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## An Annotated Bibliography of selected articles on Altmetrics.

Marinus Swanepoel, David Scott, Vanja Spiric and Deanna Foresster

Abbott, A., Cyranoski, D., Jones, N., Maher, B., Schiermeier, Q., & Van Noorden, R. (2010). Metrics: Do metrics matter? *Nature*, 465(7300), 860–862.  
<http://doi.org/10.1038/465860a>

This article is an interesting summary on the usage of metrics data within academia. Not limited to dissemination of material (as often seems to be the case) but instead, the focus is on using metrics as indices of job performance, career advancement, and academic worth. The article pits perception against reality in that respondents are asked if they believe that their institution is using metrics as a tool and additionally, institutions were asked if they do, in fact, use metrics as a tool when evaluating faculty. The only measures in which perception and application seem to line up are economic ones (Salary decisions and allocation of funding). This article does not specify altmetrics versus traditional metrics, however, an argument could be made paralleling the two and it may be worthwhile to ask administrators, chairs, etc. if altmetrics are starting to play a role in institutional decision making.

Adie, E. (2013). Altmetrics in libraries and institutional repositories. Retrieved April 17, 2014, from <http://www.altmetric.com/blog/altmetrics-in-academic-libraries-and-institutional-repositories/>

This entry addresses the Altmetric tab plugin and its use within institutional repositories, by using the example of Ex Libris. The data that is being generated in this way is unified – it reflects the altmetrics data for the published version, as well as for the deposited one. The following limitations of this plug in are listed:

- The domain is needed in order to track this data, otherwise the plug in will only reflect attention paid to the published version
- It can only track items with a DOI number or other scholarly identifier (SSRN, arXiv, PubMed, etc.)
- The results only reflect the coverage starting from July 2011
- It does not include citation counts

This service is free for individual librarians.

Adie, E., & Roe, W. (2013). Altmetric: Enriching scholarly content with article-level discussion and metrics. *Learned Publishing*, 26(1), 11–17.  
<http://doi.org/10.1087/20130103>

Adie and Roe outline the services offered by Altmetric, a company based out of London, UK. Altmetric aggregates, curates, and presents qualitative and

quantitative data on how scholarly articles have been downloaded, shared, and discussed online. It gathers information from non-traditional sources, including blogs and social media networks such as Facebook, Twitter, and Google Plus.

By looking to these sources, Altmetric may offer an understanding of the reception and impact of an article in non-formal contexts and among non-scholarly audiences—information that citation counts and journal impact factors are unable to provide.

Adie and Roe also discuss Altmetric's approach, philosophy, and business model, as well as some of the technical challenges the recent start-up has faced.

Alhoori, H., Furuta, R., Tabet, M., Samaka, M., Fox, E. A., & H. Alhoori, R. Furuta, M. Tabet, M. Samaka, and E. F. (2014). Altmetrics for Country-Level Research Assessment. In J. A., R. E., & T. K. (Eds.), *16th International Conference on Asia-Pacific Digital Libraries* (Vol. 8839, pp. 59–64). SER, Dept. Of Computer Science and Engineering, Texas A&M University College Station, United States: Springer Verlag. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-84909638339&partnerID=40&md5=912f93f6c8b48ba27b325016d2908347>

Alhoori et al. examine the value of altmetrics in evaluating research productivity at a national level. Altmetrics data on over 76 000 articles published in 35 developed and developing countries were studied. Data was gathered from Facebook, Twitter, mainstream news outlets, blogs, and Google Plus.

The authors find that on the article level, although there are weak correlations between citations and altmetrics, the latter “measure a social impact that is different from scholarly impact.” They also note that altmetrics are helpful to determine early impact, as references to articles in social media appear more quickly than do citations in scholarly literature. In addition, they confirm others' observations that altmetrics figures (i.e. the number of references to articles online) is increasing.

On the national level, the study finds a strong correlation between citations coverage and altmetrics coverage. It also finds significant relationships between country-level altmetrics and number of publications, h-index, and gross domestic expenditure on research and development (GERD). The authors conclude that altmetrics can be useful in the assessment of a country's scholarly productivity.

Allen, H. G., Stanton, T. R. R., Di Pietro, F., & Moseley, G. L. (2013). Social media release increases dissemination of original articles in the clinical pain sciences. *PloS One*, 8(7), e68914. <http://doi.org/10.1371/journal.pone.0068914>

Blind randomized repeated measures experiment rather than just data mining.

Does the social media release of an original research article in the clinical pain sciences increase viewing and downloads of the article (increased dissemination)? Four researchers in the group were each randomly (kind of) assigned four original PLOS ONE research articles that they subsequently wrote a 500-word blog on. The blog included a link to the original article. The blogs were then posted online via ResearchBlogging, Facebook, Twitter, and LinkedIn. The outcome variables of interest were the rate of HTML views and PDF downloads over a seven-day period. Again, the researchers found a spike in both outcome variables in the week following the blog post and the social media release. But, the effect is not long lasting.

Annarita Barbaro, Donatella Gentili, C. R., Barbaro, A., Gentili, D., Rebuffi, C., & Annarita Barbaro, Donatella Gentili, C. R. (2014). Altmetrics as new indicators of scientific impact. *Journal of the European Association for Health Information and Libraries*, 10(1), 2012–2015. Primer. Retrieved from [http://www.eahil.eu/journal/journal\\_2014\\_vol10\\_n1.pdf](http://www.eahil.eu/journal/journal_2014_vol10_n1.pdf)

As scholars turn increasingly to online forums outside the traditional sphere of academic literature to share and discuss their research, new measures of scholarly impact are being developed to complement existing metrics. This article discusses the trends, opportunities, and challenges presented by these new measures, called altmetrics.

The benefits ascribed to altmetrics are numerous. First, altmetrics offer a real time measure of research impact. The influence of a particular paper may be determined long before citation counts begin to indicate its impact. Second, altmetrics cover many different types of research output, such as datasets, conference proceedings, and slides. Third, altmetrics can measure the influence of research among the public and not only among scholars. Finally, some of the data harvested, such as readership in Mendeley and Zotero, are reliable indicators of active interest—arguably more so than download statistics.

