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Talking of many things: Using topical networks to study discussions in social media

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Abstract

This paper outlines a method for studying online activity using both qualitative and quantitative methods: topical network analysis. A topical network refers to "the collection of sites commenting on a particular event or issue, and the links between them" (Highfield, Kirchhoff, & Nicolai, 2011, p. 341). The approach is a complement for the analysis of large datasets enabling the examination and comparison of different discussions as a means of improving our understanding of the uses of social media and other forms of online communication. Developed for an analysis of political blogging, the method also has wider applications for other social media websites such as *Twitter*.

Keywords:
(Topical) networks
Social media
Hyperlinks
Blogs
Public debate
Issue publics

Introduction

Social media facilitate the development of conversations online around particular events or topics of interest, where participation is not necessarily limited by geographical or social factors. A message posted publicly on *Twitter*, for example, is potentially visible to all users of the site, and indeed to people without *Twitter* accounts themselves. Such web-based communication platforms offer ways for opinions, messages, and content to be shared and repurposed quickly and easily. While we might refer to *Twitter*, *Facebook*, or the blogosphere as singular entities to identify where discussions are taking place, though, the individuals using these platforms are not the same (and, indeed, the likes of *Facebook* and *Twitter* are not used in isolation); their motivations for using these sites vary, and so does their respective interest in a given subject of conversation. The group of bloggers responding to a specific political issue, for example, may be different to the group discussing the previous weekend's sports results. Different discussions will also take varying forms, although occurring within the same space. For instance, responding to crises, publishing live commentary on televised events, or taking part in a conference backchannel may involve different users, interactions, and types of information, but they co-exist within the overall activity hosted on sites such as *Twitter*.

To study how discussion takes place within, and across, social media platforms, researchers might establish long-term projects, tracking a group of users over time. This approach provides important cumulative data for identifying patterns of use – such as how many posts were published by bloggers over time, or which bloggers posted most often. This overall, baseline data is useful for examining *what* the research has found – the overall posting patterns, the most and least active users, for example. However, it does not easily explain the patterns discovered. As boyd and Crawford (2012) note in their discussion of studies involving 'Big Data', the analysis of large datasets from online sources, such as *Twitter* archives, can lead researchers to find "patterns where none actually exist, simply because massive quantities of data can offer connections that radiate in all directions" (p. 668).

To provide additional insight into online activity, this paper promotes the study of *topical networks*: "the collection of sites commenting on a particular event or issue, and the links between them" (Highfield, Kirchhoff, & Nicolai, 2011, p. 341). Using such units of analysis within large datasets is not intended to replace 'Big Data'-type studies, but to supplement them by examining the tracked activity in greater detail. Identifying topical networks using these large datasets enables researchers to determine *why* and *when* connections were made, and the context for the discussion of particular topics. This method may also be employed within smaller datasets too, of course; in response to critiques of the quantitative focus of 'Big Data', though, this approach can also provide some qualitative exploration of sections of large datasets.

Topical network analysis follows Rogers's (2009) promotion of investigating the 'online groundedness' of online activity, where research follows a particular online medium, to track "its dynamics, and makes grounded claims about cultural and societal change" (p. 8). The specific methods used for analysing data will vary from project to project, depending on the tools used. Due to these differences, this paper does not aim to set out a step-by-step process. Instead, it argues at the conceptual level for a mixed-methods approach to gain further value from large, rich datasets. The following sections provide an initial overview of topical networks and the methods for their identification and analysis, and the advantages and limitations of this approach. An example from the Australian political blogosphere is used to illustrate this process. I also outline connections between topical networks and concepts developed around both public communication and online activity, such as issue publics and web spheres, which provide theoretical grounding for this analysis. Finally, I note further directions and applications of this approach.

Topical networks

Topical networks were initially identified within a long-term research project comparing political blogging in Australia and France (Highfield, 2011), as a way of locating and comparing specific discussions within these blogospheres. The definition cited above applied to bloggers' coverage of particular themes and their linking to other blogs and web sources. However, topical networks are not restricted

to the blogosphere alone. Rather than referring to 'sites', the definition can be expanded to encompass multiple social media platforms, or concentrate on activity on a single website, such as *Twitter*. In this latter case, the topical network could feature the different users commenting on a particular issue, such as through a central hashtag. The websites involved will vary between studies, adapting the method in the process as topical networks are examined within a range of contexts, including politics, economics, popular culture, health, and education. Regardless of the research's focus, though, the resulting topical network will be oriented around a specific thematic discussion, often within a longer-term study of a wider population of sites or users.

