Altmetrics of Altmetrics Literature

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As the awareness of altmetrics grows, an increasing number of people from different sectors, disciplines and countries are becoming more interested in finding out the potential benefits and challenges of altmetrics. Universities, libraries, funding agencies, and researchers share common questions regarding altmetrics: What are altmetrics? When did research on altmetrics commence and what topics have been investigated? How do altmetrics compare to traditional metrics? Are there any studies measuring this and what are their findings? In an attempt to answer these questions, we performed a systematic literature review of research on altmetrics and analysed the altmetrics of altmetrics literature.

An Overview of Altmetrics Research

We conducted a search in Scopus (on 04.09.2015) with the search term “altmetric*”, over all years and search fields. A total of 391 publications were retrieved. From the data collected, research on altmetrics commenced in 2011, after the term “altmetrics” was introduced in 2010, and described as new metrics based on social media that give a faster and broader measure of research impact [1]. Since then, research literature on altmetrics has been steadily growing at a fast pace.

We further analysed 112 of these articles, categorizing them according to the social media data sources and research topics investigated. Over the years, diverse social media data sources have been investigated. Recently, Mendeley1 has been receiving the most interest, with the number of studies on Mendeley having doubled since 2013. Twitter2 has received a constant and high amount of interest since 2011. CiteULike3, blogs, Facebook4, and F1000Prime5 have received steady but medium attention, whereas Wikipedia6, YouTube7, arXiv8 downloads and news outlets have received steady but low attention.

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1 Mendeley (http://www.mendeley.com)
2 Twitter (https://twitter.com)
3 CiteULike (http://www.citeulike.org)
4 Facebook (https://www.facebook.com)
5 F1000Prime (http://f1000.com/prime)
6 Wikipedia (https://www.wikipedia.org)
7 YouTube (https://www.youtube.com)
8 arXiv (http://arxiv.org)
In recent years, a few new data sources have been studied, such as Goodreads\textsuperscript{9}, Figshare\textsuperscript{10}, SlideShare\textsuperscript{11}, and LibraryThing\textsuperscript{12}. Interest in ResearchGate\textsuperscript{13}, Academia.edu\textsuperscript{14}, and Google+\textsuperscript{15} has somewhat increased but remains low, whereas interest in BibSonomy\textsuperscript{16}, Delicious\textsuperscript{17}, and LinkedIn\textsuperscript{18} has dropped.

The main research focus of altmetrics research has been on cross-metric validation, comparing altmetrics to traditional metrics, commonly by measuring correlations. Overall, most studies report a weak to moderate correlation between altmetrics and citation counts [2, 3]. Differences across disciplines have also been investigated, e.g., in [3]. Another major research focus was on source validity and coverage of altmetrics. Several studies find that Mendeley is the most predominant data source (e.g., in [3]). The usage and adoption of social media by researchers was also investigated, e.g., in [4]. Several articles discuss the limitations of altmetrics, but only a few address the visualization and normalization of altmetrics.

The Altmetrics of Altmetrics Literature

In order to have an overview of the social media coverage of altmetrics literature, we investigated the altmetrics of the aforementioned 391 articles (316 having a DOI). Altmetrics from Altmetric.com were retrieved (on 04.09.2015) for 210 of them via the rAltmetric API. Table 1 presents the coverage of the metrics. Altmetrics literature has been growing at a fast pace and many articles have only recently been published, thus citations could be found for only 61\% in Scopus. In contrast, altmetrics could be retrieved for most of the articles: all articles had an Altmetric.com score, 97\% had mentions by tweeters and 77\% had readers on Mendeley.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|}
\hline
Metric & Coverage \\
\hline
Altmetric.com & All articles had an Altmetric.com score. \\
Tweeters & 97\% had mentions by tweeters. \\
Readers & 77\% had readers on Mendeley. \\
\hline
\end{tabular}
\caption{Altmetric Coverage}
\end{table}

\textsuperscript{9} Goodreads (http://www.goodreads.com)
\textsuperscript{10} Figshare (http://figshare.com)
\textsuperscript{11} SlideShare (http://www.slideshare.net)
\textsuperscript{12} LibraryThing (https://www.librarything.com)
\textsuperscript{13} ResearchGate (http://www.researchgate.net)
\textsuperscript{14} Academia.edu (https://www.academia.edu)
\textsuperscript{15} Google+ (https://plus.google.com)
\textsuperscript{16} BibSonomy (http://www.bibsonomy.org)
\textsuperscript{17} Delicious (https://delicious.com)
\textsuperscript{18} LinkedIn (https://www.linkedin.com)
Table 1. Coverage of altmetrics and citations for 210 articles on altmetrics literature

<table>
<thead>
<tr>
<th></th>
<th>Scopus Citations</th>
<th>Mentions by Tweeters</th>
<th>Readers on Mendeley</th>
<th>Readers on CiteULike</th>
<th>Mentions by Facebook pages</th>
<th>Mentions by blogs</th>
<th>Altmetric.com Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Articles with non-zero counts</td>
<td>127 (61%)</td>
<td>203 (97%)</td>
<td>161 (77%)</td>
<td>71 (34%)</td>
<td>78 (37%)</td>
<td>65 (31%)</td>
<td>210 (100%)</td>
</tr>
<tr>
<td>Average counts</td>
<td>7.44</td>
<td>55.66</td>
<td>32.64</td>
<td>1.51</td>
<td>4.67</td>
<td>4.23</td>
<td>46.06</td>
</tr>
<tr>
<td>Max counts</td>
<td>62</td>
<td>1969</td>
<td>498</td>
<td>27</td>
<td>95</td>
<td>30</td>
<td>1554</td>
</tr>
</tbody>
</table>

Table 2 shows the Spearman correlations measured between citations and altmetrics for the 210 articles. Correlations with readers on Mendeley and with mentions by blogs were high at 0.7 and 0.5 respectively. Correlations with readers on CiteULike, mentions by tweeters and the Altmetric.com score all had a moderate value of about 0.4.

Table 1. Spearman correlations between citations and altmetrics for 210 articles on altmetrics literature

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<th>Metrics</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Scopus Citations</td>
<td>0.401**</td>
<td>0.711**</td>
<td>0.417**</td>
<td>0.181</td>
<td>0.535**</td>
<td>0.381**</td>
</tr>
</tbody>
</table>

** p < 0.01

Concluding Remarks and On-Going Work

The overview of altmetrics literature and the altmetrics of altmetrics literature presented above give interesting insights into altmetrics research over the past years. However, the scope of this analysis is limited as only articles explicitly mentioning the term “altmetric(s)” were considered, and due to the restrictions of the rAltmetric API, altmetrics could only be retrieved for articles having a DOI.

There still remain many more questions to be answered and many topics still to be investigated, for example, the detection and effects of gaming on the reliability of altmetrics. This literature review forms the basis of a three year altmetrics project funded by the National Research Foundation, Singapore. On-going work includes the implementation of a cross-metric validation tool that will enable a better exploration and understanding of altmetrics.

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References


