

Real-Time Applications (Twitter)

Prof. Axel Bruns
Digital Media Research Centre
Queensland University of Technology
Brisbane, Australia
a.bruns@qut.edu.au – @snurb_dot_info – <http://mappingonlinepublics.net/>

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Abstract

The popular social media platform *Twitter* is the latest in long line of platforms for synchronous (real-time) computer-mediated communication that stretches back at least to the heyday of Bulletin Board Systems (BBSs). Its specific communicative affordances – chiefly the 140-character limit that applies to individual tweets – and the gradual co-development of the platform in collaboration between platform provider Twitter, Inc. and its growing userbase have led to the establishment of a range of usage practices for *Twitter* that privilege co-present live conversation over more drawn-out asynchronous discussion threads. This has led the platform to be recognised especially as an important space for *ad hoc* publics to gather around crises and other acute events, as well as to join in the global audiences for other major media events. However, everyday phatic communication and the maintenance of social ties also continues to account for a substantial portion of overall *Twitter* traffic. This chapter traces the origins and gradual development of the platform, and outlines some of the key contemporary uses of *Twitter*.

Introduction

Real-time forms of computer-mediated communication (CMC) via textual means look back on a long history which predates the arrival of the World Wide Web, and even the popular adoption of the Internet itself, by some margin. Many early dial-up Bulletin Board Systems (BBSs) provided some level of text-based chat functionality for their members, while the first Internet-based real-time chat systems included the distributed Internet Relay Chat (IRC) network as well as individual server-based Multi-User Dungeon (MUD, and later also MOO) adventure games, the latter of which were at times used more for live chatting than for actual gameplay. With the arrival of the World Wide Web, especially in its enhanced 'Web 2.0' phase, a variety of Websites also began to implement Webchat functionality in various guises, similar in style to the small-scale chat functionality of the BBSs (cf. Bordewijk & van Kaam, 2003, for a typology of the earliest such environments).

The key feature of such systems is that they are predominantly designed to support synchronous communication between multiple participants who are digitally co-present. They are distinguished in this attribute from asynchronous CMC systems such as Fidonet, email, mailing-lists, Usenet newsgroups, or threaded commentary features on Web pages, which instead support a text-based discussion over hours, days, and months, but usually require a reloading of the discussion thread to date in order to identify any new posts contributed since the last update. These differences between the technological features of synchronous and asynchronous communication also tend to influence the nature of the communicative exchanges they support, then: synchronous exchanges usually favour a faster-paced exchange of short messages, resembling oral communication, while asynchronous communication often consists of comparatively longer contributions at a

lower speed, similar to letter-based correspondence. Depending on the specific communicative platforms and their particular technical and social features, however, such differences between synchronous and asynchronous communication can be very subtle.

The leading global online platform for such synchronous, real-time communication at present – although incorporating a range of asynchronous features as well – is the social media platform *Twitter*. This chapter outlines *Twitter's* development over time and describes key current uses of the platform, and considers the key fields and contexts in which the platform has impacted on public and private communication practices.

The Rise of *Twitter*

Boasting some 288 million monthly active users as of April 2015 (Twitter, Inc., 2015), *Twitter* is part of a generation of social media platforms which also includes global market leader *Facebook*, *Google+*, as well as a number of country-specific platforms such as the Chinese-language social network *Weibo*. Launched in March 2006, *Twitter* was initially influenced especially by the short-message service (SMS) functionality provided by mobile phones, and from this inherited its best-known feature: the limitation of *Twitter* messages – tweets – to no more than 140 characters (the maximum length of a single SMS is 160 characters). But where SMSs are usually directed at one or a small number of specified recipients, the early *Twitter* was designed as a system for senders to broadcast their current activity to the entire network of *Twitter* users; the *Twitter* Web interface prompted them to do so by asking “What are you doing?” (Rogers, 2014). Other users could subscribe to the updates posted by specific *Twitter* accounts, without a general requirement for such subscriptions to be approved by the account being followed (in distinction from *Facebook's* reciprocal ‘friending’ mechanism); the platform was thus designed primarily to enable users to keep their circle of ‘followers’ informed of current events and activities in their lives. (The common description of *Twitter* as a platform for “microblogging” stems from this use, as the brief tweets about user activities are seen as equivalent to the longer posts in diary-style blogs.)