In this paper, I draw on research using web-based, publicly accessible data, captured from blog posts. However, the same analytical approaches may be used on other datasets. From an education perspective, for example, a collection of *Blackboard* bulletin board posts may be categorised by the subjects covered in the text, providing the initial basis for topical networks within the dataset. While this paper examines explicit network data through hyperlinks, implied connections may also be used to demonstrate the links between users. Such implied links might appear through replies to other discussion board posts, which might not have a hyperlink to signify the connection. Even without 'networked' data, the 'topical' approach may be used to examine different types of online communication.

The comparative topical network approach discussed here was developed in response to studies of large, long-term datasets, as a means of examining specific thematic discussions within the wider data collected The analysis of several months' or years' worth of data provides valuable information about patterns of use for different websites, such as the extended coverage of Arabic and Persian blogging by, respectively, Etling, Kelly, Faris, and Palfrey (2010), and Kelly and Etling (2008). However, the wider analysis alone does not explain the behaviours tracked, for example, what topics were discussed during a spike or lull in activity or the context for links to external websites.

To answer these questions, topical network analysis takes a multi-process, mixed methods approach. First, relevant keywords are used to identify and isolate

from the wider dataset the data pertaining to a chosen topic, such as blog posts, discussion board contributions, or tweets commenting on specific public figures, organisations, or events. The selected data then form the basis of the topical network. Following the identification of relevant content, a series of quantitative and qualitative processes may be used in combination to examine the discussions and activity represented within the topical network. For example, quantitative methods are used, as with the overall datasets, to determine patterns of activity. Such patterns include the number of contributions per week, day, or hour, the total contributions per user, blogger, or website, and any noticeable spikes or troughs in the discussions.

Depending on the type of data represented within the topical network (tweets, blog posts, and so on), different processes can be used to further analyse the coverage of the chosen topic. Hyperlink network mapping, for example, draws on the networked aspect of the data in question, through explicit hyperlinks to other online sources. Visualising these connections as network maps can then demonstrate which sources are common references for the participants contributing to the topical network. The visualisation process can also help to identify any clusters of users and sources within the overall network, where a smaller group of users link to each other or a distinct collection of websites that are not cited, at least not as frequently, by the rest of the network. However, it should also be noted that, while network maps provide important visual cues around the connections between users, and help to make sense of the links present within large datasets, visualisation by itself does not provide an explanation as to *why* these connections are made. Similarly, while hyperlinks are often used as indicators of connections between different websites, not all links are the same (see Adamic, 2008; Halavais, 2008).

Topical network analysis also makes use of approaches such as textual analysis to determine the context for the studied discussions. These methods allow studies to take into account different aspects of social media that might not be possible with large-scale, automated data processing, such as differentiating between link type – such as links in blog posts, blogrolls, or comments on posts – and examine what these links can tell us about online communication. This approach can also negate the question surrounding the longevity of connections between participants in the network. Links featured within blog posts are not necessarily

permanent indicators of affiliation or endorsement. A blogger may cite another's work once, in reference to a specific subject, but then never again in their later posts. The link from one blogger to another would still appear within the overall dataset collected, yet analysing the total patterns does not provide any context for this connection. Bruns (2012) raises a similar conceptual question around the lifespan of content and links posted on *Twitter*, asking for how long do the connections between users linked by @replies last. The answer to this temporal dilemma is beyond the scope of this paper; as is the case for other aspects of these studies, though, the wider context for these links will be important (for example, the rate of posting per user and overall, the time period covered by the discussion, and any repetition of the links).

Further processes involve analysing the text of relevant posts individually to provide a qualitative view of the topical network data. Rather than treating the network as a like-minded whole, covering the chosen topic to an equal degree, the textual analysis demonstrates the different responses to the topic, and the context for these comments. While each blog post or tweet contains a relevant keyword for the topical network, the surrounding text might have a different subject as its focus, or the topic in question might be framed around an alternative context. These distinct ways of commenting on a given topic are not as easily identified within quantitative analysis alone, highlighting the value of examining at a qualitative level the activity captured within large datasets to understand the topical networks.