On the other hand, critics of altmetrics point out that they can be manipulated by publishers. Moreover, references in social media networks do not necessarily reflect research quality. Some research receives more attention because the public finds the topic interesting or controversial. Also, there is little standardization across altmetrics, making them difficult to compare. Lastly, as new social media platforms are created and gain popularity, existing altmetrics may become obsolete.

Ayre, L. (2013, August 22). Libraries can embrace the use of altmetrics as a means to strengthen the functionality of institutional repositories. Retrieved October 30, 2014, from [http://eprints.lse.ac.uk/51834/1/blogs.lse.ac.uk-Libraries\\_can\\_embrace\\_the\\_use\\_of\\_altmetrics\\_as\\_a\\_means\\_t....pdf](http://eprints.lse.ac.uk/51834/1/blogs.lse.ac.uk-Libraries_can_embrace_the_use_of_altmetrics_as_a_means_t....pdf)

The author of this blog post is the manager of the institutional repository LSE Research Online, which has recently added an altmetrics tool to measure how LSE research is being used. Ayre recognizes the value of altmetrics in providing alternative measurement of impact, as well as in enhancing functionalities of institutional repositories.

Barbaro, A., Gentili, D., & Rebuffi, C. (2014). Feature Article Altmetrics as new indicators of scientific impact. *Journal of the European Association for Health Information and Libraries*, 10(1), 2012–2015.

As scholars turn increasingly to online forums outside the traditional sphere of academic literature to share and discuss their research, new measures of scholarly impact are being developed to complement existing metrics. This article discusses the trends, opportunities, and challenges presented by these new measures, called altmetrics.

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Bar-Ilan, J., Haustein, S., Peters, I., Priem, J., Shema, H., & Terliesner, J. (2012). Beyond citations: Scholars' visibility on the social Web, 14. *Digital Libraries; Physics and Society*. Retrieved from <http://arxiv.org/abs/1205.5611>

Provides a good overview of “altmetrics”, including definition, aim, and the impact altmetrics may have on scholarly communication. Authors identify their sample by using presenters (n = 57) from the 2010 STI conference in the Netherlands to address their main research questions – 1) is basic information on those presenters found easily on the Internet? - Authors report basic frequency data on their sample, however, this may no longer be accurate (of the first four authors listed in

Table 1., three report no twitter page, however a quick Google search reveals that at least two of the three now do have Twitter accounts), and is certainly unlikely to be representative of academia in general. 2) Do altmetrics data correlate with traditional metrics? Partial (weak to medium) correlations between citation (traditional metrics) and bookmarks (altmetrics) were found suggesting some relationship between the two. However, without further information it is impossible to speculate on the nature of that relationship (it could just be a byproduct of some underlying variable).

Bar-Ilan, J., Sugimoto, C., Gunn, W., Haustein, S., Konkiel, S., Lariviere, V., & Lin, J. (2013). Altmetrics : Present and Future – Panel. In *ASIS&T SIG/MET* (pp. 2010–2013).

This panel intends to present data that suggests that altmetrics can be a useful tool for people from various areas (librarians, researchers, publishers). Although this publication is just an introduction to the topic of interest for this panel and the credentials of the participants...it would be interesting to track down a transcript from the panel discussion and hear how the experts respond to some of the questions about visibility, challenges, and usefulness...

Barnes, C. (2015). The Use of Altmetrics as a Tool for Measuring Research Impact. *Australian Academic & Research Libraries*, 46(2), 1–14.  
<http://doi.org/10.1080/00048623.2014.1003174>

This article provides comprehensive critique by examining some common claims about altmetrics and their validity. In particular, Barns scrutinizes the evidence behind claims that altmetrics allow the impact to be measured in short period of times and he concludes that the correlations between altmetrics scores and citations are relatively weak. The author reviews rich body of literature that claim this correlation, and locates common problems with these studies:

- Vast number of studies rely on Person's correlation coefficient, and Barns finds that this tool is not a proper one to use, as altmetrics scores show skewed distribution (most articles are cited very rarely or never);
  - Generalizability of studies that look at mentions on social media is in question, as they exclude articles with zero altmetrics scores;
  - Altmetric studies usually compare altmetric scores and citations for period of 2-4 years post-publications, while for most fields citations occur within 10 years;
- Furthermore, Barns points out that proponents of altmetrics do not provide unambiguous definition of impact, but offer loose explanations about what is that altmetrics measures. Finally, Barns suggests that it is likely that altmetrics does not measure impact of research, but its consumption.

Bik, H. M., & Goldstein, M. C. (2013). An introduction to social media for scientists. *PLoS Biology*, 11(4), e1001535. <http://doi.org/10.1371/journal.pbio.1001535>

This PLOS Biology publication is a great read. I think that one of the interesting points that the authors raise is the idea that social media tools can be invaluable but only if scientists (etc...) know how to use them. Additionally, the authors stress the (relatively new) importance and benefits to having an online presence (including but not limited to research dissemination). The article also speaks to the growing need for scientific institutions to provide formalized training for students and faculty to learn how to use the new technology effectively. In short, this article speaks to the growing need to develop an online presence and how to navigate through the options that are available ending with a suggestion that academic and scientific institutions need to change with the evolving social media landscape and that these institutions should begin to adopt formalized training for those individuals interested in utilizing the new media platforms.

I found this article very interesting and it offers a very compelling argument for the adoption of social media as a platform for research dissemination. It might be useful to use with potential participants to 'win them over' if they are resistant to the idea of social media adding any value to their scholarly work.

Bollen, J., Van De Sompel, H., Smith, J. A., & Luce, R. (2005). Toward alternative metrics of journal impact: A comparison of download and citation data. *Information Processing and Management*, 41(6), 1419–1440.  
<http://doi.org/10.1016/j.ipm.2005.03.024>

A group of researchers examined a set of alternative metrics of journal impact by using social network approach. They take a closer look at structural aspects of impact that frequentist metric such as ISI IF cannot capture: whether journals which receive citations mostly from high impact journals also have high impact?; does a journal that contains a high number of out-going citations functions as a “hub” in the citation graph and thereby have higher impact than the number of its in-coming citations alone would indicate? Furthermore, they note that ISI IF cannot capture web based publications and that it looks at the global impact, while neglecting local community. The authors demonstrate that valid networks of journal relationships can be derived from reader downloads. This way of measuring is reader-centered, structural, and indicates local impact of journal. The authors are making an argument that structural metrics can reveal different, local, perspective of journal impact.