Such functionality was particularly popular at first with relatively technology-savvy communities on the US West Coast; its breakthrough came with the 2007 South by Southwest conference, where it was widely adopted by conference-goers themselves, as well as by others who followed the conference from a distance through the tweets being posted. *Twitter* won the conference’s Web Award, and the number of registered users and daily volume of tweets rose rapidly in subsequent months, due in part also to the considerable media coverage which followed. *Twitter's* very short and simple message format proved to be especially well suited to the very rapid, live communication that new users had already become familiar with from mobile phone SMSs, and the platform’s integration with mobile and smartphones – at first allowing users to SMS their tweets to the phone number 40404 (in the U.S.), and later through *Twitter* and similar third-party apps for iPhone and Android – meant that users were able to post frequent updates from anywhere, without needing access to desktop or laptop computers.

The rapid popularisation of *Twitter* also resulted in a considerable level of functionality co-creation between the user community and the platform provider Twitter, Inc. (cf. Bruns, 2012). As the userbase grew beyond the point where a single user could still follow the global stream (or ‘firehose’) of all tweets, or could even track all of the conversations taking place between the group of accounts they followed, *Twitter* users began to develop conventions for speaking directly to specific other participants. In a demonstration of *Twitter's* links to earlier real-time communication platforms, users adopted the Internet Relay Chat convention of writing “@username” in their tweets to specifically address the user account called *username*; Twitter, Inc. subsequently introduced functionality that highlights such @mentions in tweets as they are displayed on the *Twitter* Website and in its apps, and that alerts the recipient (for example via email) to the fact that they have received an @mention. @reply conversations are now also displayed alongside the tweets they respond to (Halavais, 2014).

A specific form of @mention is the retweet, which cites a previous message in excerpts or in its entirety in order to pass it along to the retweeting user’s followers, sometimes with added commentary or

contextualisation. Originally, such retweets were commonly preceded by “RT @username” to acknowledge that the message originated from *username*, though alternative retweet formats also exist. Twitter, Inc. subsequently sought to standardise the retweeting process by introducing an automatic “retweet button” that creates a verbatim retweet of the original message, but does not allow the retweeting user to insert further commentary of their own; in 2015, the company also introduced yet another related mechanism, which it calls “quoted tweet”, that generates a URL linking to the original tweet’s page on the *Twitter* Website but leaves sufficient space for the retweeting user to add their own commentary on the tweet link being shared. Between the traditional, “manual” RT, the “button retweet”, and this new “quoted tweet” function, there are therefore now at least three types of retweet available, each offering different functionality.

Similar to the introduction of @mentions, as distributed discussions between larger groups of users (who may not all follow each other) became increasingly difficult to track, *Twitter* user Chris Messina in 2007 suggested the adoption of another IRC convention: using the ‘#’ symbol as a topical marker or “channel tag” (Messina, 2007). Although the full range of Messina’s suggestions was never adopted, his proposal introduced what is now known as *Twitter* hashtags: brief keywords preceded by the hash symbol, which subsequent developments by Twitter, Inc. have made clickable and searchable to add further functionality. The first significant use of hashtags came during the 2007 San Diego wildfires, where the hashtag #sandiegofires was widely used to share information about the current status of the fire threat; such uses – especially to track unfolding crises and similar live events – again demonstrate the utility of *Twitter* as a real-time communication platform (Halavais, 2014). What is especially important about hashtags in a *Twitter* context is that they can be created by any user without the need for further approval, simply by placing ‘#’ in front of a keyword, and that any other user may use the same hashtag, regardless of whether they follow the other users participating in the hashtag. Combined with the functionality to search for and subscribe to the feed of hashtagged tweets, this means that hashtags provide a very fast and effective mechanism for gathering *ad hoc* publics (Bruns & Burgess, 2015) around topics of shared interest or concern, independent of pre-existing follower networks. (However, hashtags are also used for a range of other purposes: especially as a *Twitter*-style form of emphasis or metacommentary, for example in the form of hashtags like #sigh, #fail, or #headdesk.)

Although the principal format of *Twitter* messages remains text-based, further additions to *Twitter* functionality have allowed for the insertion of images, videos, and links to other types of content. Such materials are generally included in tweets as URLs pointing to the location of the external content, and Twitter, Inc. has gradually developed the frameworks to immediately display some forms of content as embedded in tweets, rather than requiring users to click through to the shared URL (and thus leave the *Twitter* Website or app itself). Due to the tight 140-character limit that applies to tweets, URLs are generally processed using one of a number of URL shortening services (such as *bit.ly* or *ow.ly*), which developed early on as part of the ecosystem of third-party services emerging around the *Twitter* platform; in 2011, Twitter, Inc. introduced the mandatory processing of all shared URLs through its own *t.co* link shortening service, regardless of whether links shared were already processed using *bit.ly* or other third-party tools.