The different discussions tracked by topical networks might also take varying forms depending on the type of event or issue covered. The live-blogging or -tweeting of a sporting event or televised debate may lead to a topical network which is completely dissimilar to that formed in response to a crisis or scandal, with different patterns of posting, linking, and sharing information - even when drawn from the same overall dataset. Similarly, the coverage of the same issue on different websites may also vary, depending on such factors as the number of people contributing to discussions and their personal or professional interest in the topic at hand. For example, tracking health-related issues on a specialist forum or discussion board, where health is the main subject to be covered, may depict a debate that is dissimilar to that captured from more general hashtag or keyword archives on *Twitter*.

Elmer (2006) notes that using a combination of qualitative and quantitative

methods allows researchers to analyse in greater detail the dynamics of different discussions (p. 15).This idea guides topical network analysis and its mixed-methods approach to studying large datasets. This method enables the researcher to compare numerous discussions taking place at different points in the data, providing a means for contextualising overall patterns and accounting for possible variations within 'Big Data' projects. Most importantly, topical networks enable researchers to examine how the coverage of a given issue plays out within the wider data, such as how the discussion of a particular person or subject develops over time.

Conceptual review

Topical networks have their theoretical roots in several concepts concerning the shape of public debate. Some of these are directly applicable to online media, while others were developed independently and subsequently adapted to this context. Topical networks depict discussions taking place around specific issues. The connections here are not necessarily permanent associations, and the discussions may develop and decline quickly. This idea links to the notion of multiple, temporary issue publics appearing within a more constant, wider-scope public sphere (or public spheres). These assemblages may overlap, with people contributing to more than one debate, but each issue public is centred on particular topics or themes (see Dahlgren, 2009). The shape of an issue public will change over time, and the context for each group means these publics will also take different forms in comparison with each other. Different contributors will comment on a range of topics, with no requirement to contribute to all or any debates.

The type and frequency of comments by each person involved in the topical network will also vary based on a number of professional and personal factors. For example, Jang and Park (2012) note the presence of 'issue specialists' within discussions, based on the subject in question being an issue of personal relevance. In addition, individuals with a professional background in aspects of the topics covered by the network may be among the most active contributors to the discussion. Within the Australian political bloggers, for instance, different groups of specialists were identified within the wider blogosphere, who would contribute to political debate by adding new interpretations of the issues at hand based on their

own economics or polling data analyses (Highfield, 2011).

The discussions featured in this paper do not necessarily focus on one particular interpretation of an issue. As Marres (2006) notes, the presence of a group of people in conversation does not mean that participants agree with each other. A great number of voices contribute to public debate overall, with smaller, topical debates taking place among a subset of these participants, each of whom have varying levels of engagement with the topics in question.

While issue publics may develop away from computer-mediated communication, there are internet-specific concepts which also help develop the ideas behind topical networks. These include web spheres (Schneider & Foot, 2005) and issue networks (Marres, 2006), both of which are formed around issue- or event-driven debates, and include both the individuals contributing to the debate and the resources used within these discussions. Such groups can be platform-specific. Bruns and Burgess (2011) suggest that the use of hashtags within tweets "facilitates the *ad hoc* emergence of issue publics made up of interested *Twitter* users around these topics" (p. 38).

Topical network analysis provides researchers with the capability to compare patterns and citations across different events and over time. Each discussion sees the creation of a temporary issue public within the larger group represented in the larger dataset, but there is no way of predicting which users will comment on which subject. In a dataset containing a known number of contributors, such as tracking the output of several *Twitter* accounts, topics might be covered by any, all, or none of the individuals concerned. Topical networks then become potentially ideal cases for the study of issue publics. Debates published online are traceable through collections of blog posts, status updates, retweets, and links. Previous studies have examined topical discussions online, focusing on specific cases rather than debates within a wider dataset; for example, Bruns's (2007) research into mentions by bloggers of an Australian detainee at Guantanamo Bay, or the analysis of how bloggers responded to Hurricane Katrina by Macias, Hilyard, and Freimuth (2009). Similarly, topical conversations on *Twitter* have been studied based on individual hashtags or keywords (for example, #ausvotes - Bruns & Burgess, 2011; #wikileaks - Lindgren & Lundström, 2011). Not only are these debates easily searchable and automatically

connected through the creation of links for each hashtag, but they can also connect separate discussions around a shared theme – the use of any hashtag is not dependent on following other accounts also posting on this topic. Finally, several studies also track *Twitter* activity based not on keywords but on a list of user accounts, such as politicians and journalists (Maireder, Ausserhofer, & Kittenberger, 2012); from the collected tweets of these users, keywords can again be used to identify topical discussions within the wider activity captured.