Bornmann, L. (2014b). Validity of altmetrics data for measuring societal impact : A study using data from Altmetric and F1000Prime. *Journal of Informetrics*, 8(4), 935–950. Digital Libraries. <http://doi.org/10.1016/j.joi.2014.09.007>

Bornmann’s research looks at the impact of research beyond the realm of science;

his research uses 1082 articles from the F1000 dataset, which is a post-publication peer review system of articles from biological and medical journals. Five thousand experts worldwide reviewed and evaluated articles using ratings (Good (1), Very Good (2), Exceptional (3)), recommendations and tags (e.g. “new finding”, “good for teaching”, “controversial”, etc.). Bornmann’s study is focused on the four altmetrics: Facebook, Figshare, Mendeley, and Twitter in order to determine how they relate to tags and ratings assigned by experts in F1000 dataset. The results indicate that the tag “good for teaching” corresponds to the number of mentions on Facebook and twitter, meaning that the Facebook and Twitter can indicate which papers are of interest for wider audience. Furthermore, Mendeley users are prone to save the article when it introduces new practical or theoretical technique, and “new finding” tag has significant number of Facebook shares. The author argues while Facebook and Twitter can be useful in determining some kind of societal impact (the author does not clearly define this term), Figshare and Mendeley cannot be of a great help in that respect.

Bornmann, L. (2015). Usefulness of altmetrics for measuring the broader impact of research. *Aslib Journal of Information Management*, 67(3), 305–319. JOUR. <http://doi.org/10.1108/AJIM-09-2014-0115>

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Bosch, S., & Henderson, K. (2014). Steps down the evolutionary road: altmetrics, open access, article-level measures, and unlimited models are some of the trends impacting serials use and pricing. *Library Journal*, (7), 32. Retrieved from <http://0-search.ebscohost.com.darius.uleth.ca/login.aspx?direct=true&db=edsglr&AN=edsgcl.364439028&site=eds-live&scope=site&scope=cite>

This article does not discuss altmetrics, rather, it focuses on financial conditions in



publishing and libraries after 2008.

Buschman, M., & Michalek, A. (2013). Are Alternative Metrics Still Alternative? *Bulletin of the Association for Information Science and Technology*, (April/May). Retrieved from [http://www.asis.org/Bulletin/Apr-13/AprMay13\\_Buschman\\_Michalek.html](http://www.asis.org/Bulletin/Apr-13/AprMay13_Buschman_Michalek.html)

Type: Bulletin entry – authors are founders of Plum Analytics

The use of citation counts as a measure of academic research faces some significant challenges, including self-citation, the fact that it takes long time for an article to acquire citations, manipulations of citations performed by journals, among others. Moreover, citations leave out the mentions outside of journal articles, while, according to some sources, citations counts only represent less than 1% of usage. The authors recognize so called alternative metrics as available, abundant, and essential. They argue that researchers could benefit from evidence regarding their interaction in the scholarly community when competing for funding opportunities. The funding bodies could also use these data to inform their decisions in a timely and holistic way. Exclusion of negative results from major scientific journals motivates researchers to present their results in non-traditional venues, such as blogs, and new metrics captures data generated in this way and attention they earn. Furthermore, additional content is being published outside of journals, and the metrics that captures that interaction could motivate researchers to share their data. Another benefit the authors try emphasize is moving from journal-centered to person-centered metrics.

Careless, J. (2013). Altmetrics 101: A Primer. (cover story). *Information Today*, 30(2), 1–36.

This short, non-refereed article presents altmetrics as a novel and controversial measure of scholarly impact. Proponents of altmetrics claim that traditional metrics no longer adequately represent the influence of academic work. Alternative metrics, or altmetrics, must fill the gaps that have appeared with the advent of Twitter, Facebook, and other online forums. They also indicate scholarly impact more quickly than do traditional metrics.

Conversely, opponents of altmetrics assert that they lack rigor and reliability; being unregulated and subject to manipulation, they should not be considered sound measures of impact.

The article concludes suggesting that “what is really up for grabs is not whether altmetrics will take hold (because its ascendance is inevitable) but the usefulness, quality, and fairness of the information collected using altmetrics.” It will require an array of metrics to accurately determine scholarly impact as academic literature is disseminated by an increasingly diverse range of traditional and non-traditional

means.

Cave, R. (2012). Overview of the Altmetrics Landscape. In *Charleston Library Conference*. Purdue University. <http://doi.org/10.5703/1288284315124>

This one is pretty straightforward, it's exactly as the title states, an overview and a history of the term "altmetrics" coined by PhD student Jason Priem. The great thing about this presentation is that it discusses how altmetrics are calculated and provides some fantastic models that make the calculations easy to understand. This presentation also breaks down the different types of web sources that are available that collect altmetric information. This could be an excellent source to refer to.

Colquhoun, D., & Plested, A. (2014). Why you should ignore altmetrics and other bibliometric nightmares. Retrieved from <http://www.dcsience.net/?p=6369>

Type: Blog post

Colquhoun and Plested argue strongly against the use of bibliometrics, and they provide arguments which question the value of altmetrics within scholarly communication. Their main objection is that bibliometrics, and altmetrics as one its type, do not consider the content of papers. In order to demonstrate the problems in regards to altmetrics, the authors analyze the list of 100 papers with the highest altmetrics scores in 2013, and they found that the articles ranked on that list are not high quality papers, and that researchers, and even publishers active on social networks tend to misrepresent the content of the papers. They conclude their discussion on bibliometrics by saying that "most metrics, and especially altmetrics, are indeed an ill-conceived and meretricious idea". Finally, the authors offer some suggestions for improving scholarly communication, including post publication peer review, which is already present within some platforms, and focusing on on-online publishing.

This article fostered lively discussion on the web, both in the comments section, on the web (e.g. The Scholarly Kitchen blog) and in other media (e.g. Economist).

