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Characterising University Library Use of Social Media: A Case Study of Twitter and Facebook from Australia

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The work presented here characterises the engagement of one university library with two social media platforms popular with academic libraries. The collected data are analysed to identify the forms of Twitter and Facebook activity that engage library stakeholders in social media conversations. Associations were observed between: i) directed tweets from the library and mentions of the library by others on Twitter; and ii) comments from the library and comments from others on Facebook. Three broad classes of Twitter user interacting with the library were revealed: i) accounts strongly linked to the library with multiple to/from tweets; ii) those weakly linked to the library with, typically, a single tweet; and iii) those indirectly linked to the library through tweets mentioning the library and sent by other users. Two divergent forms of Facebook interaction with the library were highlighted: i) a library post generating a large sequence of comments, typically in response to a competition/challenge; and ii) a library post with no comments, typically a photo post or a post inviting readers to click a link to find out more about an event/service. The work presented here is an initial investigation that provides useful insights, and offers a methodology for future research.

Keywords: academic libraries; social media; Twitter; Facebook; network analysis

INTRODUCTION

Online social media systems have created new ways for individuals to communicate, share information and interact with a wide audience (Aharony, 2012; Lin & Ranjit, 2012; Rees & Hopkins, 2009). For organisations, social media provide new avenues for communication and collaboration with their stakeholders. However, any value created for an organisation through social media comes not from any particular platforms, but from how they are used (Busch, 2011; Culnan, McHugh, & Zubillaga, 2010; Dickson & Holley, 2010). While social media may be widely used by individuals and many organisations, their use in higher education generally is still relatively new (Busch, 2011; Forkosh-Baruch & Hershkovitz, 2012). The potential value of social media for academic libraries was recognised comparatively early on, with the term ‘Library 2.0’ (referring to the application of web 2.0 online tools to library functions) being coined by Casey in 2005 (Harinarayana & Raju, 2010; Mahmood & Richardson, 2011; Nguyen, Partridge, & Edwards, 2012). Following a period of piloting (Rees & Hopkins, 2009), applications of social media systems in library settings are now commonly reported (Chen, Chu, & Xu, 2012; Glazer, 2012; Mahmood & Richardson, 2011; Thornton, 2012). The growing ubiquitous presence and use of social media means that many libraries are using social media to engage their stakeholders in the online environment (Burkhardt, 2010; Collins & Quan-Haase, 2012). Social media offer real-time channels for information sharing...
and communication (Aziz, Chia, & Loh, 2010), and venues for interactive dialogue and knowledge exchange (Aharony, 2012; Kim & Abbas, 2010).

Given that students are both a key stakeholder group for libraries, and are a key user group of social media, it is not surprising that many libraries are looking to social media tools as a method for engaging students (Dickson & Holley, 2010; Phillips, 2011). The networked nature of social media systems means that information can flow between librarians and students, but it can also then travel further – from student to student (Mallon, 2012). Beyond being the physical or virtual gatekeepers of, and advisors about, information sources, traditionally, librarians may most directly interact with students in the provision of information literacy instruction. Many have identified social media channels as a modern way to engage students in learning about information literacy (Bobish, 2011; Mawhinney, 2010; Morrow, 2010), and/or see social media as an driver for the re-conception of information literacy as an element of digital literacy (Walstrum, Garcia, & Morisson, 2011). A range of case studies of library use of various social media tools can be found – YouTube (Colburn & Haines, 2012; Collins & Quan-Haase, 2012); Pintrest (Thornton, 2012); and Flickr (Collins & Quan-Haase, 2012). However, the use of Twitter and Facebook seem to be the most commonly observed social media applications for libraries.

