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Highly-alted articles in Library and Information Science

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Abstract

The current research examines the extent to which articles published in Scopus-indexed Library and Information Science (LIS) journals are mentioned in social media platforms. It also tries to identify the highly mentioned LIS articles. The population of the study was comprised of 193 LIS journals indexed by Scopus in 2015. Each journal was searched in Scopus and the Digital Object Identifiers (DOIs) of articles was extracted. The list of DOIs was then searched in Altmetric Explorer to retrieve all attentions received by articles. Social media presence and altmetric scores of these articles were extracted in a Microsoft Excel spreadsheet for further investigations. Results of the study revealed that 28.8 percent of the total LIS publications were mentioned at least once in social media tools. The most used altmetric source in LIS research was Twitter (33.1%), followed by Mendeley (30.4%) and Facebook (5.9%), respectively. Moreover, the highest altmetric presence was seen in "Journal of Information Science" with altmetric coverage of 100 percent, followed by "Journal of Chemical Information and Modeling" (93.5%) and "Archival Science" (93.3%). The highest altmetric score was 393 for an article entitled, "The Open Access Advantage Considering Citation, Article Usage and Social Media Attention".

Keywords

Altmetrics; Alternative metrics; Altmetric Explorer; Altmetric score; Social media; Research impact

Introduction

In recent years, altmetrics (stands for alternative metrics) have attracted much attention as complement indicators for scholarly impact measures. Social web-based metrics evaluate research impact by capturing communications around scientific content across a wide range of social media platforms (Priem, Piwowar & Hemminger, 2012). Social media metrics track online footprints of scientific research from various sources, including online reference managers (e.g. Zotero, Mendeley and CiteULike), general (e.g., Facebook, Twitter and Google +) and scientific social networking sites (e.g., LinkedIn and Academia.edu), post-publication peer review platforms (e.g., PubPeer and Publoans), research highlight platforms (e.g., F1000), multimedia platforms (e.g., YouTube), social bookmarking sites (e.g., Connotea and delicious), Q&A websites and forums, policy documents, news outlets, blogs, microblogs (e.g., Twitter) and wikis (e.g., Wikipedia). Altmetrics show how scholarly output are being discussed, shared, bookmarked, recommended, read, saved, cited and socially used. Although altmetrics are thought of as article level metrics, they also can be applied to people, organizations, countries and journals (Scarlat et al., 2015). There is a general agreement in scientific community on the potential of altmetrics as measures of research impact (Zahedi, Costas & Wouters, 2014; Holmberg, 2015). A number of advantages of altmetrics over traditional citation-based indicators have been discussed including providing real-time data, speed, broader and more diverse audiences, greater level of openness, transparency and ease of data collection using APIs (Piwowar, 2013; Holmberg, 2015). On the other hand, some limitations and challenges of altmetrics were discussed, including heterogeneity, inconsistency of data sources, limited coverage, vulnerability to manipulation and gaming, lack of standards and systematically validation, confusing terminology, quality issues, theoretical and methodological issues and lack of conceptual frameworks (Hammarfelt, 2014; Bornman, 2014; Erdt et al. 2016; Haustein, 2016).

Over seven years after the suggestion of altmetrics by Jason Priem (Priem et al., 2010), several research has been done on this area. The concept and history of altmetrics are reviewed by Liu and Adie (2013), Holmberg (2015) and Erdt et al. (2016). The validity of altmetric data sources was investigated by Shema, Bar-Ilan and Thelwall (2014) and Kousha and Thelwall (2015). Moreover, attention has been given to various data sources, including Mendeley (Zahedi, Costas & Wouters, 2014), CiteULike (Haustein & Siebenlist, 2011), Twitter (Eysenbach, 2011), F1000 (Bornmann, 2014), Academia.edu (Mas-Bleda, 2014), Facebook (Hammarfelt, 2014), YouTube (Kousha, Thelwall & Abdoli, 2012), ResearchGate (Thelwall & Kousha, 2015), blogs (Shema, Bar-Ilan & Thelwall, 2014) and Wikipedia (Zahedi, Costas & Wouters, 2014). Some other studies have focused on altmetric activity of scholarly output in different disciplines and subject areas, like economics and business (Nuredini & Peters, 2016), biomedicine (Haustein et al., 2014), library and information science (Araujo, 2015; Erfanmanesh, 2017), biochemistry (Sud & Thelwall, 2014), astrophysics (Bar-Ilan, 2014), economic and business (Nuredini & Peters, 2016), engineering (Cho, 2017), ecology (Peoples et al., 2016), social sciences (Htoo & Na,