Uses of *Twitter*

Due to the flexible and non-specific design of the underlying platform, *Twitter* has been adopted across a wide range of uses encompassing personal as well as professional practices. It emerged at first as a largely interpersonal, social network designed to keep friends abreast of the user’s activities, and from this earned a reputation as a platform for relatively banal life updates; one market research company, Pear Analytics, went as far as describing the majority of *Twitter* content as “pointless babble” in a 2009 report that was widely criticised for its lack of attention to the very significant role that phatic interpersonal communication can play. More considered studies of *Twitter* adoption across diverse domains (see e.g. Weller *et al.*, 2014) have pointed to significant uses across fields ranging from political communication and journalistic coverage through crisis communication, brand communication, and scholarly communication to communal television audiencing, sports fandom, and the maintenance of social ties. Such work has contributed to what Richard Rogers (2014)

has described as the “debanalisation” of *Twitter*, which is now widely regarded as an important medium for many aspects of professional and private life.

Available space does not permit more than a few brief sketches of the most prominent of these uses, but a number of key aspects are worth stressing. We have already seen the introduction of *Twitter* hashtags as a direct attempt to make the platform more useful in covering natural disasters and other acute events, and *Twitter* has been widely recognised as an important tool in crisis communication (e.g. Hughes & Palen, 2009; Mendoza & Poblete, 2010; Palen *et al.*, 2010; Starbird & Palen, 2010), over a range of international events since the original San Diego fire in 2007. *Twitter* is deemed especially useful during such events for a number of reasons: when disaster strikes, it is often still possible for affected *Twitter* users at least to post brief status updates (possibly including images or videos) immediately from the disaster area, and they thus come to form an *ad hoc* human sensor network; this has even been exploited by a number of projects to detect earthquake events even before the seismic waves are registered by conventional sensors (Earle *et al.*, 2010). Further, the open and public nature of the platform makes it easy for ordinary users, but also for emergency responders to monitor the situation on the ground, as reported by *Twitter* users, by tracking relevant hashtag or keyword streams – as well as to respond by posting their own advisories to relevant hashtag feeds.

Similar processes also apply more widely to the coverage of other news events: *Twitter* is particularly well-suited to the rapid dissemination and subsequent discussion and evaluation of new news reports, both for individual news stories and for longer-term news events. As such news breaks, *Twitter*'s characteristics as an “ambient news” medium (Hermida 2010, 2014a; Burns, 2010) are particularly evident: always already existing as a background presence, much like ambient music, its news functions come to the fore when required for addressing new events, and in such contexts platform functionality enables the rapid assembly of an *ad hoc* public (Bruns & Burgess, 2015) to track and discuss these developments. This role was especially well visible in the context of the series of Arab Spring uprisings which began with the Tunisian revolution in 2010; while claims of *Twitter*'s (and social media's) role in causing these revolutions are most likely overstated, the platform certainly was an important tool enabling local and international observers to track events as they unfolded (Papacharissi & de Fatima Oliveira, 2012; Hermida, 2014b; Bruns *et al.*, 2013).

Further, the ability of *Twitter* to gather thematic publics has also been exploited by a range of mainstream media texts which position *Twitter* as a backchannel (Harrington *et al.*, 2013) to broadcast content or live events, from popular entertainment through sports to conferences. Twitter, Inc.'s own research reveals major peaks in user activity around events ranging from the annual Academy Awards and Eurovision Song Contest broadcasts through the football World Cup final to the first-run screening of TV episodes from popular drama and reality TV series; many such events now advertise their ‘official’ hashtags ahead of their broadcasts in order to ensure significant uptake by fans, but fans are also frequently creating their own ancillary hashtags as alternative discussion spaces. Such ‘social TV’ practices have drawn viewers back to live (rather than time-shifted) viewing, as real-time engagement with other fans via *Twitter* requires digital co-presence, and Twitter, Inc. has worked closely with television producers, sporting bodies, and other relevant organisations in promoting this use of its service.

In spite of these specific professional and/or thematic uses of *Twitter*, however, interpersonal social exchanges continue to account for a substantial portion of overall *Twitter* traffic. Indeed, the open-ended structure of the *Twitter* platform itself makes it possible for these uses to coexist alongside each other, and for users to transition seamlessly between various modes of using *Twitter*, from professional communication through live engagement to the maintenance of social ties. Some users have chosen to operate multiple *Twitter* accounts in order to separate professional from personal interests, each following different accounts and posting different content, while others combine a range of participation practices within the same account (and may occasionally alert their followers as they switch from one user persona to another). Twitter, Inc. has also introduced *Twitter* lists functionality that allows users to group the accounts they follow into a number of different lists, and to view only the updates posted by the accounts on a specific list; this allows for a filtering of all incoming tweets into feeds of updates from ‘political’, ‘news’, ‘sports’, ‘TV’, or other user-defined groups, for example.

