

TWITTER AND SOCIETY



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TWITTER AND SOCIETY

EDITED BY KATRIN WELLER, AXEL BRUNS,
JEAN BURGESS, MERJA MAHRT, & CORNELIUS PUSCHMANN



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Twitter in Scholarly Communication

30

CHAPTER Merja Mahrt, Katrin Weller, and Isabella Peters



twitter might act as an *#altmetrics* indicator for scholarly communication, but Twitter use remains rare in most scientific disciplines

TWITTER IN THE ECOLOGY OF SCHOLARLY COMMUNICATION

Since the emergence of the personal website, and later scholarly blogging, academics have used the Internet for both strictly scientific and self-promotional purposes. Microblogging via Twitter is one such example, with guidelines recently emerging for its effective use in scholarly communication. Such guidelines see microblogging as useful for diverse academic purposes and contexts (Herwig, Kittenberger, Nentwich, & Schmirmund, 2009; Mollett, Moran, & Dunleavy, 2011). Building and maintaining professional networks is one of the core uses, especially around conferences. Individual researchers, as well as group research projects and institutions, may use Twitter for advertising their own research, events, publications, or other updates, much in the same way as other commercial, political, or societal actors do in their marketing and PR efforts via Twitter (Kortelainen & Katvala, 2012; Sammer & Back, 2011). A

well-connected Twitter account and the use of pertinent hashtags help increase visibility, both for one's own research and a given field in general. Twitter can also be used for internal communication, to let people know what others in a project or department are doing. In addition, Twitter can serve as a personal archive of information that one once found worth sharing and would like to access later on, for instance, through the use of URLs in tweets.

This chapter discusses the prevalence of Twitter usage among scholars in different countries and disciplines, before presenting selected cases from research on academics who tweet, Twitter usage around conferences, and the use of URLs in tweets. While beyond the scope of this chapter, Bruns and Burgess (2012) and several chapters in the present volume deal with challenges of using Twitter *data* in scholarly research (e.g., Bruns & Stieglitz, Chapter 6 in this volume; Gaffney & Puschmann, Chapter 5 in this volume; Puschmann & Burgess, Chapter 4 in this volume). The complementary role of Twitter in teaching is reviewed by van Treeck and Ebner in Chapter 31 in this volume.

THE UPTAKE OF TWITTER AMONG SCHOLARS

No fully comprehensive studies exist on how, why, or in what ways scholars use Twitter. A number of surveys among scholars from select American and European countries reported that only around 1 or 2% of the respective respondents use Twitter at all (Bader, Fritz, & Gloning, 2012; Gerber, 2012; Harley, Acord, Earl-Novell, Lawrence, & King, 2010). Scholars at a Finnish university used "mini blogs" more frequently (14%; Gu & Widén-Wulff, 2011), but compared to other social media, only a few respondents perceived them as being useful. Ponte and Simon (2011) found the highest proportion of Twitter users (18%) in a survey of 349 European scholars, making it still the least popular Web 2.0 application. Surveys of academic Twitter users usually employ Web-administered questionnaires, and rely on self-selected samples of scholars. The representativeness of the results is therefore difficult to determine. Some samples have clear biases by age as well as academic disciplines. Moreover, Web-based surveys, where recruitment and promotion of the survey take place almost entirely via electronic means, usually underrepresent those individuals who are more reluctant to use online media.

In contrast to such studies, Priem, Costello, and Dzuba (2011) attempted to draw a random sample of academic Twitter users. They selected five British and American universities, and searched Twitter for accounts of the universities' entire academic staff. Of the roughly 5,800 scholars thus identified (and

who had sufficiently unique names), 230 could be matched to a Twitter profile, of which 145 were active. This results in a ratio of one in 40 scholars (or 2.5%) using Twitter—although it probably underestimates true activity, as only scholars who revealed their identity on their Twitter profile could be included. This alternative method still establishes Twitter participation as rare among scholars, but no differences across disciplines or levels of seniority could be observed. Interestingly, however, scholars who used Twitter did not necessarily do so in a professional context; 60% of the scholars' tweets did not pertain to job-related activities.

Although only used by a minority of scholars, Gerber (2012) found Twitter to be among the most well-known Web 2.0 applications; however, four out of five scholars had a decisively negative opinion of the microblogging service. Scholars seem to clearly distinguish between different kinds of digital media use. They embrace services that to them have clear advantages and/or can be easily integrated into the workflow (e.g., e-mail, academic search engines, and databases), but are more reluctant towards newer or more 'experimental' forms. Some scholars fear that using Twitter or other social media would prove to be a waste of their time, for which they would receive no professional recognition, and that this activity might even harm their professional reputations (Bader et al., 2012).