2016). The comparison of various altmetric aggregators was investigated by Chamberlain (2013), Holmberg (2015) and Erdt et al. (2016). Altmetric presence of institutions was also studied in some previous research (Peters et al. 2014). The main focus of most of the previous research has been on the relationship between altmetrics and citation-based indicators. Although most studies reported a statistically significant correlation between altmetrics and bibliometrics (Eysenbach, 2011; Haustein et al. 2014; Zahedi, Costas & Wouters, 2014; Sud & Thelwall, 2014; Mohammadi & Thelwall, 2014; Hassan et al., 2017), however, they suggest that altmetrics measure a different aspect of impact than that measure by bibliometrics, namely societal impact.

This study attempts to assess altmetric presence of library and information science (LIS) literature and identify the most highly-alted articles. This research differs from the previous literature in that it studies all LIS journals indexed by Scopus. Specific objectives of the study are to determine:

- The altmetric presence and the most used altmetric sources of LIS publications.
- The Top LIS Journals with the highest altmetric presence.
- The LIS publications with the highest altmetric scores.

Materials and Methods

A total of 193 LIS journals indexed by Scopus in 2015 constituted the population of this research. In recent years, Scopus has gained great popularity in scientific community and constituted the base of a great number of research (Erfanmanesh & Didegah, 2013). Considering the fact that newer articles may receive higher altmetric attentions than older ones, articles were limited based on their publication year to give equal chance to receive attention. At first, LIS journals were identified from the Scimago Journal and Country Rank website (www.scimagojr.com). Each journal was searched in Scopus and the publication date was limited to 2015.

Digital Object Identifiers (DOIs) of articles for each journal were extracted in a Microsoft Excel format. Papers with no valid DOIs were excluded from the analysis, as their online activity cannot be tracked. Hence, the population of the study reduced from 8131 papers to 6638 papers. Then, the list of DOIs was searched in Altmetric Explorer to retrieve all attentions received by articles published in each journal. Altmetric Explorer is a fee-based product of Altmetric LLP, a Digital Science company which was founded in London, UK in 2011 by Euan Adie. It is one of the most comprehensive providers of social media data that tracks and analyses the online activity surrounding scholarly output from a wide selection of online sources (Robinson-Garcia et al., 2014). It provides the altmetric score, which is a measure of the attention that a publication has received from various online and social media tools. As online mentions of articles in various sources range widely in complexity, they are weighted differently, e.g., eight points for a news story, five points for a blog post, one point for a tweet and a quarter point for a Facebook post.

The higher the altmetric score is, the more attention has received by that publication in social web. The data collection was performed during January 2017. The altmetric window for each paper is from its publication time in 2015 until the end of 2016.

Results

a) The altmetric presence and the most used altmetric sources of LIS publications

The share of papers having at-least one altmetric attention was first investigated. Results of the study revealed that 28.8 percent of total LIS publications (35.3% of publications with valid DOIs) had non-zero altmetric scores at the time of data collection of the current study. In other words, 2340 out of the total 8131 publications (6638 publications with DOIs) have received at least one attention from social media platforms. Table 1 shows 12 sources of altmetric attention for LIS publications. The total number of altmetric events as well as mean and the maximum events were provided for each altmetric source. Results revealed that Twitter was the main altmetric source for the LIS articles, about 33.1 percent of articles with valid DOIs were tweeted at least once. In other words, 2199 out of the total 6638 articles have received a total of 13864 tweets (mean: 6.3), highest of which was 547. Mendeley (30.4%), Facebook (5.9%), blogs (3.6%) and Google + (1.5%) were other dominating social media tools for the LIS articles. It was found that the total readership for the LIS papers in Mendeley was 46877 and the average readership for each article was 23.2. Results revealed that 395 LIS articles were mentioned in a total of 561 Facebook posts, the highest of which was mentioned 13 times. Moreover, out of the 2340 publications with altmetric scores, 236 (10.1%) received at least one mention in blogs and 100 (4.3%) received at least one mention in Google + (Table 1).