Costas, R., Zahedi, Z., & Wouters, P. (2014). Do "altmetrics" correlate with citations? Extensive comparison of altmetric indicators with citations from a multidisciplinary perspective. *Journal of the Association for Information Science and Technology*, n/a-n/a. Digital Libraries. <http://doi.org/10.1002/asi.23309>

In this particularly informative article, Costas, Zahedi, and Wouters present the results of their study of metrics for over 700 000 publications in a range of disciplines. They used altmetrics indicators provided by Altmetric.com and compared these to citation counts in Web of Science. Their main findings are as follows:

- Altmetric indicators remain low, with less than a quarter of publications presenting altmetric activity.
- Publications in the social sciences, humanities, and medical and life sciences show the highest altmetric figures. Conversely, publications in mathematics, computer science, engineering, and the natural sciences tend to see the least altmetric activity.
- Recent publications generally show more altmetric activity than older ones.
- There is a positive but weak correlation between altmetrics and citation counts. This suggests that they do not reflect the same kind of impact.
- Altmetrics generally, but not always, identify highly cited publications more accurately than do journal citation scores.

Crotty, D. (n.d.). Altmetrics: Mistaking the Means for the End. Retrieved from <http://scholarlykitchen.sspnet.org/2014/05/01/altmetrics-mistaking-the-means-for-the-end/>

Type: Blog post

David Crotty cautions scholars to bear in mind that altmetrics, which is synonymous with attention metrics does not measure quality and value, and thus, its use in making decisions like career advancements and funding should be restricted. Furthermore, he is concerned that the usage of altmetrics in performance assessment could change behavior of researchers to maximize their performance of that metric. The distinction between attention and impact is the one we need to bear in mind, so that we do not end up drawing attention to one self instead of producing valuable research. In general David Crotty is skeptical about proposals which reward researchers for doing things other than research. However, Crotty does not reject the use of altmetrics in scholarly communication, as long as it is not used as a replacement for measurements of quality. He ends his entry with a metaphor: “measuring attention tell us how well the movie did at the box office, when what we really want to know is whether it is any good.”

Crotty, D. (2013, October). Driving Altmetrics Performance Through Marketing — A New Differentiator for Scholarly Journals? | The Scholarly Kitchen. Retrieved from <http://scholarlykitchen.sspnet.org/2013/10/07/altmetrics-and-the-value-of-publicity-efforts-for-journal-publishers/>

This article examines some of the negative ways in which altmetrics can be manipulated in order to ‘game’ the system. In the same way that bibliometrics can be gamed (is gamed all the time) altmetrics can also be manipulated to create false

or misleading results. Individuals could potentially, buy tweets (in the same way that companies buy advertising), or buy 'likes' on Facebook, etc. The result would be a falsely inflated altmetric score and making the index a somewhat useless tool. The author suggests that if altmetrics are factored into institutional administrative or funding decisions, then marketing strategies will "ramp up", encouraging faculty to use questionable methods to inflate their scores. These marketing campaigns could potentially change the face of academia and essentially change 'peer review' to 'marketing review' favoring larger, more powerful publishing companies. However, the author points out that what marketing and social media can't manipulate is quality. He uses a great line saying that "quality remains the hole in the altmetrics donut" and that without quality, altmetrics may never take on the central role that many are seeking.

Another great quote from this article (secondary source) "Remember that the altmetric score measures attention, not quality"

Ebrahim, N. A., Salehi, H., Embi, M. A., Tanha, F. H., Gholizadeh, H., & Motahar, S. M. (2014). Visibility and Citation Impact. *International Education Studies*, 7(4), 120–125. <http://doi.org/10.5539/ies.v7n4p120>

This paper is quite nice in that it emphasizes "visibility" which is really what social media is all about. The authors are interested in whether the visibility of scholarly work has any impact on the number of citations that particular article receives. Using two case-studies, the authors demonstrates how altmetrics and bibliometrics are not mutually exclusive. The more visibility (social media attention - altmetrics) a piece of scholarly work receives, the more citations it also receives (directly affecting journal impact factor and h-index – traditional metrics). This further supports the work done by Bar-Ilan, Haustein, Peters, Priem, Sherma, et al., (2012) who found a moderate correlation between traditional metrics and altmetrics.

The number of publications is the first criteria for assessing a researcher output. However, the main measurement for author productivity is the number of citations, and citations are typically related to the paper's visibility. In this paper, the relationship between article visibility and the number of citations is investigated. A case study of two researchers who are using publication marketing tools confirmed that the article visibility will greatly improve the citation impact. Some strategies to make the publications available to a larger audience have been presented at the end of this paper.

Editorial: Alternative metrics. (2012). *Nature Materials*, 11(November), 2012.

This article differentiates between shorter-term and longer-term metrics. The shorter-term metrics include likes, tweets, blog posts, and they have a short life

span and reflect the transient nature of popularity. On the other hand, longer-term metrics, such as the number of downloads and readers, comment numbers may be more meaningful. While this article recognizes altmetrics as a valuable tool in suggesting what topics are represented, it notes that tools that rely on social media fail short when it comes to indication of quality. The author notes that “although spontaneous reviews from readers and novel altmetrics are welcomed complementary evaluation tools, they will not replace a thorough scientific quality assessment of papers and scientists through a selected-expert peer review any time soon” (p.907).

Galligan, F., & Dyas-correia, S. (2013). Altmetrics: Rethinking the Way We Measure. *Serials Review*, 39(1), 56–61. <http://doi.org/10.1080/00987913.2013.10765486>

This relatively lengthy article offers insight into a wide range of issues surrounding the advent and continued development of altmetrics. Galligan and Dyas-Correia begin with a few early definitions of altmetrics, then describe their relationship to traditional metrics. Altmetrics, they explain, measure scholarly impact on blogs, social networking websites, and collaboration tools. They provide metrics relatively quickly at the article-level. Major altmetric tools at the time of writing are identified as Plum Analytics, CitedIn, ReaderMeter, ScienceCard, ImpactStory, Altmetric.com, PLoS Impact Explorer, and Paper Critic.

Using altmetrics, librarians can help faculty understand and build their scholarly impact. Librarians may also find that altmetrics can inform collection development decisions, the authors assert. In addition to faculty and librarians, publishers, the government, and funding bodies may find altmetrics informative.