In spite of the vast majority of scholars' notable reluctance to integrate Twitter into their ecologies of academic communication, the service has become vital to the communication in some fields of research. It appears that Twitter is more popular in scholarly disciplines that are themselves related to the Web and computer-mediated communication (for example, the semantic Web research community; see Letierce, Passant, Breslin, & Decker, 2010). Here, but also in other domains, scholars engage in microblogging enthusiastically—and with considerable success. For instance, a poll on which academic Twitter users to follow that was conducted by the London School of Economics in August 2011¹ revealed over 500 popular tweeting scholars, some of whom have several thousands of followers.

USE CASE: CONFERENCES

A key use case of Twitter in scholarly environments is tweeting during conferences. Scholars are more likely to use Twitter at a conference than in everyday use (Ross, Terras, Warwick, & Welsh, 2011) and to take up tweeting when attending conferences (Reinhardt, Ebner, Beham, & Costa, 2009). Academic conferences are an ideal setting for using Twitter as a backchannel, i.e., as a sep-

arate communication channel from the main event's formal communication activities (McCarthy & boyd, 2005; Ross et al., 2011). Tweets are used to take notes or record thoughts; share information (also with non-attendees); engage in discussions before, during, and after attending an event (Reinhardt et al., 2009; Ross et al., 2011); and, more generally, pick up conference chatter (Letierce et al., 2010). But backchannels during live events may also have negative effects, including distraction and partial attention, disrespectful comments, and the formation of cliques (McCarthy & boyd, 2005). The unavailability of WiFi or power sockets, confusion about the correct hashtag, or multiple hashtags may further constrain Twitter use during conferences.

A number of large-scale analyses of conference tweets (usually collected based on conference hashtags) provide insights into communication behaviour, user networks, key users and key topics, activities over the course of time, and shared resources. They have revealed different communication patterns for different conferences: levels of user *participation*, for example, can be determined by comparing registered participants (if available) with the number of unique Twitter users in the data set. In the cases observed so far, the participation rate varied from only 1.4% (Desai et al., 2012) to a maximum of about twice as many Twitter users than registered participants (Ross et al., 2011). On such occurrences, Twitter apparently serves as a platform to widen the reach of a conference far beyond the actual participants on site.

Activity is a second criterion for comparing Twitter use at conferences. Table 30.1 shows activity measured as tweets per user for a list of different conferences, ranging from an average of 3 to almost 17 tweets per user. Looking at the distribution of tweets per user, one frequently finds that only a small number of users write the majority of tweets around a given conference, while others only tweet once (e.g., Ross et al., 2011). Following up on this, different studies have analysed the behaviour of such *key users* as well as *connectedness of users* based on retweets or @messages, for instance by computing hubs and authority scores (Letierce et al., 2010). Puschmann, Weller, and Dröge (2011) illustrated how connectedness can change over the course of an event. If one considers @messages mainly as a means for interaction, and retweets as a means for information distribution, some conference communities seem to be more focussed on talking to each other while others share information with a broader audience.

The *distribution of tweets over time* during a conference can lead to interesting insights about the most significant or resonant events within it. Letierce et al. (2010) identified spikes in activities and mapped them to single events: as might be expected, Twitter users were most active during the conference key-

Table 30.1: Comparison of Key Twitter Metrics for Different Conferences

Conference (Source)	No. of Tweets	No. of Users	Tweets per User	% of @ messages	% of Retweets	% of Tweets with URLs
#dcmi2009 (Dröge, Maghferat, Puschmann, Verbina, & Weller, 2011)	146	27	5.4	5.5%	25.3%	19.9%
#dh09 (Ross et al., 2011)	1,732	169	10.2	n.a.*	n.a.*	n.a.*
#drh09 (Ross et al., 2011)	274	23	11.9	n.a.*	n.a.*	n.a.*
#edmedia (Ebner & Reinhardt, 2009)	1,595	177	9.0	n.a.	n.a.	n.a.
#estc2009 (Letierce et al., 2010)	322	75	4.3	14.3%	15.2%	11.8%
#geoinst (Dröge et al., 2011)	1,673	99	16.9	24.3%	8.3%	14.8%
#iswc2009 (Letierce et al., 2010)	1,444	273	5.3	27.1%	20.2%	35.8%
#kidneywk11 (Desai et al., 2012)	993	172	5.8	n.a.	24.8%	42.9%
#mla09 (Dröge et al., 2011)	1,929	369	5.2	13.3%	21.4%	27.2%
#online09 (Letierce et al., 2010)	2,245	507	4.4	25.2%	18.8%	22.3%
#thatcamp 2009 (Ross et al., 2011)	2,568	187	13.7	n.a.*	n.a.*	n.a.*
#www2010 (Dröge et al., 2011)	3,358	903	3.7	7.5%	33.4%	39.9%