Identifying and analysing topical networks: case study

Topical networks may then be identified within the wider activity on, and across, numerous websites. These networks may be located and analysed from a larger dataset of activity, or captured individually as part of an ongoing comparison of online discussions. This process allows researchers to show which subjects attract the widest or most specialist interest among groups of users. Such groups might be genre-specific, such as the collection of political blogs studied here, or they might track activity within a local or national user base. For example, Bruns, Burgess, Kirchhoff, and Nicolai (2012) have mapped how hashtagged discussions representing local and international news stories, sports events, and television programmes were distributed across a network of 120,000 Australian *Twitter* users.

Because of the range of data formats, tools, and methods that might feature within different projects, this paper does not seek to list specific, step-by-step processes for the identification and analysis of topical networks. However, this section provides a brief overview of an example from the Australian political blogosphere (Highfield, 2011) to illustrate an approach to topical network analysis. Although aspects of the methods used here might not be appropriate for all studies attempting to track discussions within online communication, the framework guiding the analysis may be applicable to a variety of cases.

The context for the following topical network was a wider research project capturing the published outputs of a sample of Australian and French political bloggers between January and August 2009. During this period, 10,529 posts were archived from 61 Australian political blogs. From each post, data were extracted,

such as the date and time posted, links within posts, and the text of each post, ahead of further analysis. The two datasets were then analysed separately to determine the overall activity represented by the collected posts. This process included identifying the most active sites, most popular sources based on links received, and any peaks or troughs in daily posting activity.

However, these overall patterns cannot show the reactions of bloggers to specific topics. Analysing just the total posting and linking activity treats these almost as permanent blogging behaviours, where bloggers are active and sources linked to at a constant rate. Within the captured posts, though, myriad topics are discussed, provoking different responses from the bloggers in the sample. Not all bloggers will discuss the same topics, and their own commitments may mean that a blogger does not post for several weeks or months.

These variations can be examined, though, by moving from the wider study of the overall population to the more focused topical networks. This paper provides a brief discussion of one such network, formed around the Australian 'Utegate' political scandal between June and August 2009. This scandal centred on allegations against the then-Prime Minister and Treasurer of preferential treatment for a Queensland car dealer seeking government assistance in response to the global financial crisis. This case is investigated in further detail, alongside additional political topical networks, by Highfield (2011); for this paper, it serves to illustrate the concepts and framework behind topical network analysis.

To locate the topical network, the wider dataset was filtered to isolate relevant blog posts. In this case, the dataset was filtered at the keyword level (as opposed to limiting the data by a range of dates), in order to track the growth and decline of interest in a topic which had a clear starting point within the collected data. The Utegate topical network was created by searching for posts containing key terms (Utegate, Ozcar) and names specific to the scandal (Godwin Grech). The resulting network drew on data from 52 posts from 17 blogs, published over eight weeks between June and August 2009.

The filtered data form the basis for the topical network analysis. First, the

network was compared to the wider activity during the same period, to evaluate the level of interest in the subject among the bloggers in question. For Utegate, its peak activity on 21 June accounted for over ten percent of the posts published that day. However, within the two month period overall, Utegate featured in less than two percent of the total blog posts captured. This suggests that the scandal was not a prominent topic for Australian political bloggers, even though it was a leading story in mainstream media publications at points during the same period.

The topical network analysis then uses different processes to further examine how and why bloggers were discussing the events and issues at hand. Hyperlinks included in each post were extracted to identify which sources were cited during these discussions. Network visualisations aided the process by highlighting the prominence of different sources and bloggers within each topical network. These visualisations were created by representing each link as a directed connection between two sites – *from* the blogger in question *to* the external website. In their coverage of the Utegate scandal, the Australian bloggers contributing to the topical network linked to domestic news sites – as expected, given the local focus of the scandal – and in particular to the websites of News Limited publications.