Table 1. Social media sources for LIS publications

Rank	Altmetric Source	Number of Articles for This Altmetric Source	Total Altmetric Events	Mean Events per Publication	Highest Events
1	Twitter	2199	13864	6.3	547
2	Mendeley	2019	46877	23.2	942
3	Facebook	395	561	1.42	13
4	Blogs	236	377	1.6	13
5	Google+	100	159	1.6	7
6	News	64	195	3.05	40
7	Wikipedia	52	57	1.1	3
8	Policy	21	24	1.14	2
9	Reddit	11	13	1.18	2
10	Peer Review	10	22	2.2	12
11	Q&A	3	3	1	1
12	Video	3	4	1.33	2

b) Top LIS Journals with the highest altmetric presence

Table 2 shows top 20 LIS journals with the highest altmetric presence. This table also shows total, mean and highest altmetric scores for each journal. Of the 193 LIS journals indexed by Scopus, 123 journals had at least one mentioned article in social media platforms. As expected, altmetric coverage of journals varies greatly. The highest altmetric presence was seen in "*Journal of Information Science*" which all 80 articles published in this journal in 2015 have been mentioned in social media. "*Journal of Chemical Information and Modeling", "Archival Science*" and "*Journal of Librarianship and Information Science*" were other journals with the highest number of articles with non-zero mentions and altmetric presence equal to 93.5, 93.3 and 92.9 percent, respectively. Contrary 55 LIS journals showed altmetric presence equal to zero, which means that none of their articles have been shared, discussed or covered in social media platforms.

Table 2. Top 20 LIS journals with highest coverage

Rank	Journals	Articles	Articles with Mentions	Altmetric Presence (%)	Total Altmetric Score	Mean Altmetric Score	Highest Altmetric Score
1	Journal of Information Science	80	80	1	278	3.47	27
2	Journal of Chemical Information and Modeling	247	231	93.5	818	3.54	47
3	Archival Science	15	14	93.3	210	15	80
4	Journal of Librarianship and Information Science	28	26	92.9	155	5.96	31
5	New Review of Academic Librarianship	27	25	92.6	106	4.24	15
6	College and Research Libraries	63	58	92.1	837	14.43	63
7	Health information and libraries journal	38	34	89.5	233	6.85	28
8	Information Communication and Society	92	82	89.1	1239	15.11	237
9	Medical Reference Services Quarterly	44	38	86.4	108	2.84	13
10	International Journal of Law and Information Technology	13	11	84.6	77	7	22
11	Education and Information Technologies	28	23	82.1	87	3.78	27
12	Journal of Cheminformatics	83	68	81.9	434	6.38	58
13	Social Science Information	27	22	81.5	63	2.86	15
14	International Journal on Digital Libraries	21	17	81	81	4.76	15
15	Australian Library Journal	31	25	80.6	121	4.84	19
16	Social Science Computer Review	51	41	80.4	205	5	27
17	Journal of the Medical Library Association : JMLA	65	52	80	296	5.69	39
18	Journal of Academic Librarianship	110	85	77.3	347	4.08	33
19	IFLA Journal	35	27	77.1	76	2.81	12
20	D-Lib Magazine	67	51	76.1	912	17.88	88

c) LIS publications with the highest altmetric scores

Table 3 shows the top 20 highly-mentioned articles based on altmetric score. The number of attentions received on various social media sites as well as altmetric badge or donut (an icon that illustrates the altmetric score) for each paper was also provided in this table. The colors that make up a donut represent different sources of attention, e.g. blue for Twitter, yellow for blogs and so on. The highest altmetric score was 393 for an article entitled, "*The Open Access Advantage Considering Citation, Article Usage and Social Media Attention*" by *Wang, Liu, Mao* and *Fang*, published in the journal *Scientometrics.* This article has received a considerable amount of attention from Twitter and was the most tweeted document by far (547). It also has been discussed 12 times in blogs and 13 times in Wikipedia articles. Moreover, the number of CiteULike and Mendeley bookmarks received by this article was 5 and 133, respectively. It is interesting to note that most of the top 20 articles with the highest altmetric scores were published in journals with high journal-level metrics, indicating a potential correlation between citation-based and social web-based indicators. For all papers except one, total number of altmetric attentions received by articles in social media was higher than the number of citations received in Scopus.

