.

Organization	Model	Org Type	Free	Embeddable JavaScript	API	Open Source	Added Benefit
PLOS	Publisher	Non-profit	Yes	No	Yes	Yes – Ruby on Rails	Usage statistics
ImpactStory	Service Provider	Non-profit	Yes	Yes	Yes	Yes - Python	Sources include datasets and code repositories
Altmetric	Service Provider	For-profit	Some	Yes	Yes	No	PAAS service
Mendeley	Service Provider	For-profit	Yes	No	Yes	No	Large number of documents, members and groups
Plum Analytics	Service Provider	For-profit	No	Yes	Yes	No	PAAS and value-add services
ScienceCard	Service Provider	n/a	Yes	No	Yes	Yes - Ruby on Rails	Based on researcher profiles
ReaderMeter	Service Provider	n/a	Yes	No	No	No	Based on researcher profiles
CitedIn	Service Provider	n/a	Yes	No	No	Yes - PHP	Based on researcher profiles

Table 1. Models for Providing Altmetrics

In the publisher model for altmetrics, a publisher or the publishing platform used by the publisher provides altmetrics on the research articles that they publish. Because publishers have access to the usage statistics for their published articles, they can provide this as an additional feature that cannot be provided by service providers. For example, a publisher can include the number of HTML views for an article or the number of PDF downloads of an article.

The service provider model for altmetrics follows the software as a service (SaaS) model. A company gathers altmetrics for a research article or dataset (usually based on an identifier such as a DOI or PubMed ID), gathers the altmetrics, and then provides the altmetrics to its customers. Depending on the service, the altmetrics can be provided for free using a funding model or for a charge using a subscription model.

Publishers Providing Altmetrics

PLOS Article-Level Metrics (ALM)

PLOS (Public Library of Science) began providing Article-Level Metrics (ALMs) in 2009 on every article published in the PLOS journals and has continually developed the suite of impact indicators (. The vision of PLOS ALM is to shift the research community from measuring impact of scholarly research at the journal level toward an article-based system in which articles are judged on their own merits with a transparent set of data. These ALMs comprise of data points that capture the ways in which research articles are read, saved, shared with others, commented, and cited.

The PLOS ALM API was made available in 2011. The underlying data for the PLOS ALM is available through the PLOS ALM APIs (http://api.plos.org/alm/faq/). This API gives developers and researchers access to the data collected by the ALM application and allows for a more detailed analysis of the data. The ALM API is used by altmetrics providers such as ImpactStory and Altmetric. The ALM API was also used to create new applications for the PLOS/Mendeley Binary Battle API contest (http://dev.mendeley.com/api-binary-battle/). PLOS also provides monthly and

Figure 1. An Example of PLOS Article-Level Metrics on a PLOS ONE Article

annual zip files for the entire suite of ALM data in CSV format (http://article-level-metrics.plos.org/plos-alm-data/).

PLOS Article-Level Metrics (ALM) Application

The ALM application was started by PLOS in March 2009. The application, developed using the Ruby on Rails framework, allows a user to aggregate relevant performance data on research articles including online usage, citations, social bookmarks, notes, comments, ratings, and blog coverage. PLOS develops and uses the ALM application internally to aggregate data on every article published in a PLOS journal and every article published in a PLOS Currents focus area.

The ALM application was made available as open source to gather developer interest in the application and allow other publishing platforms to offer ALMs to their users. The ALM source code and developer documentation is located on GitHub at https://github.com/articlemetrics/alm. PLOS will continue to develop the ALM application and is committed to work with the developer community to incorporate feature requests and to resolve bug reports.