However, the hyperlink analysis itself is still initially a quantitative process. Here, the context for the links is absent – citing a news article or another blogger is not necessarily endorsement of the views presented, for instance. Textual analysis of the topical network blog posts was then carried out using the *Leximancer* software to discover the actual subjects featured by the bloggers in the sample. This automated process was supplemented by manually analysing the posts to evaluate the intentions behind bloggers' choices of links. The Utegate analysis highlights the importance of qualitative methods to topical network analysis. Although News Limited websites were linked to by several Australian bloggers discussing the scandal, these references were not necessarily positive. Instead, bloggers mentioning Utegate commented less on the scandal itself, and more on its disrupting impact on other political issues, or on the way that it was being covered by the mainstream media. In particular, the reporting of Utegate by News Limited publications was criticised by several bloggers, for its content and stance, and also for focusing attention on what the bloggers considered a non-issue. This disapproval

was accompanied by links to specific articles which were promoting Utegate instead of political issues that bloggers saw as more worthy or deserving of media attention.

The hyperlink and textual analysis of the topical networks also confirmed patterns from the wider dataset; the overall linking patterns between the blogs in the sample suggested that several thematic groups were present within the Australian political blogosphere. These groups were centred on shared topics, including economics and psephology (the study of voting and polling data). While representatives of these groups discussed Utegate, their posts remained within the context of their specialist subjects: for example, analysing the opinion polls released after the scandal broke, mentioning Utegate as a contributing factor for rising or falling approval ratings.

These findings further demonstrate the various perspectives and interpretations involved within a single discussion. To illustrate these topical variations within the network itself, composite network visualisations were created. This process drew on both the hyperlink and textual analysis to depict the distribution of different themes through the topical network; Figure 1 shows an example composite visualisation, showing the different themes featured, and sources cited, by Australian bloggers commenting on the Utegate scandal.
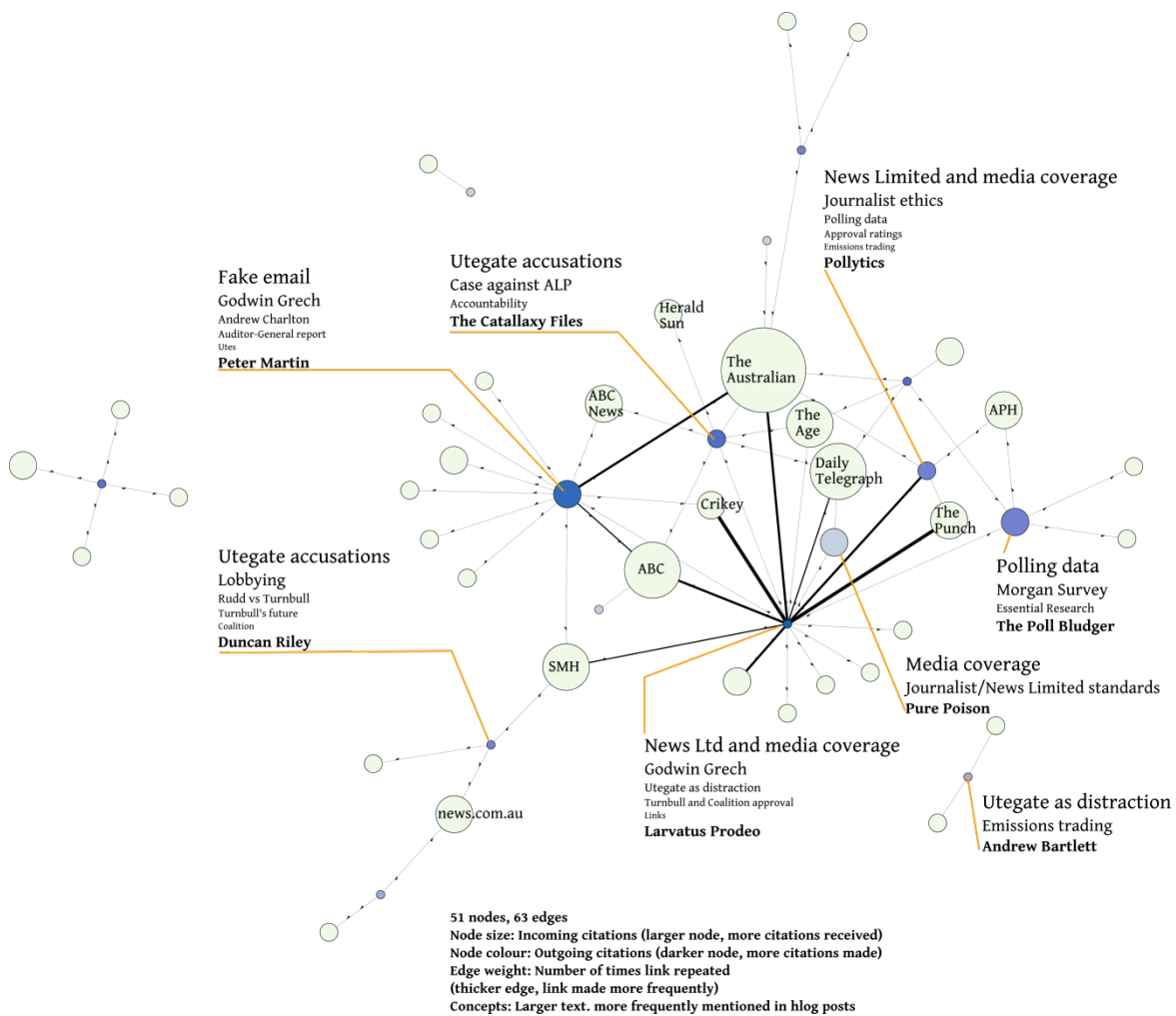
Fake email
Godwin Grech
Andrew Charlton
Auditor-General report
Utes
Peter Martin