Among the top 20 articles with the highest altmetric scores, 13 articles were cited less than 10 times in Scopus. It worth mentioning that four out of the top 20 highly-alted articles, have not received citations in Scopus until the time of data collection in this research. Moreover, the paper in 13th position with 109 citations has received unexpectedly lower altmetric attention compare to articles in 2nd and 12th places with no citations. This example highlights that altmetric score may not always be an indication of scientific merits of an article. The coverage of Mendeley for the top 20 articles was 100 percent. It was found that 8 articles had more than 50 Mendeley readership counts, the highest of which was 942. Moreover, 19 out of the 20 articles have been tweeted at-least once. Only three of the top 20 articles were cited in Wikipedia, with one of them being cited 13 times and the rest of them only once. Only 8 of the top 20 articles were mentioned in Google Plus. Moreover, 14 of the top 20 papers were mentioned in blogs as well as news.

The most popular topic in the top 20 articles was *"altmetrics, webometrics and scientometrics"* with four publications (no. 4, 5, 6, 7). Of these articles, one was on the scientific productivity of the academicians (no. 4), one studied the correlation between altmetrics and bibliometrics (no. 5), another tried to estimate the size of Google Scholar (no. 6) and the last one investigated the characteristics of researchers publish in predatory open-access journals (no. 7). The second highest number of articles was in the area of *"social media and social networking"* (no. 3, 8, 15). The first one studied the effect of social media use on citizen's participation in civic and political activities (no. 3). The second one investigated how using social networking sites affect college-age users' well-being (no. 8). The third article studied how candidate's Twitter presence affects the outcomes of 2012 US Republican presidential primary election (no. 15). There were three

articles *on "archives and repositories"* (no. 10, 11, 12). Of those articles, one discussed Interference Archive (IA) as one example of an activist archive (no. 10), one was on information interoperability problems for web-based repositories (no. 11) and an editorial on the special issue of journal *Archival Science* in the topic of archival practice and activism (no. 12). Two articles were categorized as pertaining most to "*academic libraries"* (no. 18, 19). Paper no. 18 studied different dimensions of McDonaldization in academic libraries environment. Moreover, the impact of student use of library resources on their academic performance was investigated in the 19th article. There were two articles in the area of *"information behavior"* (no. 17, 20), one studied scholarly use of digital collections by researchers in humanities (no. 17) and another one investigated the effect of gender and Internet skills in contributions to Wikipedia (no. 20). A total of two articles were categorized in the area of *"health information science"*, both published in *Journal of Health Communication* (no. 2, 14). One out of the top 20 highly-alted papers in LIS is on *"open access"*, compared citation and altmetric advantage of open access publications compare to non-open access publications (no. 1). *"Scholarly communications"* (no. 9), *"big data"* (no. 13) and *"information society"* (no. 16) are other topics with one highly-alted articles in LIS.

Table 3. Top 20 highly-alted publications in LIS journals

Publication	Journal	Altmetric Score	Total Attentions	Sources of Attention								Scopus Citations
				Blogs	Twitter	Face book	News	Wiki pedia	G+	Cite U Like	Mendeley	
The Open Access Advantage Considering Citation, Article Usage and Social Media Attention	Scientometrics		579	12	547	0	1	13	6	5	133	10
Law & Order, CSI, and NCIS: The Association Between Exposure to Crime Drama Franchises, Rape Myth Acceptance, and Sexual Consent Negotiation Among College Students	Journal of Health Communication		65	4	17	4	40	0	0	1	21	0
Social media use and participation: a meta-analysis of current research	Information, Communication & Society		101	1	76	0	24	0	0	0	304	38
Academia's never-ending selection for productivity	Scientometrics		171	3	164	3	1	0	0	1	61	3
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		123	13	107	2	0	0	1	5	286	31