One of the most widely-used social media tools employed by organisations is Twitter (twitter.com) (Burkhardt, 2010; Culnan et al., 2010). Twitter is a popular and rapidly growing ‘microblogging’ service where users can post quick and frequent short messages (up to 140 characters) called ‘tweets’, which may contain links to other online material such as photos and websites, to their ‘followers’ who have subscribed to their Twitter account (Dickson & Holley, 2010; Kim & Abbas, 2010). Tweets can be tagged with a searchable ‘hashtag’ (for example, an event might publicise a hashtag for participants to use so that tweets associated with the event can be easily collected via a tag search), and a user can ‘retweet’, to all of their followers, a tweet that they receive from another user (Forkosh-Baruch & Hershkovitz, 2012; Gallaugher & Ransbotham, 2010). Tweets can be directed specifically to other named user accounts, or broadcast generally to all followers of the sending account. Except for the content of tweets from protected (private) accounts, all tweets are effectively broadcast to ‘the world’ and are publicly discoverable via a search. There is a range of third-party applications that provide additional functionality on top of the Twitter platform and/or help manage Twitter content. Facebook (facebook.com) is a similarly popular social media system, with hundreds of millions of users (Aharony, 2012). Facebook has a number of user account types (profiles, groups and pages), and while they are intended for different purposes, they share the same basic features (Forkosh-Baruch & Hershkovitz, 2012) – a library would typically create a Facebook page. Facebook users have a personal profile that allows them to describe themselves and their interests, and through this locate and connect with other users and interest groups (Aharony, 2012). Individual users request to be ‘friends’ with other users, and if a request is accepted, this connection allows enhanced interactions between the two users. The main communication area in Facebook is a user’s ‘wall’, where they, and generally their friends, can post messages (‘posts’), and respond to messages by posting ‘comments’, and readers can vote for a post or comment by ‘liking’ it (Forkosh-Baruch & Hershkovitz, 2012). A more recent feature of Facebook is the user ‘news feed’, which an updating list of activity from their friends. For example, when a user’s friend makes a new friend, likes a page or message, etc., this is noted in the user’s news feed, so tends to encourage sharing and liking, and helps to build communities in Facebook (Aziz et al., 2010).
A 2010 study of 100 academic libraries in the USA found that 89 libraries had a presence on Facebook and 85 libraries were using Twitter (Mahmood & Richardson, 2011). A 2011 study of the 21 member libraries of the Ontario Council of University Libraries observed that 62% were using Twitter and 52% were using Facebook – the two most commonly used social media applications (Collins & Quan-Haase, 2012). Libraries report that both Twitter and Facebook are used because the features they provide work in related but different ways. It is indicated that Facebook is used for community building (Chen et al., 2012) and for providing static links to static library resources (Salisbury, Laincz, & Smith, 2012), while Twitter is used for communicating with individuals (Chen et al., 2012) and for timely updates about new resources and current events (Salisbury et al., 2012). The different functions and affordances that Twitter and Facebook offer libraries necessitate good coordination of the two tools to ensure that they are used efficiently (Chen et al., 2012). Libraries have found value in strategically linking their Twitter and Facebook posts to increase the total reach of their social media messages (Thornton, 2012), and it is possible to configure Twitter and Facebook to automatically route updates in one system to the other, and this has been reported as useful for libraries that use both systems concurrently (Saylor, Schnitzer, Allee, & Blumenthal, 2011).

There is general agreement that social media systems are having a significant impact on what librarians, libraries and library users do (Nguyen et al., 2012). However, while academic libraries have strongly embraced social media, comparatively little is known about the nature and impact of its use (Chiu & Lin, 2012). In particular, there has been a call for additional research on the comparative affordances and uses of the various social media systems used by libraries (Aharony, 2012; Kim & Abbas, 2010), and for research that provides quantitative data and metrics which move beyond anecdote, and which provide more reliable measures of the impact of library social media activity (Dickson & Holley, 2010; Glazer, 2012). Research on the use of social media by higher education institutions in general is still limited, and evaluation of the impact of social media activities is not straightforward (Culnan et al., 2010), as few benchmarks exist and relationships between activity and outcomes are indirect (Busch, 2011).