Utegate accusations
Case against ALP
Accountability
The Catallaxy Files

Utegate accusations
Lobbying
Rudd vs Turnbull
Turnbull's future
Coalition
Duncan Riley

News Limited and media coverage
Journalist ethics
Polling data
Approval ratings
Emissions trading
Pollytics

Polling data
Morgan Survey
Essential Research
The Poll Bludger

Media coverage
Journalist/News Limited standards
Pure Poison

News Ltd and media coverage
Godwin Grech
Utegate as distraction
Turnbull and Coalition approval
Links
Larvatus Prodeo

Utegate as distraction
Emissions trading
Andrew Bartlett

Nodes: Herald Sun, The Australian, The Age, ABC News, Daily Telegraph, APH, Crikey, ABC, The Punch, SMH, news.com.au

51 nodes, 63 edges
Node size: Incoming citations (larger node, more citations received)
Node colour: Outgoing citations (darker node, more citations made)
Edge weight: Number of times link repeated
(thicker edge, link made more frequently)
Concepts: Larger text. more frequently mentioned in hlog posts

Figure 1: Composite Utegate topical network visualisation, showing key sources and topics featured by selected bloggers.

Why topical networks?

As the Utegate case study shows, an advantage of the topical network approach is found in the snapshots extracted from the wider dataset. By focusing on temporary groups within a larger population of users or sites, topical networks provide the opportunity to evaluate how public debate takes place online, such as within the blogosphere or social media. For example, different discussions within the political blogosphere might be compared to examine whether bloggers link only to individuals sharing the same political affiliation or ideology, as demonstrated either explicitly on their sites or implicitly through their coverage of issues. Collections of tweets on matters of public interest may be studied to evaluate whether social media users follow the mainstream media in their coverage of issues, or whether they promote alternative interpretations of these themes. However, although topical network analysis method was developed for studying political communication online, the approach has applications beyond this context, as there are many different discussions and uses of social media taking place simultaneously.

The identification and study of topical networks within larger datasets allows for a more nuanced examination of online activity. Patterns and statistics derived from the total data collected provide important contextual information, and serve to introduce the subject of the study – the users or sites tracked. Although the resulting overview of the collected data shows the total activity, though, it does not provide information about the dynamics of discussions within different contexts. The study of topical networks then provides a crucial counterpoint to the analysis of the whole period, composite dataset. Instead of viewing the baseline data as the definitive picture of the groups studied, topical networks question the users featured and the connections made between them and other sites. By isolating topical networks within large datasets, the researcher can examine whether the wider patterns are consistent for all contexts, or if different sites become prominently linked in response to particular themes.

Topical network analysis is still an exploratory method, though, and is not without its limitations. The keyword-oriented method of identifying topical networks does not necessarily locate all relevant material. For research into *Twitter* activity, for example, more extensive topical networks might be identified around a mixture of keywords and hashtags; in cases where multiple hashtags are used, such as when a central tag has not yet been agreed upon, searching for particular keywords can supplement the filtered data. Posting about a specific subject on *Twitter* does not also require the relevant hashtags to be included in tweets. Australian political discussion on *Twitter* often includes the #auspol hashtag, for example, but also encompasses tweets not containing this marker. Similarly, blog posts might include common labels or categories for their posts to note the primary topics featured, but again there is no requirement for this.