In this context it should be noted that a very significant proportion of the global *Twitter* userbase never, or only very rarely, posts tweets of their own. This is an indication, on the one hand, of a substantial attrition rate, leaving behind accounts which were set up to explore the uses of *Twitter*, but were subsequently abandoned by their users. However, on the other hand it also points to a substantial use of *Twitter* for what Crawford describes as “listening” (2009), or what has elsewhere also been seen as “lurking”: that is, it indicates a use of *Twitter* as a real-time feed of updates from ‘interesting’ accounts (ranging from Barack Obama to One Direction) which replaces or augments the news feeds available from other sources. These ‘listening’ *Twitter* accounts may appear passive insofar as their own tweeting is concerned, but they are nonetheless actively receiving news from their chosen fields of interest via *Twitter*, forming part of their overall news diet.

The distribution of such *Twitter* uses and practices is likely to vary substantially around the globe. Research from the United States indicates that adolescent African-American users constitute a very significant userbase for *Twitter* in that country (Smith, 2011), while work on the Australian Twittersphere points to considerable use by comparatively affluent, urban, professional, well-educated users in the 25-55 age range (Sensis, 2013), but also to a significant influx of teen users since 2012 (Bruns *et al.*, 2014). Userbase demographics elsewhere are likely to vary further from these observations. In light of such considerable national and regional differences, any global observations about *Twitter* demographics and usage practices should be regarded with great scepticism, therefore.

Conclusion

While available space does not permit a detailed discussion of the overall history of *Twitter* as one of most prominent current real-time communication platforms, or a full review of the major uses of *Twitter*, this brief overview points to the considerable breadth and depth of the platform’s impact on contemporary public and private communication practices (for a more detailed discussion and an overview of key current research directions, see Weller *et al.*, 2014, and particularly Rogers, 2014). What emerges from this is a picture of *Twitter* as a platform that continues to evolve rapidly, driven by the interplay between Twitter, Inc.’s own development efforts and the ongoing evolution of user practices that adopt and adapt available functionality.

The considerable ecosystem of third-party developers and service providers which has emerged around *Twitter* constitutes a further node in this network of relationships: external *Twitter* developers, encouraged initially by Twitter, Inc.’s relatively permissive policies of access to its internal data, played a crucial role in extending *Twitter*’s functionality, as we have already seen from the preceding discussion. More recently, however, such access has been curtailed considerably by a change in Twitter, Inc.’s policies, as the company has sought more aggressively to generate a sustainable revenue stream. Such changes have undermined the activities of a significant part of the developer community (as well as of scholarly researchers), increasingly limiting further development to Twitter, Inc.’s activities alone (cf. Burgess & Bruns, 2015). This has made research and development around *Twitter* an increasingly precarious activity, and may well slow down or impede the further growth of the platform beyond its current positioning.

References

- Bordewijk, Jan L., and Ben van Kaam. 2003 [1986]. Towards a new classification of tele-information services. In *The New Media Reader*, eds. Noah Wardrip-Fruin and Nick Montfort, 576-582. Cambridge, Mass.: MIT P.
- Bruns, Axel. 2012. *Ad hoc* innovation by users of social networks: The case of *Twitter*. *ZSI Discussion Paper* 16. <http://eprints.qut.edu.au/49824/>. Accessed: 18 Apr. 2015.
- , and Jean Burgess. 2015. Twitter hashtags from *ad hoc* to calculated publics. In *Hashtag Publics: The Power and Politics of Discursive Networks*, ed. Nathan Rambukkana. New York: Peter Lang.