Galligan and Dyas-Correia suggest that altmetrics will complement traditional impact measures and may in time outright replace them with future changes in formal scholarly publication trends. In addition, they consider how altmetrics might come to shape the peer-review process and open access publishing.

Finally, the authors identify further work that needs to be done to improve altmetrics, as well as some of the criticisms that have been leveled at them. These points are generally the same as those offered by a number of other articles.

Haines, L. L., Light, J., O'Malley, D., & Delwiche, F. A. (2010). Information-seeking behavior of basic science researchers: implications for library services. *Journal of the Medical Library Association : JMLA*, 98(1), 73–81. <http://doi.org/10.3163/1536-5050.98.1.019>

This article reports on a qualitative study using semi-structured that was conducted in order to examine information-seeking behavior of basic science researchers. This research does not address altmetrics directly, rather, it discusses researcher's

behavior and preferences in regard to using databases, and search techniques. Its value for the altmetrics study might be in regards to recruiting and interviewing strategies. This study can also be used as an example of the use of interviews in order to disseminate information and educate researchers.

Halliday, J., Konkiel, S., & Adie, E. (2013). Implementing an altmetrics reporting service into DSpace using Altmetric. com. *Open Repositories July 8 - 12, 2013*. Retrieved from [https://www.scholarworks.iu.edu/dspace/handle/2022/16667\nhttp://or2013.net/sites/or2013.net/files/slides/OR13\\_altmetric\\_jh.pdf](https://www.scholarworks.iu.edu/dspace/handle/2022/16667\nhttp://or2013.net/sites/or2013.net/files/slides/OR13_altmetric_jh.pdf)

The authors of this essay suggest that libraries are in a position to facilitate informed dialogue concerning altmetrics on campus, including researchers as well as administrative staff. In order to do so, librarians should inform themselves on the growing body of peer-review research on altmetrics, with paying the special attention to the concept of “impact flavors”, which refers to distinctive patterns in the impact of individual product. Furthermore, the discussions about correlations between altmetrics and traditional citations are emphasized as important. Librarians are also advised to learn about the available altmetrics tools, such as ImpactStory and PlumX. The authors encourage librarians to disseminate knowledge about altmetrics and support its use, while being cautious about limitations of the tools that are in the early stages of its development.

Hammarfelt, B. (2014). Using altmetrics for assessing research impact in the humanities. *Scientometrics*, (18 March), 12. <http://doi.org/10.1007/s11192-014-1261-3>

This article reports on the research that focuses on the altmetric coverage and impact of humanities-oriented articles and books published by Swedish universities in 2012. The author used a database called SwePub, which contains publications data from 30 Swedish universities, and the sample includes 310 journal articles and 54 books. The author lists the possible benefits usually associated with altmetrics (diversity in regards to materials, the shorter period of time needed for altmetric data to be available, openness in terms of methods, accessibility, and the fact that altmetrics measures judgment that goes beyond scholarly impact), pointing out that those characteristics especially important for the research in the field of humanities. The limitation in terms of defining humanities is acknowledged in this article, and it may contribute to the discussion regarding academic disciplines and difficulties concerning classification of fields. When discussing the research finding, Hammarfelt points out that the scholars might be in danger of equating impact with promotion. Namely, many of the Twitter mentions of the books were results of publisher’s promotion strategies.

Haustein, S., Peters, I., Bar-Ilan, J., Priem, J., Shema, H., & Terliesner, J. (2014). Coverage and adoption of altmetrics sources in the bibliometric community. *Scientometrics*,

1–19. <http://doi.org/10.1007/s11192-013-1221-3>

This study addresses the potential of altmetrics by looking at the use of altmetrics and its sources and indicators in the bibliometric community. This study contributes to the existing literature on altmetrics by exploring who is using social media and for which purpose. Literature and web presence search and a survey among conference participants were conducted in order to address two sets of questions: to what extent are bibliometric papers present on bibliographic databases and social reference managers; and to what extent are bibliometricians present on social media platforms? The findings of this study indicate that bibliometric literature is well represented on Mendeley (82% of documents were included in Mendeley libraries). Also, this study found that bibliometricians rely on LinkedIn for establishing connections with their colleagues, while use of Google Scholar Citations is growing. Half of the participants surveyed at the 2012 STI conference in Montreal indicated that social media affects their professional lives. However, due to the specific sample, the results of this study are not generalizable, and the potential of this study is limited.

Holmberg, K. (2014). The Meaning of ... Altmetrics Humanities and Social Science Research. In *2014 IATUL PROCEEDINGS*. Helsinki. Retrieved from <http://docs.lib.purdue.edu/iatul/2014/altmetrics/1/>

This is more of a presentation on Altmetrics than a paper. However, it may be very useful to use as supplementary material when recruiting potential interviewees. Instead of providing them with an information packet that relies on them making the time to read, this might be more appealing in that it's just the bullet points, it's something a little different (different medium or communicate message), and it's already quite polished.

If nothing else, contained within this presentation are some really good figures demonstrating the impact of social media on particular audiences and on particular domains of research (figures include citations).

Holmberg, K., & Thelwall, M. (2014). Disciplinary differences in Twitter scholarly communication. *Scientometrics*. <http://doi.org/10.1007/s11192-014-1229-3>

This article reports on a research that examines disciplinary differences in using Twitter for the purposes of scholarly communication. This research focuses on three questions: 1. What do researchers typically tweet about? 2. How are researchers in different disciplines using Twitter for scholarly communication? 3. Are there disciplinary differences in the types of tweets sent by researchers? The disciplines that were included in the studies are: astrophysics, biochemistry, digital humanities, economics, history of science, cheminformatics, cognitive science, drug discovery, social network analysis, and sociology. A convenience sample was used

to identify the researchers, and the researchers' communication via Twitter was monitored between March 4, 2012 to October 16, 2012, the results were then analyzed statistically and 200 tweets were randomly selected for qualitative analysis. The results indicate that there are differences among disciplines in regards to type of tweets that were published. Some researchers, such as biochemists prefer to use retweets, the researchers in the field of digital humanities and cognitive science use Twitter for conversations, whereas economists were more prone to share links. The researchers' behavior on Twitter also differs in regards to the percentage of tweets that are discipline-relevant, with economists that produce the largest portion of the tweets that are discipline-specific, while sociologists dedicate only 5% of tweets to their disciplines. The authors suggest that the researchers may be using Twitter for popularizing science, more likely than as a tool for scholarly communication. This research has many limitations, including small sample (24-52 researchers per discipline), the limitations that are associated with convenience sample, as well as the problems regarding classification of disciplines.

