Do altmetrics point to the broader impact of research? An overview of benefits and disadvantages of altmetrics

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ABSTRACT

Today, it is not clear how the impact of research on other areas of society than science should be measured. While peer review and bibliometrics have become standard methods for measuring the impact of research in science, there is not yet an accepted framework within which to measure societal impact. Alternative metrics (called altmetrics to distinguish them from bibliometrics) are considered an interesting option for assessing the societal impact of research, as they offer new ways to measure (public) engagement with research output. Altmetrics is a term to describe web-based metrics for the impact of publications and other scholarly material by using data from social media platforms (e.g. Twitter or Mendeley). This overview of studies explores the potential of altmetrics for measuring societal impact. It deals with the definition and classification of altmetrics. Furthermore, their benefits and disadvantages for measuring impact are discussed.

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1. Introduction

Until a few decades ago, the general assumption in science policy was that a society could benefit most from research that is conducted at a very high level – evaluated according to the standards inherent in science. In recent years, this automatistic approach has found less favour in science policy; policymakers expect science to demonstrate its value to society (Bornmann, 2013). A good example of this trend can be found in a recent book by Bastow, Dunleavy, and Tinkler (2014), which is an attempt to "re-explain the distinctive and yet more subtle ways in which the contemporary social sciences now shape and inform human development" (p. 2). The trend towards audit science is framed in a general change to the science landscape and is frequently described as a development from Mode 1 to Mode 2; while in Mode 1 science was characterized by the academic interests of a scientific community, Mode 2 is more concerned with the collaboration between science and other areas of society and with research that is relevant to a particular application in society (Gibbons et al., 1994).

It is not clear how the impact of research on other areas of society should be measured – unlike the impact which research has on itself. While peer review and bibliometrics have become standard methods for measuring the impact of research on other research, there is not yet an accepted framework within which to measure societal impact. Nowadays, the case-study approach to societal impact is favoured; however, this approach does not meet all the requirements generally associated with a societal impact framework. According to Frank and Nason (2009), the best method of measuring societal impact (in health research) should be "feasible, not too labour intensive, and economically viable. It should be as accurate and responsive as possible within a reasonable evaluation budget that should represent a small percentage of the money invested in the research being assessed" (p. 531). There is a need for indicators which can reliably and validly measure the impact of research on certain parts of society, with the primary aim of creating productive interaction and successful communication between research and societal stakeholders. "Scientists must be able to explain what they do to a broader public to garner political support and funding for endeavours whose outcomes are unclear at best and dangerous at worst, a difficulty which is magnified by the complexity of scientific issues" (Puschmann, 2014, p. 91).

2. What are altmetrics?

Alternative metrics (called altmetrics to distinguish them from bibliometrics, Gunn, 2013) are considered an interesting option for assessing the societal impact of research, as they offer new ways to measure (public) engagement with research output (Piwowar, 2013). "Altmetrics . . . is a term to describe web-based metrics for the impact of scholarly material, with an emphasis on social media outlets as sources of data" (Shema, Bar-Ilan, & Thelwall, 2014a,b).[1] In 'article-level metrics' (ALMs, Fenner, 2013b), views, downloads, clicks, notes, saves, tweets, shares, likes, recommends, tags, posts, trackbacks, discussions, bookmarks, and comments are counted, rather than just citations of a paper in a database such as Scopus (Elsevier), or by a publisher such as the Public Library of Science (PLOS, Fenner, 2013b) (Liu, Xu, Wu, Chen, & Guo, 2013; Zahedi, Costas, & Wouters, 2014). Adie and Roe (2013) call these individual events (tweets or shares, for example) 'mentions' if they link to papers (and 'posts' if they do not). Every form of ALM involves log data which measures individual mentions over a certain period of time (Haustein, 2014). "Today, for every single use of an electronic resource, the system can record which resource was used, who used it, where that person was, when it was used, what type of request was issued, what type of record it was, and from where the article was used" (Kurtz & Bollen, 2010, p. 4). The more or less frequent "use" of research output can either be seen as the direct impact of research or as evidence of "real" impact (Neylon, Willmers, & King, 2014).

The importance of this alternative form of metrics is indicated by one of the biggest multidisciplinary database providers, Elsevier, not only entering into partnership with Altmetric, a start-up tracking and analysing the online activity around scholarly literature, but also buying Mendeley, which combines a citation manager with a scholarly social network (Roemer & Borchardt, 2013). Furthermore, according to Chamberlain (2013) and Piwowar and Priem (2013), scholars are already including altmetrics in publication lists in their CVs (in addition to citation impact measurements), conferences on the subject are being arranged (such as altmetrics.org/altmetrics14) and organizations (such as ImpactStory and Altmetric) have been founded to collect and provide altmetrics (Fenner, 2013a). Against the background of this development Bornmann (2014) and Taylor (2013a) are talking about a revolution in scientometrics, Lin and Fenner (2013) about a new paradigm of research assessment and Kurtz and Bollen (2010) about a renaissance in bibliometrics with, notably, a new definition of the expression "impact of science". According to Galloway, Pease, and Rauh (2013) "altmetrics is a fast-moving and dynamic area".

However, the use of alternative metrics to evaluate research is not new. It has a long tradition in scientometrics with the analysis of acknowledgements, patents, mentorships, news articles, and usage in syllabi (Priem, 2014). The use of the Internet for alternative metrics began with "webometrics" (or "cybermetrics") whereby the number of times a paper was mentioned on the web was counted (Roemer & Borchardt, 2012). These mentions were called "web citations" (Shema et al., 2014b). Several studies have investigated the relationship between web citations and traditional text citations finding moderate correlations in most cases (see e.g. Kousha & Thelwall, 2007; Vaughan & Shaw, 2005, 2008).

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[1] Rousseau and Ye (2013) have proposed "influmetrics" as a new name for this new form of metrics. Cronin (2013) thinks that "complementary metrics" is more appropriate than "alternative metrics". "Influmetrics" has the advantage against "complementary metrics" and "altmetrics" that it does not provoke the question "complementary or alternative to what?"