

Letter to the Editor: On the conceptualisation and theorisation of the impact caused by publications

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Abstract Hausteijn et al. (Theories of informetrics: a Festschrift in honor of Blaise Cronin, in press) have linked up with a long tradition in scientometrics in publishing an attempt at a conceptual-theoretical reflection of the “impact” concept in bibliometrics and altmetrics. The very interesting publication by Hausteijn et al. (Theories of informetrics: a Festschrift in honor of Blaise Cronin, in press) is taken as an opportunity in this letter to the editor, in the first part to discuss the classification of article-level metrics, and in the second the theoretical reflection of “impact”.

Keywords Bibliometrics · Altmetrics · Theory of citing

Dear Sir,

Hausteijn et al. (in press) have linked up with a long tradition in scientometrics (de Bellis 2009) in publishing an attempt at a conceptual-theoretical reflection of the “impact” concept in bibliometrics and altmetrics. As a first step they have therefore developed a scheme to classify metrics, both alternative (e.g. Twitter counts) and traditional (e.g. citations in scientific documents), which can be used to measure the impact of publications. In a second step they have undertaken a discussion of the metrics against the background of a range of theories (from social sciences) which in the past have been played a more or less important role in a theoretical discussion of “impact” (such as the normative or the social-constructivist theory) (Bornmann and Daniel 2008). The very interesting publication by Hausteijn et al. (in press) is taken as an opportunity in this letter to the editor, in the first part to discuss the classification of metrics, and in the second the theoretical discussion of “impact”.

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The classification of metrics

With their scheme to classify alternative and traditional metrics, the authors differentiate between (1) accessing, (2) appraising, and (3) applying: (1) A publication is accessed by a person when he or she downloads a publication or its metadata, or save this publication/its metadata in a reference manager. (2) A publication is appraised by a person when he or she mentions or quotes this publication on a microblog platform, in a comment, in a scientific document, in a policy document or in a range of other documents or on other platforms. (3) The contents of a publication are applied when significant parts of it are actively used, adapted, or transformed in other publications or on another platform. Whereas the scheme attributes particular sources for (1) accessing or (2) appraising, this was or could not be done for (3) applying. That means, one can distinguish between metrics which document access to a publication (accessing) from those which use a publication in a piece of writing (mentioning). The more often such usage takes place (accessing or mentioning), the more impact a publication has achieved.

With all metrics which count the mentions of a publication in a piece of writing, we initially assume that the author has applied (used) the results from that publication. One can, however, assume that the significance of a publication mentioned can vary widely for the writing. Some publications will have had a central importance for a piece of writing—such as the publication by Hausteijn et al. (in press) for this letter to the editor—and others will be only of peripheral significance. With publications which had a central importance, one can assume that the mentioned publication has led to an intellectual influence on the citing author. Since, in the measurement of impact, one is very interested in identifying these significant and influential publications, a series of citation content analyses have been performed in bibliometrics to determine the importance of cited publications for the citing author (Bornmann and Daniel 2008). Here the citations have been classified as simple mentions or as extensive discussions of the cited publications. The more extensively a publication is discussed in a document, the more significant it is estimated to be for the author of the publication. One could also perform such a classification for the pieces of writing used as sources for alternative metrics. Thus one need not stop at examining whether citations are simply mentions or have led to a discussion of results, but one could do the same for blogs, tweets, and comments. Publications have a greater or lesser significance for the authors of these texts as well.

The classification of citations into mentions and discussions of results is very complex. This is why bibliometricians have also attempted to extract the degree of importance from certain characteristics of the mention (or citation). Thus in citation content analyses the hypotheses are proposed (and tested), that (1) publications cited in the introduction section generally have a lower importance than those cited in the methods or results sections, and (2) publications cited more than once in a document are more important than those with only one mention. In a similar way to the attempt to assess the importance of cited publications with this kind of classification, one can also undertake a classification with altmetrics. On the one hand one could also count the frequency of mentions of an individual publication among the altmetrics source texts. On the other hand, one could categorise the altmetrics sources themselves for the individual metrics, whether the probability that they include important publications is higher or lower. Thus one assumes, for instance, that the level of importance of a mentioned publication in a tweet is harder to determine than that of a quote in a blog entry. Documents are also tweeted which are only of interest

at first glance. But quotes from blogs are often made from a selection of publications which have stood out as especially important.