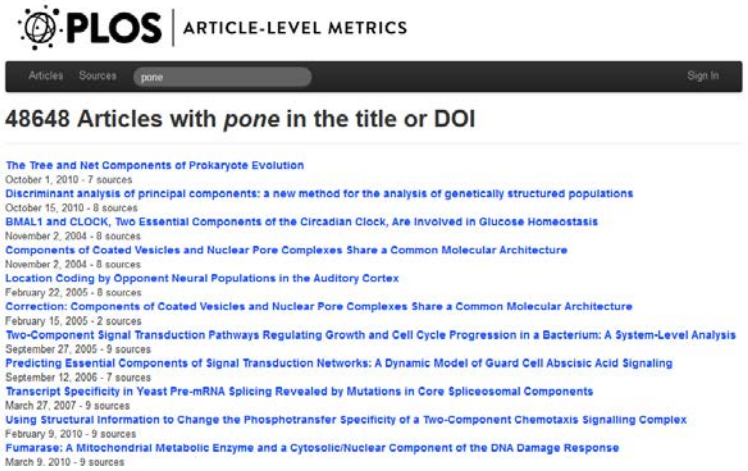

Figure 2. An Example of the PLOS Article-Level Metrics Application.

Service Providers of Altmetrics

ImpactStory

ImpactStory (http://impactstory.org/) is a free, open source web service to that aggregates data from many sources and displays it in a single report. ImpactStory retrieves data points for research objects from over a dozen websites and analyzes the data based on the user engagement with the research. ImpactStory gathers data for a wide range of research outputs including research articles, datasets, blog posts, figures, and code repositories. To use ImpactStory, researchers enter research outputs such as articles from Google Scholar, a researcher's ORCID, a presentation on SlideShare, a dataset on Dryad, or software on GitHub. The source code is available on GitHub at https://github.com/total-impact.

Altmetric

Altmetric (http://www.altmetric.com/) is a service provider that captures Tweets, blog posts, news stories, and other pieces of content that mention scholarly articles. Individual users can use Altmetric for non-commercial use. Commercial use of Altmetric requires a user to sign up for a yearly plan to access the Altmetric Explorer. The Explorer can be used to browse, search, and filter this data. Users can utilize it to deliver insights, track conversations, and measure levels of attention over time. The primary user of the Altmetric Explorer will likely be publishers and publishing platforms.

Altmetric provides a web plugin that allows publishers to add the Altmetric 'donut' graphic and score with a single line of code added to the article HTML. Users can view an article's citation data, page views, news mentions, blog posts, and social shares including Facebook and Twitter. Altmetric provides metrics for a number of websites including the BioMed Central journals, the Nature Publishing Group journals, and Scopus. There is also a bookmarklet that can be added to a web browser to that will show a research article's altmetric score when browsing an online research article.

Mendeley

Mendeley (http://www.mendeley.com/) provides web-based and desktop applications for storing, organizing, searching, and commenting on research articles. Mendeley provides a comprehensive API (http://dev.mendeley.com/) for gathering information on documents stored at Mendeley, author statistics, group information, etc. The Mendeley API is used by other altmetrics providers including PLOS ALM, ImpactStory, and Altmetric.