A range of research methodologies are reported in the literature investigating library use of social media, including: literature reviews (Dickson & Holley, 2010; Joint, 2010; Mallon, 2012), descriptive case studies (Aziz et al., 2010; Mawhinney, 2010; Morrow, 2010; Rees & Hopkins, 2009; Saylor et al., 2011; Walstrum et al., 2011), stakeholder interviews (Corrall & Roberts, 2012; Nguyen et al., 2012), harvesting descriptive statistics from sites (Aharony, 2012; Collins & Quan-Haase, 2012; Harinarayana & Raju, 2010; Mahmood & Richardson, 2011; Thornton, 2012), stakeholder surveys (Kim & Abbas, 2010; Lin & Ranjit, 2012; Salisbury et al., 2012; Wakeham, Roberts, Shelley, & Wells, 2012), and analysis of social media message content (Aharony, 2012; Chen et al., 2012; Chiu & Lin, 2012; Colburn & Haines, 2012; Phillips, 2011). Another approach to evaluation is network analysis (Culnan et al., 2010). The network data inherently created by social media tools represent the connections between participants as they interact, and can be used to make visible the previously elusive social processes at play, and to identify strategically important components and participants in the social network, and to show the development of the communication links over time (Smith et al., 2009).

The work presented here responds to the identified need for more quantitative research into the ways in which libraries are using social media for communication with their stakeholders. It uses publicly available data for analysis and visualisation to characterise the engagement of one university library with two social media platforms currently popular with academic libraries. Both Twitter and Facebook usage are addressed in common and complementary ways that respond to the different functions and modes of use of both systems. The collected
data are analysed both statistically and graphically to identify the forms of Twitter and Facebook activity that engage library stakeholders in social media conversations. The work presented here is an initial investigation that provides useful insights, as well as offering a methodology for future research.

**METHODOLOGY**

A search was undertaken of Australian university library websites to locate those with an advertised link to Twitter and Facebook accounts specifically associated with the library. An inspection showed one library in particular was relatively active on both Twitter and Facebook – this library was chosen for the case study documented here. A ruling was obtained from the relevant institutional human research ethics committee that the collection and use of publically accessible historical Twitter and Facebook records in a manner that does not identify any individual did not require formal ethics approval for research purposes. The NCapture program (QSR International, 2012a) is able to capture all publicly available data (tweets and retweets) originating directly from a specific Twitter account, as well as data arising from a search for tweets originating from other accounts that mention a specific Twitter account. Similarly, NCapture can also capture all publicly available posts made by a specific Facebook account, as well as all follow-up comments associated with an original post.

The functioning of the Twitter system means that a significant (often multi-year) archive of tweets can be extracted directly from an account. However, the results from a search for mentions of an account are typically much more limited in quantity and time period. To build a continuous record of mentions of an account requires the routine capturing and compilation of Twitter search results. Over a six month period from 24 January to 24 July 2013, mentions of library’s Twitter account were systematically captured. At the end of that period, all of the direct Twitter data available from that library account were also captured – representing all tweets and retweets from the library over the period 28 March 2012 to 24 July 2013. So while Twitter activity emanating from the library account was available for nearly 16 months, the mention data was more limited being confined to the final six months. Additionally, the functioning of the Facebook system means that a significant archive of posts and comments can be extracted for a user account. At the end of the six month period described above, all of the available Facebook data for the library account were captured – representing all posts and comments from the library over the period 26 August 2010 to 24 July 2013. The NVIVO program (QSR International, 2012b) was used to convert the captured Twitter and Facebook data into Microsoft Excel (Microsoft, 2010) spreadsheets. Basic account statistics for the library from both Twitter and Facebook were compiled.