Konkiel, S. (2013a). 1 Altmetrics: a 21 century solution to determining research quality. *Online Searcher*, (August), 1–8.

This non-refereed article argues that altmetrics may complement usage statistics and traditional impact measures to help librarians determine the value of scholarly journals. Konkiel discusses the advantages and disadvantages of altmetrics and traditional metrics, finding that while no single metric is infallible, used together, they are a helpful indicator of quality academic research.

Traditional metrics, such as the journal impact factor and citation counts, have long been viewed as among the most reliable, objective measures of scholarly impact. Critics, however, have pointed out that these metrics are susceptible to gaming, and that high numbers of citations do not necessarily reflect research quality. Moreover, citations take time to accrue, and so these traditional measures are unhelpful in determining the impact of recently-published work. Finally, these metrics do not consider non-traditional forms of scholarly communication, including preprints, conference presentations, and datasets.

Altmetrics have their own drawbacks. There is no authoritative list of which specific measures comprise altmetrics, and the most important measures change as the popularity of various content platforms and social media websites changes. In addition, perhaps even more than traditional metrics, altmetrics can be gamed, and high figures do not equal academic quality. On the other hand, unlike traditional metrics, altmetrics are much speedier and measure impact in a variety of forms of non-traditional scholarly communication.

Five general categories of altmetrics are identified: shares, saves, reviews,



adaptations, and social usage statistics.

Konkiel, S. (2013b). Tracking citations and altmetrics for research data: Challenges and opportunities. *Bulletin of the American Society for Information Science and Technology*, 39(6), 27–32. <http://doi.org/10.1002/bult.2013.1720390610>

This article mainly discusses the difficulties with measuring the impact of citations and resulting from that, the difficulties with journal impact factor as a reliable metric for...anything. Additionally, the authors make a good point that some alternative metrics can be just as problematic. For example...tracking the downloads of an article doesn't necessarily tell us anything about the reuse (citations) of that article. It doesn't even tell us if the article has been read at all. The authors suggest alternatives to the existing methods for tracking impact of data/articles. However, they stress that one of the largest obstacles will be standardizing citations and getting those involved with scholarly activities (primarily researchers) on-board. Researchers, who could benefit the most from a standardized, reliable, and valid system, appear to be the most difficult to 'manage'.

Kortelainen, T., & Katvala, M. (2012). “Everything is plentiful—Except attention”. Attention data of scientific journals on social web tools. *Journal of Informetrics*, 6(4), 661–668. <http://doi.org/10.1016/j.joi.2012.06.004>

Using the 2010 journal impact factor (JIF), the top scholarly journals from multiple research domains such as applied physics, computer science, evolutionary biology, and educational research, etc. were identified (n=100). Multiple social media sites were accessed soon after the web sites of the identified journals were visited and 'attention' to the journals was identified.

To be honest...this paper is kind of terrible. The methodology is really sketchy and not explained in a way that makes it understandable nor replicable. Also...their explanation about types of attention is really off the wall. They speak in a very Cartesian manner about the brain and the mind (as though they are separate entities) and...it really doesn't make a lot of sense.

I'd steer clear of this article if it were me. It seems kind of sketchy and I wouldn't put much confidence in any of their findings...

Lapinski, S., Piwowar, H., & Priem, J. (2013). Riding the crest of the altmetrics wave: How librarians can help prepare faculty for the next generation of research impact metrics. *arXiv*, 4. Digital Libraries. Retrieved from <http://arxiv.org/abs/1305.3328>

The authors of this essay suggest that libraries are in a position to facilitate informed dialogue concerning altmetrics on campus, including researchers as well

as administrative staff. In order to do so, librarians should inform themselves on the growing body of peer-review research on altmetrics, with paying the special attention to the concept of “impact flavors”, which refers to distinctive patterns in the impact of individual product. Furthermore, the discussions about correlations between altmetrics and traditional citations are emphasized as important. Librarians are also advised to learn about the available altmetrics tools, such as ImpactStory and PlumX. The authors encourage librarians to disseminate knowledge about altmetrics and support its use, while being cautious about limitations of the tools that are in the early stages of its development.

Lapinski Scott P. (2013). *Altmetrics: Conversations, Situations & Realizations*. In *Altmetrics: Help Your Researchers Measure Their Full Impact*. CONF, Boston, MA.

This Power Point presentation is created by Scott Lapinski, who is a Digital Resource Librarian at Harvard Medical School. The presentation contains screenshots of various different altmetrics-related online tools. However, the presentation itself not rich in content, it does not contain original text and it does not provide substantive information, so it is difficult to assume the main points of the presentation.

Lin, J., & Fenner, M. (2013). *Altmetrics in Evolution : Defining and Redefining the Ontology of. ISQ : Information Standards Quarterly, 25(2), 20–26*. JOUR. <http://doi.org/10.3789/isqv25no2.2013.04>

Lin and Fenner discuss classification in altmetric measures which would helped them build more useful and better defined tools for representing altmetric data in The Public Library of Science (PLOS). They developed a systemized classification that preserves diversity in altmetrics, while creating more sophisticated tools that accommodate future development of altmetrics. The classification that they proposed can be used by various groups: researchers, funders, institutions and publishers. The guiding principles for the classification were the following: each metric can be placed in only one group; the grouping accommodates future development of metrics; the grouping should cluster the metrics that share temporality, correlation of activity to other metrics, and correlation of native format; and finally, not all metrics for the grouping would be represented together in every aggregate. Classification of existing metrics caused many difficulties, so finally, the authors focused on the purpose and nature of measurement. Once they analyzed available data by looking at the level of engagement, the following groups emerged: Viewed, Saved, Discussed, Recommended, and Cited. This classification is coherent and it reflects correlations of various metrics. However, it does not capture demographics of the users, so the information who engages with scholarly products is being left out for now, until more sophisticated development of this classification.

