Should We Seek for Educational Impact of Research Articles in Social Media Metrics?

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Although previous studies have shown that prevalence of research article mentions in general social networking sites such as Twitter, Facebook, and Blog posts is weakly connected with research impact (Thelwall, Haustein, Larivière & Sugimoto, 2013), there are less empirical research on what other aspects of impact can be drawn from these metrics. Since purpose of scholarly writing might sometimes go beyond its research use and its benefits stretch to students as well as society, previous studies have suggested that examining online syllabi mentions and course reading lists can help to harness educational impact of journal articles (Kousha and Thelwall, 2008). Using evidence from syllabus mentions, this research, also, focuses on the connection between educational use of research articles and social media mentions. Various forms of scholarly publications are being produced with pedagogical intentions to aid education, and although books are the most cited source in online syllabi (Kousha & Thelwall, 2016a) journal articles are likely to be used for educational purposes (Kousha & Thelwall, 2008). In current research, educational impact of research is considered as the journal articles which are mentioned in course reading lists and course descriptions.

Education “is a social, not an individual process” (Hrastinski & Aghaee, 2010) and student today are involved in using social media more than any time before. However, although students might use social media to share and discuss about their education (Veletsianos, 2012), evidence suggests their limited participation in networking and sharing in educational courses that involve use of social media (Veletsianos & Navarrete, 2012) and there is far less evidence on extent of students use of social media for sharing scholarly articles which are part of course reading lists. Identifying student users of social media is not easy as they might not mention their age or professional status as others; therefore, the purpose of this research is to take a first step and only generally explore whether there is a connection between how frequent scholarly articles are mentioned in syllabi and their social media mentions.

Method

Previous studies have used search engines such as Bing to identify mentions of journal articles (Kousha & Thelwall, 2008) as well as monographs (Kousha & Thelwall, 2016) in online syllabi and course reading lists. However, due to recent limitations assigned to using Bing such as charging for high number of searches and inaccessibility in certain countries, a pilot study using the list of publication in Open Syllabus Project (explorer.opensyllabusproject.org) was conducted to identify books used in teaching. Open Syllabus Project (OSP) claims to collect list of over one million syllabi from about 10 to 15 years ago and mostly from English speaking countries. It also accepts syllabi of volunteer donors and avoids sharing copyright restricted syllabi. This, however, does not undermine the value of this list for studying teaching impact of resources as it might include more non-online syllabi due to receiving them directly from the universities which would, otherwise, remain unidentified with search engine-based exploration of course descriptions.

In order to respond research question, evidence of educational impact of journal articles is extracted from Open Syllabus Project or OSP (https://opensyllabus.org) and for this purpose first general coverage of top 5000 journals was extracted and then only 14 journals among journals with higher number of articles in syllabi and most frequent syllabus mentions in 2018 August are selected. These include the Science (with 3,487 titles in syllabi), American Political Science Review (991), International Organization
Citations and DOIs of 209,748 articles across 1880 to 2019 in these journals were then downloaded from Scopus. DOIs were available for 164,464 articles which were used to search Altmetric.com for social media mentions. As results for most social media were too few to be reported in this research focus is placed on reporting Twitter mentions, blog posts, and Wikipedia citations. In the data, the oldest Scopus articles with syllabus mentions was published in the journal of the Science in 1880. Because significance of the correlations between syllabus mentions and other measures is assessed the focus is placed on the results from 1975 onwards, where the counts and correlation show more regular patterns. Articles published in 2015 forward in selected journals also had not any syllabus mentions in OSP, therefore, the data is normalised by total counts from Scopus for articles between 1975 and 2014.

**Findings**

Figure 1 indicates the number of journals among the top 5000 journals in Open Syllabus Project across different Scopus subject categories. The circles in the figure represent Scopus broad subject categories, and are from left to right in order of the frequency of journals in each subject, while the diameters of each circle/category is measured relative to the number of unique titles mentioned from journals. Although majority of journals with syllabus mentions were in Social Sciences (1964 journals), the number of article titles mentioned (49,376 articles) in this field were less than one-tenth of articles (519,756 articles) mentioned from 982 journals in Medicine. As well, in categories related to life science and biomedicine (such as Biochemistry, Genetics and Molecular Biology, Environmental Science, Health Profession, and Pharmacology, Toxicology and Pharmaceutics), it is common to observe larger number of article titles mentioned in syllabi from limited, smaller set of journals in contrast to social science and humanities where diversity of journals is bigger than in medicine, but the number of titles in syllabi might not appear as big.

![Figure 1. Number of Scopus-indexed Journals among top 5000 journals with Syllabus mentions and frequency of the titles (circle size)](image-url)
Figure 2 shows the proportion of selected journals’ articles in 1975-2014 with syllabus mentions in OSP and it suggests that around 40% of articles in *Journal of Economic Perspective*, *World Politics* and *International Organization* were used in teaching. The journal of *Science* have articles on variety of topics and has the highest number of articles in the given period (1,792 articles) that appeared in syllabi. However, the sheer quantity of articles published (85,475) means that the proportion mentioned of the *Science* in syllabi is marginal (2.1%). Other journals, however, either on politics, economy, sociology, language or history had around on average about 20% and up to maximum of 45% of their articles mentioned in Syllabi.

