Peer-review science is taking off on Twitter, but who is tweeting what and why?
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The most tweeted peer-reviewed articles published between 2010 and 2012, and the trends associated with their social media success, have been identified by Stefanie Haustein at the University of Montreal's School of Library and Information Science. She and her colleagues from the US, UK and Germany took 1.4 million articles held in the PubMed and Web of Science databases and determined how many times they appeared on Twitter. "Being based on 1.4 million documents, this is the largest Twitter study of scholarly articles so far," Haustein said. The top two were articles on the effect of radiation on humans, and the top 15 includes articles on acne in teenage athletes, penile fracture, and the links between physical activity and mortality rates. Number 12 was in fact an article on autism by Laurent Mottron, a professor at the University of Montreal. The findings were published in the Journal of the Association for Information Science and Technology (JASIST).

The study looked at tweets that were directly related to the peer-reviewed article in question. The tweets either contained a link directly to the article in a scientific database or contained highly specific bibliographic information that would enable anyone to find the study immediately (such as DOI or PMID numbers).

The analysis shows that a high number of tweets does not correspond to a high number of citations in peer-reviewed journals – a method of measuring impact that is generally accepted by the scientific community. As a result, the number one article on the list of researchers, dealing with an altered gene during radiation exposure, was tweeted 963 times but only received nine academic citations. An article on a similar topic, in the wake of the Fukushima explosion, had 30 citations compared to its 639 tweets. "The most popular scientific articles on Twitter stress health implications or have a humourous or surprising component. This suggests that articles having the broadest scientific impact do not have the widest distribution," Haustein said.

The study was supervised and co-authored by University of Montreal Professor Vincent Larivière, holder of the Canada Research Chair on the Transformation of Academic Communication. "For the time being, Twitter cannot be considered a good marker of scientific impact – but it could indicate a certain social impact. When we look at the top articles, many have a surprising or humourous character. Articles are often tweeted anecdotally," Larivière said.

The traditional way of calculating the impact of a scientific article is based on the number of citations it has received in other scientific articles – it reflects impact on the scholarly community of citing authors. Peer review ensures a certain level of quality. "In the case of social networks, anyone can mention an article to anyone, there is no quality control," Haustein said.

Nonetheless, even if two-thirds of the tweeted articles were mentioned only once, Twitter is increasingly used to disseminate scientific articles. Over the three years studied, there was an increase in the proportion of articles cited on the network, reaching 20.4% in 2012. And despite the general finding regarding the number of citations, many of the articles most mentioned on Twitter are from journals such as PNAS, Science, Nature, The Lancet, and New England Journal of Medicine. The journal that received the most tweets was Nature, with 13,430 mentions of 1,083 papers (42%).

The researchers point out that the recent evolution of social networks offers new prospects for scientific communication. "The fact that more and more articles are tweeted is good news because it helps scientific communication. Regardless of whether non-scientists are sending this information, it proves that science is an aspect of general culture," Larivière said. Barely 15% of university
graduates in Quebec are active on Twitter. The researchers would like to question scientists' resistance to the social network as a tool for communications. "Considering the correlations revealed from our sample [...] we assume that the number of mentions on the Twitter network is not a good indicator of an article's impact. This could be due to many factors, including the fact that Twitter is not yet very popular among researchers and that the viability of Twitter as a tool for scientific communication remains underestimated," the authors wrote.

More information: The Twitter Top 15 Peer-Reviewed Studies

1. Hess et al. (2011). Gain of chromosome band 7q11 in papillary thyroid carcinomas of young patients is associated with exposure to low-dose irradiation. Hess is affiliated with German Research Center for Environmental Health.


10. Bravo et al. (2011). Ingestion of Lactobacillus strain regulates emotional behavior and central GABA receptor expression in a mouse via the vagus nerve. Bravo is affiliated with University College Cork.


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