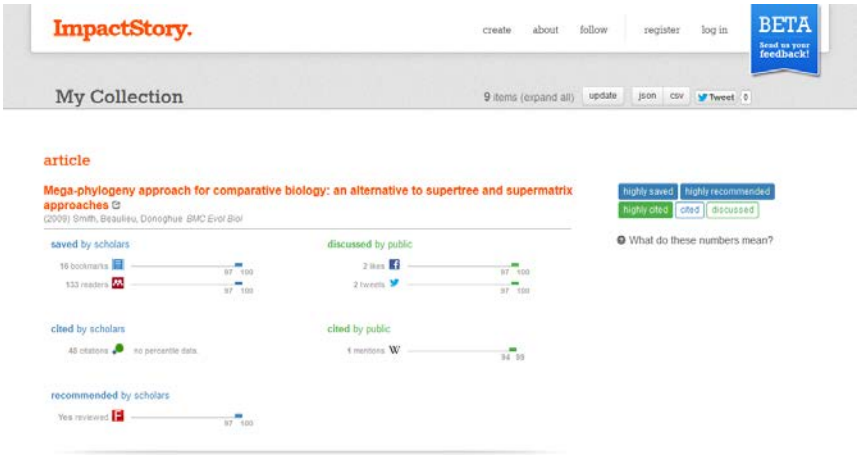

Figure 3. An Example of Impactstory Article Metrics

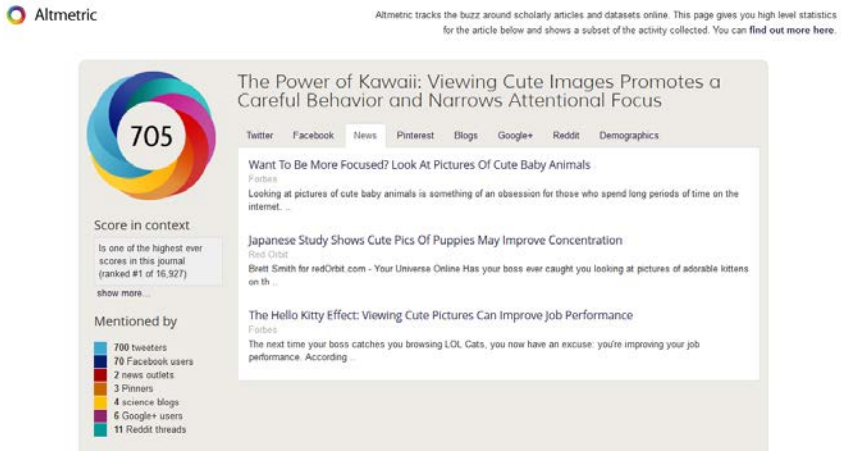

Figure 4. An Example of Altmetric Article Metrics

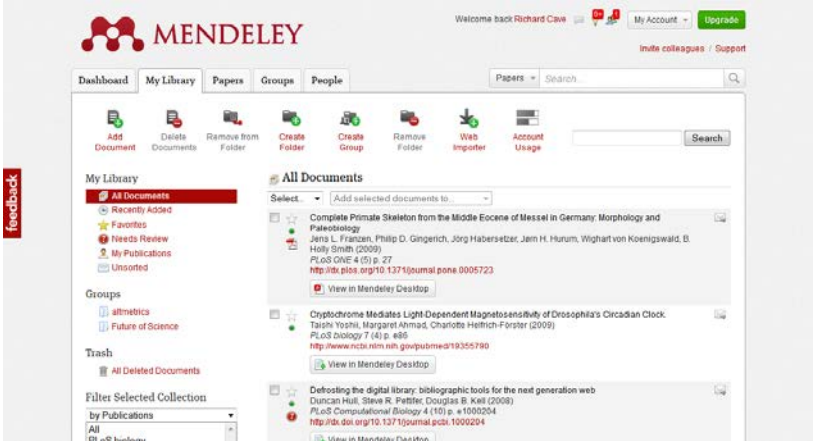

Figure 5. An Example of a Mendeley Library

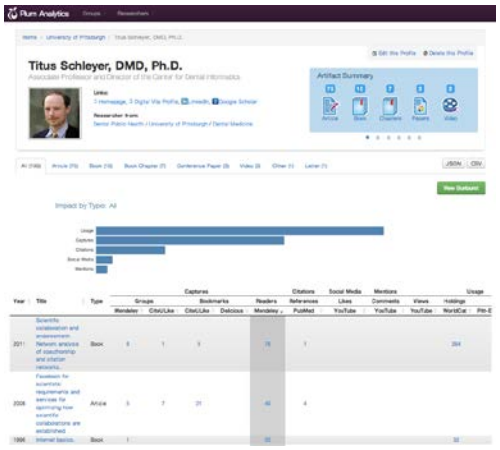

Figure 6. An Example of an Author Profile in Plum Analytics

Plum Analtyics

Plum Analytics (http://www.plumanalytics.com/) is a start-up focused on institutions and will provide altmetrics to help researchers track, assess, and compare the impact of their research. The company will offer metrics-based reports including "quantifying how departments or labs measure up to their peers; discovering 'rising stars' in different research areas for recruiting or co-research purposes; monitoring research marketing efforts; and providing quantifiable research outcomes in pursuit of grant funding" (PlumAnalytics.com, http://www.plumanalytics.com/about.html). As of October 31, 2012, Plum Analytics was not openly available, but was being used in pilot projects at the University of Pittsburgh and the Smithsonian.