* Ross et al. (2011) only provided aggregated values for the three conferences in the data set: 66% @messages, 10% retweets, and 24% tweets with URLs.

notes, the awards, and closing sessions. However, related external events that happen independently from the actual conference can also produce peaks in activity if they affect the scholarly interests of that community. During the 2009 International Semantic Web Conference (#iswc2009), for instance, *The New York Times* released a data set for sharing which many of the attendees, mainly computer scientists, commented on via Twitter (Letierce et al., 2010). Analyses of timelines can also be used to study the *contents* of conference tweets. Stankovic, Rowe, and Laublet (2010) tried to automatically map tweet contents to particular sub-events of a conference (e.g., specific talks or sessions). They

identified topics that were tweeted a lot without being present in talks in order to indicate trends. Inversely, the supposedly central topics of a conference may go unnoticed on Twitter (Desai et al., 2012).

The manual coding of tweets allows for deeper analyses of their content—for instance, with regard to topic or communicative purpose. Ross et al. (2011) manually categorised 43% of a sample of conference tweets as “jotting down notes”. Other studies have distinguished between the use of “informative” (referring to conference topics) and “non-informative” messages (e.g., opinions or advertisements). The proportion of informative versus uninformative tweets can vary considerably from one event to another (Desai et al., 2012; Dröge et al., 2011), but given that this research field is still in development, it is unclear whether such differences are due to, for example, the nature of the event, traditions of a discipline, or communicative routines of the participants. As tweets often include little commentary, Ross et al. (2011) concluded that Twitter is used for establishing an online presence rather than for encouraging a participatory conference culture. The fact that many conference tweets contain URLs (Table 30.1) suggests that attendees like to use Twitter for the dissemination of additional information.

So far, studies on microblogging during conferences hint towards differences in the Twitter practices of different disciplines. Conferences related to (digital) humanities appear to have lower percentages of URLs and retweets compared to those from computer science, while the latter tend to have less @messages. However, based on the relatively small and hardly representative set of conferences examined so far, one can only speculate about the reasons for the apparent differences. In addition to diverging communicative traditions, conference size and format may equally influence tweeting styles; small and rather informal events like #geoinst and #thatcamp (both digital humanities; THATCamp had about 100, and the conference of the Institute for Enabling Geospatial Scholarship had less than 500 attendees) see higher numbers of tweets per user, for example. Lastly, microblogging practices may also develop over time, while Twitter adoption rates or familiarity with the medium, its potentials, and limitations change as well. Instead of studying an arbitrary set of conferences, it would be important for the advancement of this research field to examine subsequent events in a conference series for which a baseline has been established.

However, there are currently no explicit attempts to investigate the landscape of Twitter usage during scholarly conferences more comprehensively (and considering the slow uptake of Twitter in many research communities, possibly for

good reasons). Instead, the focus of research on conference tweets has recently shifted to ways of automatically extracting additional information from tweets and detecting conference highlights for (non-)attendees.

USE CASE: URLS AS CITATIONS

Like other social media, Twitter has been discussed with regard to alternative measures for scholarly impact (“altmetrics”; Priem, Taraborelli, Groth, & Neylon, 2010). Retweeting or referencing content via URLs may, in fact, be seen as an act of citation, and social media-based citing behaviour positively affects traditional indicators of scholarly influence, i.e., download rates or citations in scholarly publications (Eysenbach, 2011; Priem, Piwowar, & Hemminger, 2012; Shuai, Pepe, & Bollen, 2012). As shown for conference tweets, tweeting URLs is frequent among scholars, and it seems more common than among other groups of users. Of a random sample of 720,000 tweets, 22% contained URLs (boyd, Golder, & Lotan, 2010), while this proportion was 55% in an eight-month sample of tweets collected from roughly 600 academic users (Weller & Puschmann, 2011). Typical scholarly practices performed via tweets are information, resource, and media sharing (Veletsianos, 2012), as well as recommending literature (Ebner & Schiefner, 2008), although neither study explicitly stated whether these practices necessitate the use of URLs.