Methods for estimating the size of Google Scholar	Scientometrics		134	2	128	1	2	0	1	4	24	11
Who publishes in predatory journals?	Journal of the Association for Information Science and Technology		85	7	71	1	1	1	2	4	31	21
why following friends can hurt you: an exploratory investigation of the effects of envy on social networking sites among college-age users	Information Systems Research		26	1	7	1	17	0	0	0	32	6
Science 2.0 Repositories: Time for a Change in Scholarly Communication	D-Lib Magazine		102	3	88	8	0	0	3	3	20	3
Interference Archive: a free space for social movement culture	Archival Science		13	0	4	0	9	0	0	0	31	1
Reminiscing About 15 Years of Interoperability Efforts	D-Lib Magazine		90	10	77	1	0	0	2	0	8	3
Humanizing an inevitability political craft: Introduction to the special issue on archiving activism and activist archiving	Archival Science		9	0	0	0	9	0	0	0	11	0
Beyond the hype: Big data concepts, methods, and analytics	International Journal of Information Management		85	1	79	0	2	0	3	2	942	109
Learning to See Beneath the Surface: A Qualitative Analysis of Family Medicine Residents' Reflections About Communication	Journal of Health Communication		18	1	8	1	8	0	0	0	8	0
Twitter and elections: are tweets, predictive, reactive, or a form of buzz?	Information, Communication & Society		89	1	86	1	1	0	0	0	78	2
The myth of us: digital networks, political change and the production of collectivity	Information, Communication & Society		56	0	52	0	3	0	0	0	69	6
Beyond the Scanned Image: A Needs Assessment of Scholarly Users of Digital Collections	College & Research Libraries		58	3	52	3	0	0	0	0	33	2

The McDonaldization of Academic Libraries and the Values of Transformational Change	College & Research Libraries		82	0	81	1	0	0	0	0	59	0
The Impact of Library Resource Utilization on Undergraduate Students' Academic Performance: A Propensity Score Matching Design	College & Research Libraries		80	0	71	7	0	0	2	1	49	3
Mind the skills gap: the role of Internet know-how and gender in differentiated contributions to Wikipedia	Information, Communication & Society		61	0	54	2	2	1	0	0	59	11

Discussion

This study investigated the altmetric presence of LIS literature to identify top articles with the highest social media mentions. Results of the study revealed that of the total articles published in LIS journals indexed by Scopus in 2015, 2340 articles had non-zero altmetric coverage. In other words, over a forth (28.8%) of LIS publications have been mentioned at-least once in social media platforms. Comparing with the results of Hassan et al. (2017) which reported an altmetric presence of 20.46 percent for articles indexed by Scopus in 2015, we can conclude higher coverage for LIS research. LIS articles have received attentions from 12 different social media sources. Twitter was the source providing the most altmetric data for LIS publications, followed by Mendeley and Facebook. Results of this research in consistent with many previous studies, which reported that Mendeley and Twitter are the most important altmetric data sources (Erdt et al. 2016; Haustein et al. 2014; Zahedi, Costas & Wouters, 2014). Moreover, in comparison of different altmetric aggregators, Erdt et al. (2016) reported that Mendely and Twitter are the most popular altmetric sources in all service providers. The coverage of Mendeley for the top 20 articles with the highest altmetric score in 2015 was 100 percent. This finding is consistent with that of Shrivastava and Mahajan (2016) who reported 100 percent coverage rate of Mendeley for top 100 articles in the area of Artificial Intelligence. Except for Twitter and Mendeley, the results showed that the presence of LIS papers on other social media platforms is not high, as just 16.9 percent of papers being shared on Facebook, 10.1 percent being shared in blogs and 4.3 percent being shared on Google Plus.

Conclusion

Altmetrics is a new field with less than a decade old. It can provide accurate evaluation of the impact of scholarly output as a complement to traditional citation-based indicators. Judging an articles' impact might be more fairly assessed with the use of several altmetric, usage-based and

bibliometric indicators. The present study is limited by its time coverage, as considered only publications in 2015. Further research can broaden this time coverage. Moreover, the current research studied the highly-mentioned LIS articles based on data from Altmetric Explorer. As the technical functionality and data sources of altmetric aggregators varies, duplication of this research with data from other service providers like Plum Analytics and ImpactStory may lead dissimilar results. Moreover, 44 out of the 193 LIS journals do not provide DOI for articles, which have led to their altmetric absence. An interesting direction for the future research would be to compare the characteristics of highly-alted and highly-cited articles in LIS in an attempt to determine the shared characteristics.

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