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Altmetrics of Papers From Scientific Periphery Reflect Global Trends: A Case Study of Publications by Zagreb University School of Medicine

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ABSTRACT

This study aims to investigate the altmetric activity of papers published by the University of Zagreb School of Medicine in internationally visible journals and to identify differences in altmetric activity between the papers published in international and local journals and between those published in English and Croatian. We also investigated changes in altmetric activity over time and the characteristics of papers with the highest Twitter and Mendeley activity.

The sample included 390 papers collected from the bibliographic database Scopus. Their altmetric and citation activities were measured at three time points: in July 2014, 2015, and 2016.

The findings generally correspond to those observed in the large-scale studies of medical papers. Papers in renowned journals, and papers reporting clinical guidelines and multicentric studies had the most intense altmetric activity. In contrast, papers published in local, Croatian journals showed minimal altmetric activity, especially the papers published in Croatian. These results indicate that the local publishing community has not yet recognised social media as a tool for promoting research and that non-English language publications have minimal chances to receive attention, even in social media.

The evaluative potential of altmetric indicators has to be further explored in a broader context.

Introduction

New publishing platforms have brought changes in the models of scientific communication beyond the traditional journal as well as a variety of formats that accompany traditional scientific articles, such as sharing “raw science” in the form of datasets, semantic publishing, or “nanopublication” (Priem, Taraborelli, Groth, & Neylon, 2010). Many of these formats, including self-publishing via blogging, micro-blogging, and post-publication comments, are facilitated by social media technologies. Diverse audiences beyond the academy have emerged as well: practitioners, clinicians, and the general public (Lapinski, Piwowar, & Priem, 2013). These are the so called “pure” or non-publishing readers and practitioners who make use of research publications in their daily activities (Haustein et al., 2013). Moreover, open access has made scientific information more available to the general public, requiring from researchers to bring science to non-specialists (European commision, 2016).

The widespread use of social media in disseminating and discussing research publications calls for new ways of measuring the impact of individual authors and their publications (Priem et al., 2010). Haustein, Bowman, and Costas (2015) defined these metrics as "events on social and mainstream media platforms related to scholarly content or scholars, which can be easily harvested, and are not the same as the more ‘traditional' concept of citations". Altmetrics measure any impact a publication or an author may have on other people (Bar-Ilan et al., 2012). They try to capture the activities that happen between viewing a paper and citing it (Fenner, 2014). By tracking shares, likes, comments, discussions, reviews, bookmarks, saves, tweets, and mentions of scientific publications and sources in social media (Wouters & Costas, 2012), altmetric tools capture the real-time impact of scientific outputs on the total reader population. Trueger et al. (2015) proposed to call it “a measure of disseminative impact”.

Taylor (2013) found that research that delivers knowledge to practitioners is likely to have greater societal impact, but the usage patterns of research publications may vary, depending on the social, economic, legislative, and national status of individual research disciplines. For example, medicine is characterised by a significant share of practitioners in the total number of users of research information, great interest of general public in all kinds of medical information, and by a great proportion of OA publishing in the total number of new scientific publications (Laakso & Björk, 2012; Škorić, Vrkić, & Petrak, 2016). Social media offer health scientists numerous opportunities to

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disseminate their research transparently, increase the impact of their articles and reports, and engage with the public (Bjerglund Andersen & Söderqvist, 2012). These may be some of the reasons why medical papers have such a discernible echo in social media. Medical authors working in small academic communities on the scientific periphery who are struggling for better visibility and impact could especially benefit from using social networks and other Web 2.0 tools. According to Hebrang Grgić (2014) "peripheral scientific communities are defined by either (or both) of two factors – language (other than English) and economy". Countries that do not spend much on research and do not have powerful publishing industry can be considered as peripheral countries. The journals from these countries rarely publishe reports on "breakthrough" research results that have a potential global influence (Sambunjak, 2006).

Background

The use of medical scholarly content in social media has been studied extensively. Haustein, Larivière, Thelwall, Amyot, and Peters (2014) have analysed how often Twitter is used to diffuse journal articles in biomedical and life sciences and examined the relationship between tweets and Web of Science (WoS) citations. They have found that Twitter has a much lower coverage of scholarly documents than other social media platforms, but that there are journals and specialties in biomedical sciences that are of great interest to the Twitter community. This in-depth analysis of highly tweeted documents has showed that while some papers seem to receive attention on Twitter because of actual health implications or topicality, others seem to be distributed on Twitter due to humorous or curious content, which suggests that tweets do not necessarily reflect scientific or professional impact. Low correlation between the number of citations and tweets per document indicates that tweets and citations are far from measuring the same impact.