![Figure 2. Proportion of articles with at least one Syllabus Mention across journals](image)
Figure 3 indicates the median number of syllabus mentions of articles (3), while the value is 2 in four journals of Science, Journal of Political Economy, American Economic Review and TESOL Quarterly. These journals with lower median syllabus appearance, other than Science (median citations: 19), in fact, are among journals with higher median citation counts (54, 40 and 24). Median Twitter users of articles in the Science (11) is the highest, while the figures for International Organisations (8), American journal of Political Science (7) and Quarterly Journal of Economics (6) were over double that of the remaining journals (between 1 and 4). The median number of Wikipedia and Blog citations were 1 across almost all journals. The exceptions were about blog citations of articles in the Science and Quarterly Journal of Economics (both 2).

Table 1 shows the results of Spearman’s correlations coefficient between Syllabus mention and four other indicators from each five years. As shown, the correlations between syllabus mentions and social media metrics were almost in all cases insignificant; the only exception occurred in correlation between Blog citations and Syllabus mentions in 2011. In majority of the cases, the positive observation in both metrics examined were below 30, although this might be due to small size of dataset. The only significant connection with syllabus mentions was seen in Scopus Citations which was significant between 1980 and 2005.
Table 1. Spearman’s correlation coefficient between Syllabus mentions and counts of Scopus citations, Twitter users, Wikipedia citations, and Blog posts for articles with at least one mention – Note: Correlation are reported when there was more than 30 positive observations.

<table>
<thead>
<tr>
<th>Publication Year</th>
<th>Scopus Citations</th>
<th>Twitter Mentions</th>
<th>Wikipedia</th>
<th>Blogs</th>
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<tr>
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<tr>
<td>1995</td>
<td>.350**</td>
<td>195</td>
<td>.255</td>
<td>41</td>
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<tr>
<td>2000</td>
<td>.264**</td>
<td>361</td>
<td>.154</td>
<td>78</td>
</tr>
<tr>
<td>2005</td>
<td>.210**</td>
<td>307</td>
<td>.214</td>
<td>78</td>
</tr>
<tr>
<td>2010</td>
<td>.055</td>
<td>91</td>
<td>-.268</td>
<td>45</td>
</tr>
<tr>
<td>2011</td>
<td>.071</td>
<td>78</td>
<td>.185</td>
<td>49</td>
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</tbody>
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$r$: Spearman’s correlation coefficient; #: Number of articles; * significant at $p < 0.05$; ** significant at $p < 0.01$

Discussions and Conclusion

In this research, the connection between social media uptake and syllabus mentions of those articles in journals frequently mentioned in syllabi was examined and no statistically significant relationship between indicators was found. As correlations showed weak and often insignificant connection between syllabus mentions and these metrics, it is can be inferred that there are intervening factors such as social aspects of impact that predominate over educational impact in social media and therefore, even if educational impact present remains difficult to be harnessed. Since syllabi mentions to articles predominated in journals on politics, economics, sociology and history, care should be taken when interpreting more careful judgement the social impact of these topics that might have affected social media uptake of articles should not be undermined.

The connection between counts of Twitter users of articles was weak and insignificant as was the correlation with research impact (Thelwall et al., 2010), therefore, the type of impact that tweets harness is still not clear. The findings are also contradictory when it comes to correlations with Wikipedia, as this is inconsistent with a previous research which had seen significant correlations between Wikipedia citations and Syllabus mentions (Kousha & Thelwall, 2017). However, it may highlight the difference between books and journal articles as the aforementioned research had only focused on citations to books rather than journal articles.

With regards to Blog citations, although observations was few and correlations were significant only once, it is interesting that one significant correlation was seen in more recent years as scholarly blogging is ‘an emerging academic practice’ (Kirkup, 2010) and there might be educational purposes in the activity.

Altogether, as this research has only tested statistical connections, there remains a place for conducting content analysis or survey to extract actual extent of activity of sharing scholarly articles for educational purposes. Usually there are variety of reasons for sharing research through social networking sites and as correlations does not indicate such a connection which can be hypothesized for future examinations. If, in fact, social media uptake for educational purposes is weak due to lack of use, one
logical reason for students not posting journal articles in the course reading lists can be because of sharing the link of the course reading list rather that one particular journal article. However, if result are made weaker due to presence of other sources of impact types of sharing such as social, and political, there are less tools to distinguish them from each other.

Finally, educational impact of academic articles might be closely related to social, cultural or historical aspects of research and easily become difficult to harness in the face of larger uptake of research for social reasons.

References