As with any study of online activity, especially around *Twitter* and blogs, it is important to acknowledge the representative limits of the datasets used. While the collected tweets analysed may number in the thousands or millions, the people involved in the specific discussion on *Twitter* are not necessarily representative of the total population, nor indeed of everyone using the internet. Similarly, the presence of links in tweets, blog posts, or on discussion boards does not mean the endorsement of the site linked to, and it certainly does not imply that people seeing the link will follow it. As noted earlier, too, how to define the lifespan of links and connections between users is a question still to be definitively answered when examining online communication.

The findings from projects tracking a specific group of users or sites, as with the study of French and Australian political bloggers, are also subject to limitations. While the analysis may draw on large datasets, it is highly unlikely that the data will reflect all posts by every political blogger in Australia and France, for example. Although some online communication platforms, such as discussion boards, might provide more closed environments for research, sites such as *Wordpress*, *Blogger*, or *Twitter*, which are not restricted by paywalls or required technical knowledge, have extensive userbases. Instead of trying to track the entire network forming the blogosphere, for example (which, with the presence of locked, and private blogs, is near-impossible), the research here follows a 'partial network' approach (Hogan,

2008). Here, small subsets of the network provide a microcosm of the wider network, with findings and patterns extrapolated upon for more general conclusions about online activity. However, it is still important to note that the research is not studying *all* participants within online discussions. There are also significant ethical questions around collecting online data, and how to use this within research, which have not been definitively answered even for web-based content which is publicly accessible. While it is not the aim of this paper to discuss debates of online ethics, these questions will need to be addressed in projects studying internet-mediated activity.

Limits also apply to the scope of the topical networks themselves; for example, the blogging case study featured here provides an overview of activity within the blogosphere in question. However, it does not take into account any discussions on the same topic published on other websites or social media platforms, or indeed offline. Further topical networks might draw upon multiple websites for their analysis, but this was not the aim of the initial research and is beyond the scope of this paper.

Finally, while topical network analysis brings together aspects of quantitative and qualitative methodologies, linking such processes as textual analysis and social network analysis, additional work is required to bring out further detail about who is contributing to the discussion and why. More qualitative work would help to further examine the motivations and rationale behind posting, commenting, or linking. For example, interviewing participants about their uses of online communication and interest in particular topics, would provide new, more nuanced information than might be found on the websites in question.

Conclusion

The case study outlined here demonstrates how topical network analysis complemented the wider patterns of activity tracked within the total dataset used in this project. This example provides an initial account of the use of a method which has important applications for further studies into online communication. As research continues into the dynamics of conversations online, investigating how discussions start and spread, and which topics gain traction where, topical network analysis

allows for a consistent approach to identifying, examining, and comparing different discussions within a single dataset.

Although it was developed for studying political blogging, the topical network method is transferable across different platforms. By using a mixture of qualitative and quantitative methods, some of which are outlined in this paper, research can move beyond the large-scale overviews of analysis into 'Big Data', and focus on specific activity within these datasets. This is not to undervalue the insights provided by 'Big Data'; topical networks are intended not to replace the analysis of large datasets, but rather to provide additional detail and nuance in examining the online activity tracked in these projects.

There is further scope for developing the topical network method here, particularly by examining multiple platforms concurrently. The discussion of a particular event is not limited to *Twitter* alone, and nor are the participants. Future research may track the dynamics of specific conversations not just within the blogosphere, but across social media in general. As with the single-platform case study outlined here, identifying topical networks within this space will support ongoing research into online activity. By comparing different conversations within a wider dataset, the method enables researchers to develop, develop further conclusions than would be possible from looking at a single case study or the baseline data alone. In doing so, topical networks provide more grounded information about how a platform is used, what its users are contributing, and how discussions online may suddenly appear, and just as quickly fade away.