Liu, J., & Adie, E. (2013). Five Challenges in Altmetrics : A Toolmaker ' s Perspective. *Bulletin of the Association for Information Science and Technology*, 39(4), 31–35.

This article deals specifically with challenges that users of altmetrics are currently experiencing. 1. What can and should be measured? 2. What sources of data should be used? 3. How can we identify research being discussed? 4. Missing links (how to deal with different versions of the same article on multiple sites with different identifiers) 5. How to interpret the data? Each of these challenges is addressed, however, no concrete way in which to deal with them is suggested. Basically this article says that we need to be more diligent and develop better technology. This article might be useful when discussing the limitations to altmetrics, perhaps in a discussion section of a paper.

Michalek, A. (2013). Altmetrics : Help Your Researchers Measure Their Full Impact. In *Altmetrics: Help Your Researchers Measure Their Full Impact* (pp. 1–39). Boston, MA.

This slideshow presentation, delivered to a librarian audience by a co-founder of Plum Analytics, aims to demonstrate that altmetrics are important in efforts to measure scholarly impact. Michalek lists several of the well-known shortcomings of traditional metrics and suggests that with so much more activity—including scholarly activity—online, altmetrics are needed to more accurately determine impact. PlumX is offered as a provider of such altmetrics.

Five different categories of impact are identified: usage, captures, mentions, social media, and citations. Captures (e.g., bookmarks, favorites, Mendeley readers), mentions (e.g., blog posts, news stories, Wikipedia articles), and social media (e.g., tweets, Facebook shares and likes) comprise altmetrics.

Much of the presentation provides an overview of the workings and capabilities of PlumX. One of the next steps listed for PlumX at the time the presentation was given is to allow article level metrics to be embedded in journal websites and institutional repositories.

Paul-hus, A., Sugimoto, C. R., Haustein, S., & Larivière, V. (2015). Is There a Gender Gap in Social Media Metrics ? Retrieved from <http://www.issi2015.org/files/downloads/all-papers/0037.pdf>

As the title suggests, this article addresses the gender differences that exist in the sciences and questions whether that gender difference may extend to visibility on social media. Using Web of Science as a data source, a sample of papers published in 2012 was selected and citations were counted for one calendar year. To gauge

online visibility, the authors used altmetrics.com data. Visibility and WoS papers were linked using DOI. Any papers without a DOI were excluded from analysis. This in and of itself is problematic because a good proportion of Social Science and Humanities journals do not use DOIs. In order to account for this issue, Arts and Humanities papers were excluded altogether. (Again, problematic, because of the inherent gender difference between Natural Sciences and Social Sciences and Humanities). The manner in which gender of author was attributed is not explained and again, likely is not without issue. The results that are reported are not very clear nor informative. The authors report only the means and do not say whether any variables were controlled for, whether any of the gender differences were significant (eyeballing them most of the differences in mean scores seem negligible). The authors claim that their findings do, in fact, demonstrate a more "gender-balanced portrait" when considering social media metrics versus scientific impact measured by citations however...this seems a very broad claim based on the data and results that they report. Mean scores tell us very little about anything at all...

Piwowar, H., & Priem, J. (2013). The power of altmetrics on a CV. *Bulletin of the American Society for Information Science and Technology*, 39(4), 10–13.  
<http://doi.org/10.1002/bult.2013.1720390405>

Type: Special Section

In this article Piwowar and Priem advocate for inclusion of altmetrics on academic CVs, as long as they are accurate, clear, and meaningful. They identify inclusion of additional information as the primary benefit of altmetrics in academic CVs. Graduate students or recent graduates who would take advantage of altmetrics' timeliness, as it takes long time for citations to appear in academic journals. The authors note that there is a correlation between downloads, bookmarks, and tweets with citations. Altmetrics indicate engagement with public which is crucial for future funding, recruitment, and accountability. Finally, the authors stress that altmetrics need to be considered not as a replacement for expert evaluation, but as a supplement, and they suggest three kinds of interpreting altmetrics data: signaling, highlighting, and discovery. A CV with altmetrics indicates that a scholar is innovative in scholarly communication, and it can help highlight research output that might otherwise go unnoticed. Finally, appropriate altmetrics data can be used by evaluators as a starting point for discovery about who is interested in the research and how they approach it.

Priem, J., Groth, P., & Taraborelli, D. (2012). The altmetrics collection. *PLoS ONE*, 7(11), e48753. <http://doi.org/10.1371/journal.pone.0048753>

Type: Overview

Citations only reflect formal acknowledgments, and they leave out tools that scholars use to interact with the literature. “Altmetrics is the study and use of scholarly impact measures based on activity in online tools and environments” (p.1), and it offers a more exhaustive picture of scholarly communication. However, this tool should be used with certain caution. As well as some other internet tools, altmetrics can be subject to manipulation. This collection includes articles that, among other topics, address statistical analysis of altmetrics data source, metric validation, qualitative research describing the scholarly use of online tools.

Priem, J., Piwowar, H. A., & Hemminger, B. M. (2012). Altmetrics in the wild: Using social media to explore scholarly impact. *arXiv Preprint, 2014(10/04/2014)*, 1–23. Digital Libraries. <http://doi.org/http://arxiv.org/abs/1203.4745v1>

This study sampled over 24,000 articles published by the Public Library of Science (PLOS) in an attempt to better understand altmetrics and their relationship to citation counts. Priem, Piwowar, and Hemminger draw many conclusions from the study, but the most important are as follows:

First, sources of altmetrics provide an immense amount of data, though different sources show very different amounts of activity related to scholarly work. About a quarter of the articles sampled had nonzero data from five or more altmetrics sources, showing some diversity.

Second, the kinds of impact measured by altmetrics and citations are related, but distinct. Neither provides the whole picture, and ideally both should be used to determine impact. Some altmetrics indicators correlate with citation counts, but not all do.

Third, according to the authors, “articles cluster in ways that suggest several different impact “flavors,” that capture impacts on different audiences and of different types; for instance some articles . . . may be heavily read and saved by scholars but seldom cited.”

Rasmussen, P. G., & Andersen, J. P. (2013). Altmetrics: an alternate perspective on research evaluation. *ScieCom Info*. Retrieved from <http://journals.lub.lu.se/index.php/sciecominfo/article/view/7292>

This rather brief article outlines the main trends in altmetrics research and use. As its aim is to introduce the northern European scientific community to altmetrics, it offers very little original or unique information. Like many authors, Rasmussen and Andersen see altmetrics as complementary and not oppositional to traditional metrics.