The Twitter data were graphed using Excel to visualise the monthly frequency of tweets of all types - directed tweets, undirected tweets and retweets sent by the library, and, for the period of monitoring, mentions of the library account by others. The presence of any association between the number of mentions of the library and any type of tweets sent by the library was assessed visually by scatterplots of the Twitter data. The spreadsheet Twitter data were also exported in comma separated values (CSV) format, and then imported into the Gephi program (The Gephi Consortium, 2012) to visualise the communication network embodied in the data. As outlined in Figure 1, Gephi can be used to represent Twitter user accounts as ‘nodes’, and the communication path (representing one or more tweets) between two nodes as an ‘edge’. In the Twitter network diagrams used in this paper, edges are presented as curved lines, the direction of tweets is clockwise around the edge, and the width of an edge is proportional to the total number of tweets recorded between the two nodes in that direction.
The Facebook data were graphed using Excel to visualise the monthly frequency of posts of all types – own posts from the library, posts made by others, comments made by others to posts, and comments made by the library. The presence of any association between the numbers of posts and comments by others was assessed visually by scatterplots of the Facebook data. The spreadsheet Facebook data were also exported in comma separated values (CSV) format, and then imported into the Gephi program to visualise the communication network embodied in the data. As outlined in Figure 2, Gephi can be used to represent the sequence of Facebook posts on a page as a connected series of nodes, with the sequence of any comments made on a particular post as a branch of nodes connected to the originating post/node. In the Facebook network diagrams used in this paper, the sequence of posts and comments is indicated by directed edges, with wider edges assigned to the main post sequence, and the source (library or other) of a post or comment is indicated by the colour of the node.

RESULTS AND DISCUSSION

Figure 3 shows the monthly total number of directed tweets, undirected tweets and retweets (shaded segments) sent by the library during the period indicated, and, for the final six month period of monitoring, the total number of mentions of the library by others (unshaded segments), for the months indicated.
It can be seen that the three types of tweets sent by the library vary slightly from month-to-month, but that the number of each type in any given month is approximately equal. The monthly averages for each of three types of tweets sent by the library were: directed tweets – 95.4; undirected tweets – 91.5; and retweets – 90.2. The library has achieved a good balance of tweet types – with basically equal numbers of messages sent to the world at large and all followers, messages sent to specific users, and messages re-broadcasted from other users. For the final six months shown in Figure 3, for which there was a substantial record of the mentions of library by other Twitter accounts, the monthly totals of mentions were compared to each of the corresponding monthly totals of the three types of tweets sent by the library in the form of scatterplots. One strong linear association was observed – monthly total mentions versus monthly total directed tweets. Figure 4 presents this scatter plot with the monthly data point pairs labelled – note that both axes have expanded scales.

![Figure 4](image)

**Figure 4**
Scatterplot of monthly total directed tweets versus monthly total mentions.

While it is acknowledged that the observed association is based on only six data points, it is large in magnitude (Pearson correlation coefficient = 0.943) and statistically significant ($p <
0.004). As noted previously, the value for an organisation that is derived from a presence in social media comes not from the social media systems themselves, but how they are used to interact with stakeholders (Culnan et al., 2010), and simply having a presence does not guarantee stakeholder participation (Chen et al., 2012; Waters, Burnett, Lamm, & Lucas, 2009). Use of social media channels by organisational stakeholders is voluntary, so it is important for an organisation to attract a critical mass of members (followers) and facilitate their active participation in an online community (Culnan et al., 2010). Figure 4 provides some evidence of a link between the level of intentional interactivity from the library and the response obtained from its broader Twitter environment. A directed tweet is a purposeful communication to another user, which is flagged to that user, and may lead to a return message, retweet or other form of mention in response. It may also lead to a user that does not currently follow the library to ‘connect’ to the library on Twitter via following - over a six month period from 24 January to 24 July 2013 the number of followers that the library had grew by 37.0% from 1728 to 2368. Based on six observations only, and that these observations are comprised of monthly total data, these results are treated as indicative rather than definitive. Using the schema presented in Figure 1, Figure 5 presents a visualisation of the Twitter network data recorded for the library.