Acknowledgements

References

Adamic, L. A. (2008). The Social Hyperlink. In J. Turow & L. Tsui (Eds.), *The Hyperlinked Society: Questioning Connections in the Digital Age* (pp. 227–249). Ann Arbor: University of Michigan Press and University of Michigan Library.

boyd, d., & Crawford, K. (2012). Critical Questions for Big Data. *Information, Communication & Society*, *15*(5), 662–679. doi:10.1080/1369118X.2012.678878

Bruns, A. (2007). Methodologies for mapping the political blogosphere. *First Monday*, *12*(5). Retrieved from http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/issue/view/235

Bruns, A. (2012). How Long Is a Tweet? Mapping Dynamic Conversation Networks on Twitter Using Gawk and Gephi. *Information, Communication & Society*, *15*(9), 1323–1351. doi:10.1080/1369118X.2011.635214

Bruns, A., & Burgess, J. (2011). #ausvotes: How Twitter Covered the 2010 Australian Federal Election. *Communication, Politics & Culture*, *44*(2), 37–56.

Bruns, A., Burgess, J., Kirchhoff, L., & Nicolai, T. (2012). Mapping the Australian Twittersphere. Paper presented at Digital Humanities Australasia, Canberra, 30 March 2012.

Dahlgren, P. (2009). *Media and political engagement: Citizens, communication, and democracy.* New York, NY: Cambridge University Press.

Elmer, G. (2006). Re-tooling the Network: Parsing the Links and Codes of the Web World. *Convergence: The International Journal of Research into New Media Technologies*, *12*(1), 9–19. doi:10.1177/1354856506061549

Etling, B., Kelly, J., Faris, R., & Palfrey, J. (2010). Mapping the Arabic blogosphere: politics and dissent online. *New Media & Society*, *12*(8), 1225–1243. doi:10.1177/1461444810385096

Halavais, A. (2008). The Hyperlink as Organizing Principle. In J. Turow & L. Tsui (Eds.), *The Hyperlinked Society: Questioning Connections in the Digital Age* (pp. 39–55). Ann Arbor: University of Michigan Press and University of Michigan Library.

Highfield, T. (2011). *Mapping intermedia news flows: Topical discussions in the Australian and French political blogospheres.*(Doctoral thesis). Retrieved from http://eprints.qut.edu.au/48115/

Highfield, T., Kirchhoff, L., & Nicolai, T. (2011). Challenges of tracking topical discussion networks online. *Social Science Computer Review*, *29*(3), 340–353. doi:10.1177/0894439310382514

Hogan, B. (2008). Analyzing social networks via the internet. In N. Fielding, R. M. Lee, & G. Blank (Eds.), *The SAGE Handbook of Online Research Methods* (pp. 141–160). London: SAGE.

Jang, S. M., & Park, Y. J. (2012). The Internet, selective learning, and the rise of issue specialists. *First Monday*, *17*(5). Retrieved from http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/3888/3206

Kelly, J., & Etling, B. (2008). Mapping Iran's online public: Politics and culture in the Persian blogosphere. Berkman Center for Internet & Society: Harvard Law School. Retrieved from http://cyber.law.harvard.edu/publications/2008/Mapping_Irans_Online_Public

Lindgren, S., & Lundström, R. (2011). Pirate culture and hacktivist mobilization: The cultural and social protocols of #WikiLeaks on Twitter. *New Media & Society*, *13*(6), 999–1018. doi:10.1177/1461444811414833

Macias, W., Hilyard, K., & Freimuth, V. (2009). Blog Functions as Risk and Crisis Communication During Hurricane Katrina. *Journal of Computer-Mediated Communication*, *15*(1), 1–31.

Maireder, A., Ausserhofer, J., & Kittenberger, A. (2012). Mapping the Austrian Political Twittersphere: How politicians, journalists and political strategists (inter-)act on Twitter. In P. Parycek & N. Edelmann (Eds.), *Proceedings of CeDem12 Conference for E-Democracy and Open Government* (pp. 151–164). Krems, Austria: Danube University. Retrieved from http://phaidra.univie.ac.at/o:154914

Marres, N. (2006). Net-work is format work: Issue networks and the sites of civil society politics. In J. Dean, J. W. Anderson, & G. Lovink (Eds.), *Reformatting politics: Information technology and global civil society* (pp. 3–17). Hoboken, NJ: CRC Press.

Rogers, R. (2009). *The End of the Virtual: Digital Methods*. Amsterdam: Vossiuspers UvA.

Schneider, S. M., & Foot, K. A. (2005). Web sphere analysis: An approach to studying online action. In C. Hine (Ed.), *Virtual methods: Issues in social research on the Internet* (pp. 157–170). Oxford: Berg Publishers.