Following a similar approach to citing as in traditional publications, Priem and Costello (2010) analysed 2,322 tweets from scholars and searched for Twitter citations, i.e., links to peer-reviewed articles, to determine the impact of traditional publications in social media. It was shown that 6% of tweets in the sample were Twitter citations, half of them linking directly to the referenced articles. More than half of the directly linked articles (56%) were open-access articles. Moreover, Twitter citations happened fast: 39% occurred within one week after publication of an article, 15% on the same day.

Peters, Beutelspacher, Maghferat, and Terliesner (2012) studied Twitter practices of scholarly bloggers (affiliated with universities or other research institutions). About one in three of a total of 50,019 tweets contained a URL. An analysis of the top-level domains of link destinations showed that tweeting science bloggers most often linked to their own blog posts or those of colleagues on the same blogging platform. More popular link destinations were online news outlets (1%), Twitter-centred services (e.g., twitpic.com, 2%), or other media channels (e.g., youtube.com, 2%; friendfeed.com, 2%). In an analysis of 3,631 conference tweets, Weller, Dröge, and Puschmann (2011) manually categorised URLs based on the link destinations (e.g., blog, media, slides, publica-

tion, etc.). The rank-frequency distribution of URLs was highly skewed, with more than half of URLs appearing only once in the data set. URLs tweeted at the 2009 conference of the Modern Language Association (#mla09; literary studies) mainly pointed to blog posts or press articles, while Twitter users at the World Wide Web conference (#www2010; computer science) frequently linked to scholarly publications and presentation slides.

The results of the presented studies indicate that scholars use Twitter to quickly distribute information on relevant, often open-access publications, and to facilitate their retrieval. They also promote their own work, not necessarily from traditional scholarly outlets, but also from social media. Furthermore, although URLs are frequently added to tweets, Twitter citations of scholarly publications in the stricter sense are rare, and are only performed by few people. Thus, using such indicators in altmetrics to measure the impact of publications in social media may lead to false impressions of a paper's or author's popularity. This may even be aggravated by the common practice of linking to own publications (i.e., self-citation; Weller & Peters, 2012), while the short life-span of shortened URLs puts the stability of such metrics into question (Weller et al., 2011).

While posting URLs is popular during conferences as well as in everyday scholarly communication, the respective studies again seem to indicate differences between disciplines with regard to preferred formats of the material linked to. Tweets sent around the selected literary studies conference referred to a diverse set of resources, while computer scientists at WWW 2010 focussed on original publications or slides. It is possible that scholars from the humanities refer to blogs more often because they see them as a space for explaining and discussing content and would like to invite others to join in the debate. However, the exploratory state of the literature only allows for tentative interpretations of the apparent differences between disciplines.

CONCLUDING REMARKS

Twitter is not uniformly used across all academic disciplines and fields. Although the service is widely known and actively researched, considerable parts of the academic community are reluctant to use Twitter at all or in relation to their work. As long as Twitter use remains rare in their academic environment, scholars are not likely to take up tweeting. Yet, for some fields and/or specific occasions like academic conferences, Twitter has become a part of the communicative ecologies of scholars. It facilitates exchange among existing networks of

scholars, e.g., via sharing URLs, but also allows adding contacts in an informal and low-threshold manner, or simply helps people in getting into conference mood. In the end, scholars have to decide for themselves whether Twitter offers sufficient benefits to devote time to tweeting. However, the range of studies on Twitter use in scholarly communication documents that the platform can be integrated into scholarly practices in a multitude of ways.

Subsequently, using Twitter for the evaluation of scientific output is equally explored, and the number of alternative impact indicators based on social media has exploded in recent years. Twitter-specific altmetrics actually reveal patterns comparable to traditional evaluation metrics (Eysenbach, 2011), but tweeting behaviour is still too understudied to determine the validity of Twitter metrics. In future, indicators should be carefully scrutinised instead of using social media data on scholarly communication and referencing practices simply because they are available.

The studies reviewed in this chapter stem from a variety of scholarly fields, including humanities, computer science, and health science. Thus, the respective data may be based on different underlying methods for data collection and analysis. In addition, data sets are often compiled on a study-specific basis. Since data exchange between researchers is rare, Twitter data studies are difficult to reproduce and to compare, but replications of existing studies would be useful in confirming patterns of practices beyond single events. Given the often quantitative and 'big data' oriented rationales of research on academic Twitter use, qualitative and more interpretative approaches into the how and why of scholarly Twitter behaviour may be another fruitful direction for future research (Veletsianos, 2012).

NOTE

- 1 <http://blogs.lse.ac.uk/impactofsocialsciences/2011/09/02/academic-tweeters-your-suggestions-in-full/>

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