**Figure 5**
Library Twitter network visualisation.
While there is a single topological arrangement of the data for a given network, it can be visualised in many ways. Figure 5 is the resultant network layout produced by the Gephi program using the ‘Force Atlas’ layout algorithm (Akhtar, Javed, & Sengar, 2013). The Force Atlas algorithm is a type of ‘force directed’ algorithm. Generically, force directed algorithms assign ‘attractive’ forces between the endpoints of each edge, and ‘repulsive’ forces between all nodes in the network. The structure of the network is then iteratively simulated using a set of configuration parameters until it reaches an equilibrium state (if possible) where the net attractive and repulsive forces on all nodes are in balance. In Figure 5 all nodes (Twitter accounts) have been de-identified, with the node for the library positioned in the centre of the network diagram. The widths of the network edges are proportional to the number of tweets between pairs of nodes. All network nodes and edges are in their resultant positions given by the Gephi program layout, except for the large edge directed to the node at the centre bottom of the Figure 5 which represents undirected tweets sent from the library to all of their followers and ‘the world’ at large. This node was effectively coincident with the library node in the network originally produced by the Gephi program, and was relocated to make it visible and move it from the crowded central region of the network.
As the library Twitter account was the focus of the data collection exercise undertaken, the force directed layout naturally places it in the centre of Figure 5. One interpretation of Figure 5 is that around the library at the centre there are a number of ring-like regions. The first is an inner region composed of a number of thin partial rings and loosely associated nodes. The second is a solid ring that is up to five nodes wide. The third region is a halo of loosely associated nodes outside of the second ring. The Force Atlas layout algorithm naturally locates together those nodes most closely connected in the network - that is, those users with the most number of tweets sent between them. Generally, we would expect those nodes in the inner region to be most strongly connected to the library, and those nodes in the outer region to be least connected with the library. A random sample of ten nodes in each of the three regions was selected. For each of the selected nodes, the total number of tweets to and from the library were summed. While focussing on the library, the Twitter data collection process naturally also captured links between users that also mentioned the library. The layout algorithm also takes these non-library links into account when positioning nodes in the network, so precisely where any particular node sits in relation to the library node may be influenced by that node’s connections to other nodes in the network. For example, a node that is strongly connected to the library, but also strongly connected to a node further out in the network, may end up being located further out in the network that might be expected based solely on the strength of its connection to the library. To account for this possible influence on network layout, the median value of the connections to the library for the ten nodes in each region was used an overall measure of the level of connection between the three regions and the library. The median value was used instead of the mean value, as the median lessens the influence of extreme/outlier cases, and in the analysis here it is likely to be a better measure of central tendency than the mean. The median number of library connections for the inner region was 9.5; for the middle region it was 1; and for the outer region it was 0. The Twitter network shown in Figure 5 is complicated, and there is some value in separating out the visualisation of tweets sent from the library and those sent by other nodes. Figure 6 presents smaller versions of the Twitter network with clockwise outward tweets from the library on the left, and all other tweets from all other nodes on the right.

**Figure 6**
Left – tweets out from the library; Right – tweets from all other nodes.
The nodes in the inner region are strongly linked to the library, with many visible links in both directions in Figure 6 - to and from the library. Users that appear in this region include the Twitter accounts of entities related to the library, i.e., from other groups/departments at the same university. Rather than direct inter-departmental communication, this is likely to mainly represent institutional social media cross-promotion via retweeting. The nodes in the middle region (the distinct wide band of nodes) typically have a single connection to the library, i.e., one tweet either from the library to/mentioning the account, or one tweet from the account to/mentioning the library. The nodes in the outer region are mostly not directly connected to the library – in the sample of ten nodes above nine nodes had no links, and a single node had one link to the library. The left network in Figure 6 shows the library connecting to only a few of the outer region nodes. The right network in Figure 6 shows that many of the tweets originating in this region connect to users other than the library. Some of the nodes in the outer region represent users who are mentioning the library in their tweets to others, and it is these ‘others’ who are the most distant nodes from the centre and having no direct connection to the library node.

Figure 7 shows the monthly total number of own posts from the library, posts made by others, comments made by others to posts, and comments made by the library on the library’s Facebook page, for the months indicated.