Theory of mentioning (citing)

Haustein et al. (in press) apply the normative theory, the social constructivist theory, and the theory of concept symbols as well as the theories of social capital, attention economics, and impression management, to undertake a description of the process in which one document is mentioned in another document or on a platform. Besides these theories there are of course other theories which could be applied to this description, like the systems theory of Luhmann (2012a, b) (see Mingers and Leydesdorff 2015). I would like to assert in this letter to the editor that, for the area of research evaluation—and actually it is only there that metrics are relevant—that one theory in particular is definitive: Merton's normative theory (Merton 1973). This theory holds that a citation should be made precisely when an intellectual influence of one publication has taken place on the author of another publication. A citation should thus demonstrate this influence and can therefore be regarded as a reward for the research work of a cited author. According to this, a large number of citations indicate an important publication since it was able to influence many other researchers. With the intellectual influence and the reward, the normative theory picks up exactly the aspects which are decisive for research evaluation. Because the central question here is, who influences whom intellectually and is thus rewarded with mentions in a document.

Since this is a normative theory, there are also—besides the intellectual influence—many other reasons for citations which do not follow this norm. These other reasons become relevant particularly when citations receive a great significance as an instrument for the evaluation of research performance. Then the danger arises that this instrument acquires a life of its own and citations are employed strategically by such things as excessive self-citation or the citation of important researchers to increase the value of one's own publication. Such mechanisms for deviation from the norm have been described by Merton (1938) with his theory of deviant behaviour. However, when the causes of citations which do not correspond with the norm of intellectual influence are discussed in scientometrics, this is not done in terms of the anomie theory of Merton (1938), but that of social-constructivist theory. In the application of this theory to scientometrics, however, it is often overlooked that it is much more wide-ranging than the simple naming of other causes of citations. According to this theory, scholarly texts are documents which authors negotiate in social processes. The research results intended to be described in the documents do play a role in these processes, but there are many more and much more important aspects which determine this process. Thus the text is constructed in anticipation of possible later expert opinions, and research results presented in such a way to raise the probability of acceptance of the publication by a journal. According to this theory, citations—similarly to the research results to be described—are randomly, strategically and imperfectly included in a text.

One advantage in the use of Merton's theories for the description of the citation process consists in their relation to the actual interesting aspects in research evaluation (that is, the intellectual influence by important publications) and describe a mechanism which represents a danger for research evaluation (that is, the over-stressing of metrics in research assessment). The other advantage is that the theory also seeks to explain the citation

process, which makes the theory predictive: Norms are meant to guide action, and one can check retrospectively the extent to which researchers have orientated themselves to these norms. The social constructivist theory and many other theories fail these (normative) assertions which do not allow particular predictions and thus empirical verification. According to the concept symbols theory (Small 1978) citations, for example, may reflect particular ideas (i.e. are symbols for particular theories, results, or data) which are connected with the papers cited. Even if one were to identify or classify these ideas, this does not enable one to explain or predict the process of citation. The concept symbols theory (and also other theories) can only be used to undertake a description of the citation process.

The problem with the use of the normative theory is that it only applies to researchers. Since the platforms, from which the alternative metrics are generated, are not only used by researchers but also by other people, these norms are only partly relevant for the area of altmetrics. But there is great interest in the area of research evaluation in measuring the impact of publications in areas of society beyond research. This is why the absence of an extension of the normative theories to populations outside science is felt. Which norms guide the actions of particular groups (such as politicians or psychotherapists) when they mention a publication in their own writing or on a platform? One should concern oneself with this question above all, when “impact” is theoretically examined against the background of broad impact measurement with the help of altmetrics.

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