ScienceCard

ScienceCard (http://sciencecard.org/) is a web service created by Martin Fenner in 2011. It collects altmetrics for scientific articles based on a researcher's name to create a baseball card metaphor for the researcher. It uses data retrieved from Twitter, Mendeley, PubMed Central, CiteULike, Wikipedia. and CrossRef.

ScienceCard is an open source application based on the PLOS ALM application and is available on GitHub (https://github.com/mfenner/alm). The ScienceCard API can be used to fetch the data from the service.

ReaderMeter

ReaderMeter (http://readermeter.org/) was created by Dario Taraborelli in 2010 to estimate the impact of a research article based on the article's usage at Mendeley. ReaderMeter adapts two popular impact metrics for authors (the H-Index and the G-Index) and redefines these metrics by using bookmarks instead of citations. ReaderMeter is a service that is used by entering an author's name into the website.

CitedIn

Citedin (http://citedin.org/) is a combination of a searchable database and web service for citations in the literature, biomedical databases, blogs, books, and wikis. It is provided by the department of Bioinformatics of Maastricht University. The application was created by Andra Waagmeester and is available as open source from Google Code at http://code.google.com/p/citedin/.

Getting Started

If you're a librarian

1. Collect and track altmetrics for research articles published at your university, for research of interest and to display altmetrics on author biographies.
2. Ask publishers to provide altmetrics for every published research article.
3. Ask providers of data to put licenses on their data to allow the broadest distribution (e.g., CC-0).
4. Join the altmetrics discussions on Mendeley (group "altmetrics"), Twitter (#altmetrics), or the altmetrics Google Group (https://groups.google.com/forum/#!forum/altmetrics).

If you're a publisher

1. Collect and display altmetrics for every article published.
2. Work with a service provider to put altmetrics on research articles or install an open source altmetrics application to track altmetrics. If hosting an open source application, take into account the cost required to host the application and underlying data, the technical expertise necessary to run the application, and so forth.
3. Join the altmetrics discussions on Mendeley (group "altmetrics"), Twitter (#altmetrics), or the altmetrics Google Group (https://groups.google.com/forum/#!forum/altmetrics).