**Figure 7**

*Monthly frequency of Facebook posts and comments (own and others) for the library.*

It can be seen that, compared to the Twitter data in Figure 3, the pattern of Facebook activity for the library is more varied. The monthly averages for each type of Facebook activity were: library posts – 21.4; posts by others – 7.0; comments by others – 41.5; and comments made by the library – 14.3. Scatterplots of the monthly total data were constructed to identify any obvious associations between the Facebook communication from others (posts and comments) and the Facebook activity of the library. One strong linear associate was observed – monthly total comments from others versus monthly total comments from the library. Figure 8 presents this scatter plot with the monthly data point pairs labelled.

**Figure 8**
Apart from two obvious outliers (labelled ‘A’ and ‘B’), Figure 8 shows a strong linear association between the comments from the library and others on the library’s Facebook page. If the two outlier months are excluded, the observed association is large in magnitude (Pearson correlation coefficient = 0.914) and statistically significant ($p < 4.59 \times 10^{-14}$). The nature of the two outlying points in Figure 6 where the ratio of other comments to library comments is much higher than normal will be explored further below. While comments by others on a Facebook page are typically in response to post from the page owner, and so have some relationship to own posts, Figure 8 suggests that the primary association for user Facebook interaction in the form of comments arises from comments from the page owner, rather than just from the original posts. As with the Twitter data results, there is more evidence here that the development of an active online social media community requires the intentional facilitation by the Facebook page owner. Follow-up comments from the library appear to stimulate further comments from other users of the library Facebook page. The data collected show that over the six month period from 24 January to 24 July 2013 the number of likes for the library Facebook page grew by 26.3% from 4764 to 6018. While Figure 8 contains significantly more data points than Figure 4, it is again acknowledged that the observations presented in Figure 8 are comprised of monthly total data. Using the schema presented in Figure 2, Figure 9 presents a visualisation of the Facebook network data recorded for the library.

**Figure 9**
Library Facebook network visualisation.
Figure 9 is the resultant network layout produced by the Gephi program using the ‘YifanHu’s Multilevel’ layout algorithm (Gansner, Yifan, North, & Scheidegger, 2011). YifanHu’s Multilevel algorithm is another type of force directed layout algorithm, and has the characteristic of efficiently producing a visually uncluttered network diagram. This feature of the layout algorithm is used here to highlight the sequence of Facebook posts in a central ‘spine’, with the sequence of comments made on a particular post shown as a branch attached to the originating post. The earliest post from the library, dated 26 August 2010, appears at the top of Figure 9, and the sequence of posts on the library Facebook page winds down towards the bottom of Figure 9. Generally, the sequence of posts on the library Facebook page periodically have small branches of comments attached where users have responded to a particular post. There are a small number of exceptions to this pattern, where a much larger branch of comments is observed – the comment sequences labelled ‘A’, ‘B₁’ and ‘B₂’ are such cases. The comment branch labelled A in Figure 9 is the source of the outlier point labelled A in Figure 8, and is also the source of the large number of ‘other’ comments indicated for April 2012 in Figure 7. The comment branch labelled B₁ in Figure 9 begins at the main spine with a post occurring on November 2012, but many of the comments were actually made in December...
2012. The comment branch labelled B₂ occurs entirely in December 2012, and together with December comments related to branch B₁, is the source of the outlier point labelled B in Figure 8, and also the source of the large number of other comments indicated for December 2012 in Figure 7. The region of the main spine in Figure 9 labelled ‘C’ is of interest as it indicates an extended sequence of posts from the library with no corresponding comments attached. This is examined further below. Figure 9 is an overview of the entire Facebook network for the library. Figure 10 presents an expanded view of the boxed area indicated in Figure 9 that contains points A and C.