- , Tim Highfield, and Jean Burgess. 2013. The Arab Spring and social media audiences: English and Arabic Twitter users and their networks. *American Behavioral Scientist* 57(7): 871–898. doi: 10.1177/0002764213479374.
- , Darryl Woodford, Troy Sadkowsky, and Tim Highfield. 2014. Mapping a national Twittersphere: A ‘big data’ analysis of Australian Twitter user networks. Paper presented at the European Communication Conference (ECREA), Lisbon, 13 Nov. 2014.
- Burns, Alex. 2010. Oblique strategies for ambient journalism. *M/C Journal* 13(2). <http://journal.media-culture.org.au/index.php/mcjournal/article/view/230>. Accessed: 18 Apr. 2015.
- Burgess, Jean, and Axel Bruns. 2015. Easy data, hard data: The politics and pragmatics of Twitter research after the computational turn. In *Compromised Data: From Social Media to Big Data*, eds. Ganaele Langlois, Joanna Redden, and Greg Elmer, 68–88. London: Bloomsbury.
- Crawford, Kate. 2009. Following you: Disciplines of listening in social media. *Continuum* 23(4): 525–535.
- Earle, Paul, Michelle Guy, Richard Buckmaster, Chris Ostrum, Scott Horvath and Amy Vaughan. 2010. OMG earthquake! Can Twitter improve earthquake response? *Seismological Research Letters* 8(12): 246–251.
- Halavais, Alexander. 2014. Structure of Twitter: Social and technical. In *Twitter & Society*, eds. Katrin Weller, Axel Bruns, Jean Burgess, Cornelius Puschmann, and Merja Mahrt, 29–42. New York: Peter Lang.
- Harrington, Stephen, Tim Highfield, and Axel Bruns. 2013. More than a backchannel: Twitter and television. *Participations: Journal of Audience & Reception Studies* 10(1): 405–409.
- Hermida, Alfred. 2010. From TV to Twitter: How ambient news became ambient journalism. *M/C Journal* 13(2). <http://journal.media-culture.org.au/index.php/mcjournal/article/view/220>. Accessed: 18 Apr. 2015.
- . 2014a. Twitter as an ambient news network. In *Twitter & Society*, eds. Katrin Weller, Axel Bruns, Jean Burgess, Cornelius Puschmann, and Merja Mahrt, 359–372. New York: Peter Lang.
- , Seth C. Lewis, and Rodrigo Zamith. 2014b. Sourcing the Arab Spring: A case study of Andy Carvin’s sources on Twitter during the Tunisian and Egyptian revolutions. *Journal of Computer-Mediated Communication* 19(3): 479–499.
- Hughes, Amanda L., and Leysia Palen. 2009. Twitter adoption and use in mass convergence and emergency events. *International Journal of Emergency Management* 6(3–4): 248–260.
- Mendoza, Marcelo, Barbara Poblete, and Carlos Castillo. 2010. Twitter under crisis: can we trust what we RT? Paper presented at the 1st Workshop on Social Media Analytics (SOMA ’10). Washington, DC: ACM.
- Messina, Chris. 2007. Groups for Twitter; or A proposal for Twitter tag channels. *FactoryCity*, 25 Aug. 2007. <http://factoryjoe.com/blog/2007/08/25/groups-for-twitter-or-a-proposal-for-twitter-tag-channels/>. Accessed 18 Apr. 2015.
- Palen, Leysia, Kate Starbird, Sarah Vieweg, and Amanda Hughes. 2010. Twitter-based information distribution during the 2009 Red River Valley flood threat. *Bulletin of the American Society for Information Science and Technology* 36(5): 13–17.
- Papacharissi, Zizi, and Maria de Fatima Oliveira. 2012. Affective news and networked publics: The rhythms of news storytelling on #Egypt. *Journal of Communication* 62: 266–282. doi: 10.1111/j.1460-2466.2012.01630.x.
- Pear Analytics. 2009. Twitter study—August 2009. <http://www.pearanalytics.com/wp-content/uploads/2012/12/Twitter-Study-August-2009.pdf>. Accessed 18 Apr. 2015.
- Rogers, Richard. 2014. Debanalising Twitter: The Transformation of an Object of Study. In *Twitter & Society*, eds. Katrin Weller, Axel Bruns, Jean Burgess, Cornelius Puschmann, and Merja Mahrt, ix–xxvi. New York: Peter Lang.
- Sensis. 2014. Yellow™ social media report: What Australian people and business are doing with social media. <https://www.sensis.com.au/content/dam/sas/PDFdirectory/Yellow-Social-Media-Report-2014.pdf>. Accessed 18 Apr. 2015.
- Smith, Aaron. 2011. Twitter update 2011. *PewResearchCenter: Internet, Science & Tech*, 1 June 2011. <http://www.pewinternet.org/Reports/2011/Twitter-Update-2011/Main-Report.aspx>. Accessed 18 April 2015.

Starbird, Kate, and Leysia Palen. 2010. Pass it on? Retweeting in mass emergency. *Proceedings of the 7th International ISCRAM Conference*. Seattle: ISCRAM.

Twitter, Inc. 2015. About. <https://about.twitter.com/company>. Accessed 18 Apr. 2015.

Weller, Katrin, Axel Bruns, Jean Burgess, Cornelius Puschmann, and Merja Mahrt, eds. 2014. *Twitter & Society*. New York: Peter Lang.