Many authors have studied the correlation between altmetrics and citation metrics (Bornmann, 2015; Costas, Zahedi, & Wouters, 2015; Haustein & Larivière, 2014; Mohammadi & Thelwall, 2014; Mohammadi, Thelwall, Haustein, & Larivière, 2015; Thelwall & Kousha, 2015; Tonia, 2014; Zahedi, Costas, & Wouters, 2013, 2014a, 2014b). A study comparing 11 altmetric indicators (excluding Mendeley) with WoS citations (Thelwall, Haustein, Larivière, & Sugimoto, 2013) found that six were associated with citation counts, at least in medical and biological sciences. The authors reported that less than 20% of the papers were covered by most of social media resources.

Based on a sample of 1.2 million documents published in journals covering biomedical research, clinical medicine, health, and psychology indexed in PubMed and WoS, Haustein and Larivière (2014) analysed Mendeley as a source of usage statistics for scientific papers. They reported that 66% of the analysed papers had at least one Mendeley reader and that the average number of readers per document was quite high compared to the uptake and average activity on other social media platforms. Even though reading and citing are not similar scientific activities, Li and Thelwall (2012) found positive correlations between the Mendeley readership counts and the traditional bibliometric indicators in a sample of genomics and genetics papers. Exploring different types of users in clinical medicine, engineering and technology, social science, physics, and chemistry research papers inside and outside academia, Mohammadi et al. (2015) found that clinical medicine articles had the highest coverage in Mendeley and that many of them were read by medical professionals. The authors refer to it as "plain reading" without a follow-up, such as citing or doing other research activities.

Some studies have highlighted the importance of using social media for health communication and public health surveillance. According to Bjerglund Andersen and Söderqvist (2012), community orientation, open two-way communication, flexibility, fast distribution, wide audience, and freeness are the key advantages of using social media in public health science communication. Its key weaknesses, on the other hand, are lack of control, vulnerability to misuse, and lack of formalised peer-review. Since social media are widely used by the public to discuss health issues, the authors emphasized that if the scientists' perspective is not present in social media, then other perspectives will prevail.

Another topic of interest, especially to medical journals, has been the challenge social media present to the "traditional" metrics. Hoang, McCall, Dixon, Fitzgerald, and Gaillard (2015) emphasise that researchers in any medical specialty should not ignore the opportunities to increase their impact via social media, even though peer-reviewed publication remains the most widely accepted measure of academic productivity. The same is recommended to medical journal publishers: even though altmetric indicators do not directly tell about the quality or the impact of the paper, social media should be used by journals to increase their visibility (Scarlat, Mavrogenis, Pećina, & Niculescu, 2015).

Literature suggests that altmetrics can also generate many controversies. While some authors argue that they can be a good proxy for societal (Bornmann, 2014) and early scientific impact (Eysenbach, 2012), others argue that they reflect nothing but rumour, popularity, and superficiality (Coloquhoun & Plested, 2014). These objections, however, are also true of the traditional citation metrics; quantitative methods cannot and should not be used as a measure of quality, because they fail to consider the content of papers (Coloquhoun & Plested, 2014).

Evaluation of the research output on both individual and institutional level is becoming increasingly important today. It can be performed as a large-scale, multifaceted survey, conducted systematically and regularly, but it can also be occasional and fragmentary, with a specific purpose to serve as a decision-making instrument. Despite its limitations and shortcomings (Haustein & Larivière, 2015), citation-based metrics dominate among other criteria for academic promotion and tenure decisions in many institutions (Konkiel, Sugimoto, & Williams, 2016) and in other forms of academic decision-making (e.g. grant proposal evaluations, academic awards, etc.). On the other hand, alternative metrics have been subjected to close scrutiny in the academic setting (Sud & Thelwall, 2014; Sugimoto, 2015). Fenner (2014) argues that many questions have to be answered before using altmetric indicators for research evaluation, two of them in particular: how to standardise altmetric indicators and how to interpret the results in the context of scholarly impact.

Every academic setting influences academic and research performance in its own way, and uses its own methods of evaluation, often anchored in local circumstances. When the academic setting is small and on scientific periphery, this evaluation can be very delicate and require certain precautions (Bekavac, Petrak, & Buneta, 1994). Peer-review, as the most important component of research evaluation, is often burdened with personal bias and lack of objective evaluation criteria (Marusic & Marusic, 1999), and bibliometric analysis (especially citation analysis) serves as a complementary tool for correcting the weaknesses of peer-review, especially in small scientific communities (van Raan, 1996).

As librarians in an academic medical library, we perform a large number of bibliometric analyses and consider ourselves to be, as Roemer and Borchardt (2013) suggested, "well positioned to carry an informed dialogue on adopting and using of new types of research dissemination tools". To the best of our knowledge, there are no published studies on the altmetric impact of papers from small academic communities, so in this study we focused on the local particularities of one such small setting and its relation to the international trends. Moreover, not even in large international studies did we find time series analysis of altmetric activity on the same/single data set. Our aim was to examine the altmetric echo of papers published by the University of Zagreb School of Medicine (UZSM) in internationally visible journals over two and a half years.