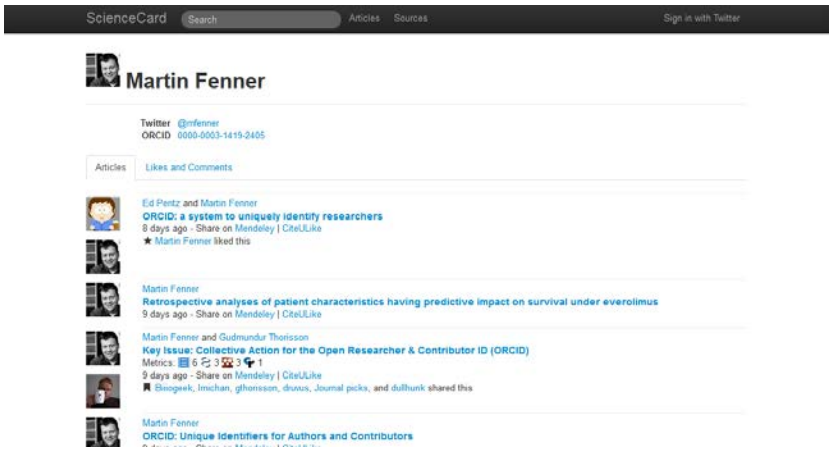

Figure 7. An Example of an Author Profile in Sciencecard

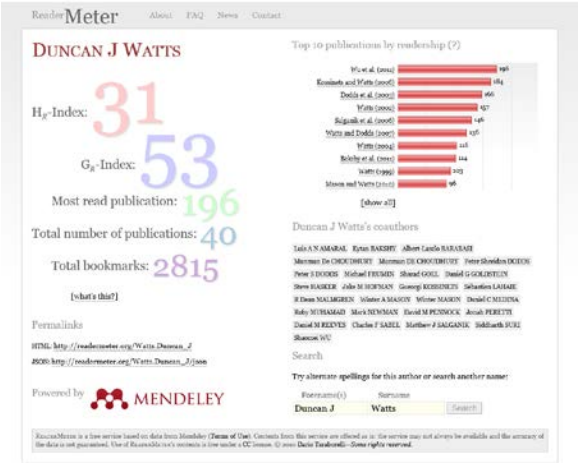

Figure 8. An Example of an Author Profile in ReaderMeter

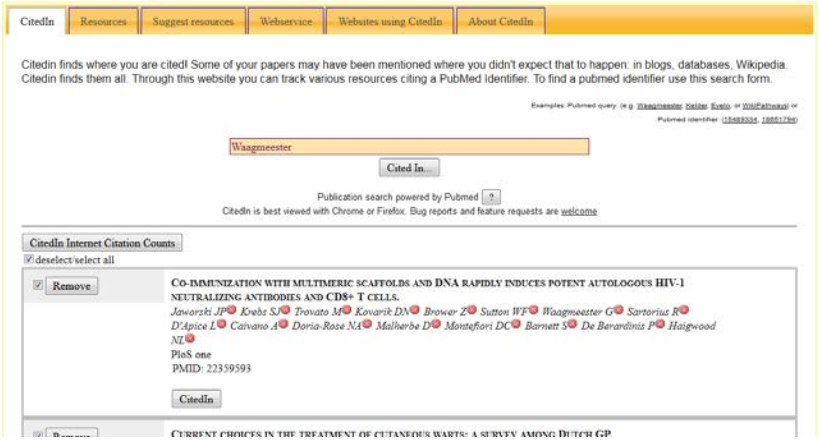

Figure 9. An Example of an Author Profile in CitedIn

Next Steps

In the past year, the idea of altmetrics has gained a lot more traction in the scientific community, but a lot of work still needs to be done. This includes further addition of data sources; advocacy and outreach to funders, publishers, authors, and librarians; building convincing use cases; working on best practices shared among the providers of altmetrics data; and convincing the remaining skeptics in the publishing industry of the use of altmetrics. The landscape of dissemination and evaluation channels for researchers is constantly evolving and altmetrics will also evolve.

References

Altmetric.com. (n.d.). Retrieved from http://www.altmetric.com/

Altmetrics Manifesto. (n.d.). Retrieved from http://altmetrics.org/about/

CitedIn. (n.d.). Retrieved from http://citedin.org/

Hull D., Pettifer S. R., & Kell D. B. (2008). Defrosting the digital library: Bibliographic tools for the next generation web. *PLoS Comput Biol, 4*(10), e1000204. http://dx.doi.org/10.1371/journal.pcbi.1000204

ImpactStory. (n.d.). Retrieved from http://impactstory.org/

Mendeley. (n.d.). Retrieved from http://www.mendeley.com/

Mendeley Developers Portal. (n.d.). Retrieved from http://dev.mendeley.com/api-binary-battle/

MESUR. (n.d.). Retrieved from http://mesur.informatics.indiana.edu

Plum Analytics. (n.d.). Retrieved from http://www.plumanalytics.com/

PLOS Article-Level Metrics. (n.d.). Retrieved from http://article-level-metrics.plos.org/

PLOS. (n.d.). ALM Development. Retrieved from https://github.com/articlemetrics

Priem, J., Taraborelli, D., Groth, D., & Neylon, C. (2010). Altmetrics: A manifesto, (v.1.0), 26 October 2010. Retrieved from http://altmetrics.org/manifesto

ReaderMeter. (n.d.). Retrieved from http://readermeter.org/

ScienceCard. (n.d.). Retrieved from http://sciencecard.org/