Rehemtula, S., Rosa, M. D. L., Leitão, P., & Avilés, R. A. (2014, June 17). Altmetrics in

Institutional Repositories: New Perspectives for Assessing Research Impact. *Libraries in the Digital Age (LIDA) Proceedings*. Retrieved from <http://ozk.unizd.hr/proceedings/index.php/lida/article/view/141>

This very short 2014 article is particularly relevant to our research topic. Rehemtula et al. study if and in what ways institutional repositories are using altmetrics. The researchers gathered data on the top 100 institutional repositories from the 2014 edition of the Ranking Web of Repositories. They found that though seventy percent of repositories offered usage statistics on some level, fewer than ten percent provided altmetrics. Most of these were based out of Australia and the United Kingdom.

The researchers conclude that though not infallible, altmetrics are an increasingly important means of determining scholarly impact. As such, institutional repositories would do well to use them, and librarians should actively inform faculty of their value.

Roemer, R. C., Borchardt, R., & Borchardt, R. (2012). From bibliometrics to altmetrics: A changing scholarly landscape. *College & Research Library News*, 73(10), 596–600. Retrieved from <http://crlnews.highwire.org/content/73/10/596.full>

This article provides a nice, easy to read overview of different metrics (traditional and altmetric) tools. Other than that, it does not comment on the pros or cons of the differing tools nor does it provide any meaningful information aside from explanations on each source, where they can be found (online), and the main (intended) purpose of each one.

Scott, N. (2012). Altmetrics are the central way of measuring communication in the digital age but what do they miss? Retrieved from <http://blogs.lse.ac.uk/impactofsocialsciences/2012/12/17/scott-altmetrics-central-digital-whats-missing/>

In this blog post, Scott asserts that the question of whether or not altmetrics are superior to traditional metrics draws attention away from the real value of altmetrics, which is that they are "the central way to measure more varied forms of scholarly communication of the digital age." Altmetrics become more important as scholarly communication moves outside of peer-reviewed journals.

Scott goes on to list several areas in which altmetrics might improve. He notes, for example, that altmetrics do not reach many forms of electronic communication, such as email. Also, he argues, altmetrics may measure the extent to which research is discussed, but this does not necessarily reflect actual impact—actions taken as a result of the researcher's findings. These problems are complex and would no doubt be very challenging to resolve.

Shuai, X., Pepe, A., & Bollen, J. (2012). How the Scientific Community Reacts to Newly Submitted Preprints: Article Downloads, Twitter Mentions, and Citations. *PLOS One*, 7(11), e47523. Digital Libraries; Physics and Society.  
<http://doi.org/10.1371/journal.pone.0047523>

Using a collection of 4606 articles submitted to the preprint database between Oct 2010 and May 2011, the authors look at the relationship between the number of Tweets that mention the preprints, the number of downloads of the preprints and the number of citations that follow a Twitter mention of the preprint. This article is unique in that it examines not simply the volume of responses but also includes a temporal variable...the delay and span of time between tweet and response. Again, the authors find support for the correlation between social media mention and citation count that has been observed in other studies. However, the thing that makes this paper unique is the temporal component. So...there seems to be a positive correlation between social media mention and citation count (as one increases so does the other) but other studies have not investigated whether this effect holds up over time or whether this is a one shot effect. The authors address the temporal variable by differentiating between delay (measured as the time difference between the date of a preprint submission and a spike in Twitter mentions) and span (measured as the time lag between the first and last twitter mention or download of the article). The results indicate that nearly 80% of the articles reach the peak of Twitter mentions one day after they are submitted. And the distribution of the curve (span) shows that articles are mentioned one day only. Overall, the authors report a strong relationship between social media interest (in this case, Twitter), article downloads, and early citations.. Twitter mentions and downloads follow two distinct temporal patterns with Twitter mentions having narrower delays and shorter time spans than downloads.

Thelwall, M. (2012). A History of Webometrics Link Analysis : Impact. *Bulletin of the Association for Information Science and Technology*, 39(6), 18–24.  
<http://doi.org/10.1002/bult.2012.1720380606>

The paper examines the history of webometrics, defined as “the study of the quantitative aspects of the construction and use of information resources, structures and technologies on the web drawing on bibliometric and informetric approaches.” A term coined in 1997, webometrics may be seen as a contributor to altmetrics, though it is broader and interested in more than scholarly publications.

Much of webometrics has been and remains based on link analysis. The impact of websites and webpages may be determined at least in part by tracking the number of links on other sites and pages directing toward them. In the case of scholarly publications, researchers have come to include only certain parts of the Web when

tallying links, citations, mentions, and similar uses of scholarly materials. This field has come to be called altmetrics.

Torres-Salinas, D., Cabezas-Clavijo, Á., & Jiménez-Contreras, E. (2013). Altmetrics: New Indicators for Scientific Communication in Web 2.0. *Comunicar*, 21(41), 53–60. <http://doi.org/10.3916/C41-2013-05>

This article introduces the concept of altmetrics to a Spanish and Chinese readership. Torres, Cabezas, and Jiménez begin with a description of various altmetrics indicators and platforms, then move on to their own examination of altmetrics and citation counts for a sample of communications studies articles. The paper considers what other research has found on the relationship between altmetrics and traditional metrics, then finishes with a discussion of the limitations of altmetrics.

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Yeong, C. H., Abdullah, B. J. J., C. H. Yeong, & Abdullah, B. J. J. (2012). Altmetrics: the right step forward. *Biomedical Imaging & Intervention Journal*, 8(3), 1–2. JOUR. <http://doi.org/10.2349/bij.8.3.e15>

This brief, relatively early article provides the context in which altmetrics developed and emphasizes their potential to capture new aspects of scholarly impact. Yeong and Abdullah describe altmetrics as “a sprawling constellation of projects and like-minded people working at research institutions, libraries, and publishers.”

Having been published in a biomedical journal, this article aims primarily to provide the reader with a brief overview of a new development in scholarly communication, and thus offers little unique information.