**Figure 10**
Library Facebook network visualisation – expansion of indicated area in Figure 9.

In the expanded view provided by Figure 10 it is possible to discern the source (library or other) for the individual posts and comments. The points labelled ‘A’ and ‘C’ correspond to those in Figure 9. Point A identifies the source of the large branch recorded in April 2012 that was comprised of 151 comments, including 2 from the library. At the other extreme, point C
indicates a run of ten posts by the library that did not receive a single comment. It is of interest to explore the nature of the post at point A and the posts at point C to see why they might generate such differing user responses. The original post from the library at point A invited readers to respond with a guess about an object, with the most correct guess winning the object – clearly the prize was considered desirable by a significant number of commenters. The posts by the library at points B1 and B2 in Figure 9 also challenged readers to a task requiring a response, though no specific prize was on offer. Of the ten posts associated with point C, one was a humorous library-related photo, two were re-posts of previous photo-based announcements, and the remaining seven were all announcements about library-related events or services comprised of a short text message and a web link. None of these ten posts particularly invite reader responses and seven of the ten actively direct the reader on to another web location. In Facebook it is possible for readers of posts to ‘like’ an individual post, and the count of such likes is available. However, while pressing a like button is some measure of the impact of a post, it is an engagement of a lesser nature compared to the reader response required to actively draft a written comment in response to a post. For the seven posts that direct readers to a new web page, it would be possible to implement click tracking to count the number of transfers to the new web page, and thus gain some measure of the specific effectiveness of the Facebook posts in channelling users to the desired message.

CONCLUSION

The potential value of social media for academic libraries was recognised comparatively early on and the applications of social media systems in library settings are now commonly reported. A range of case studies of library use of various social media tools can be found, however the use of Twitter and Facebook seem to be the most commonly observed social media applications for libraries. There has been a call for research that provides quantitative data and metrics, and which provide more reliable measures of the impact of library social media activity. This paper presents an investigation into the use of Twitter and Facebook by an Australian university library particularly active in using social media. Using publicly available Twitter data over a period of more than a year, and publicly available Facebook data over a period of more than two years, the interactions of the library on these two platforms were analysed and visualised to characterise the engagement of the library with these two social media systems.

Associations were observed between: i) directed tweets from the library and mentions of the library by others on Twitter; and ii) comments from the library and comments from others on Facebook. Directed tweets and Facebook comments are purposeful interactions with other users, and may promote social media interactions in return. The network visualisations produced provide insights into the ways that the library under investigation is using Twitter and Facebook. Three broad classes of Twitter users interacting with the library were revealed by the Force Atlas layout algorithm: i) accounts strongly linked to the library with multiple to/from tweets; ii) those weakly linked to the library with, typically, a single tweet; and iii) those indirectly linked to the library through tweets mentioning the library and sent by other users. YifanHu’s Multilevel layout algorithm highlighted two divergent forms of Facebook interaction with the library: i) a library post generating a large sequence of comments, typically in response to a competition/challenge; and ii) a library post with no comments, typically a photo post or a post inviting readers to click a link to find out more about an event or service.

The analysis and visualisations presented here do not indicate the purpose and content of the Twitter and Facebook communication that they summarise. While detailed textual analysis of the content of collected tweets and posts was beyond the scope of this investigation, the 6214 tweets (containing approximately 100,000 words) and 3031 Facebook posts (containing
approximately 56,000 words) collected form a rich data set in their own right, and an analysis of their content would provide more insight about the purpose and nature of the social media conversations undertaken by and with the library. The visualisations of the Twitter and Facebook interactions of the library presented here are necessarily limited. While mentions on Twitter of the library account have been captured for a six month period, the focus on the library, emphasised by its inherent central location in Figure 5, means that the wider complete network of Twitter interactions around the library is not included. The Facebook visualisations presented do include the temporal sequence of posts and comments, but the identity of the authors is limited to ‘library’ and ‘other’, and the numbers of ‘likes’ of posts and comments (an additional form of Facebook interaction) are not shown. A factor limiting the generalizability of the findings here is that the Twitter and Facebook data were collected from a single library account only. Another limitation (due to the constraints of the Twitter platform on free-form data searching) is that the mentions of the library on Twitter are limited to a six month period. However, the work documented provides useful insights into the ways that libraries might use (and the way that one library has used) social media to communicate with their stakeholders. Additionally, a methodology is presented for the collection, analysis and presentation of data from the Twitter and Facebook social media platforms to make visible social media interactions, characterise those interactions, and to identify those forms of interaction that are most effective and impactful. This methodology offers a useful basis for future research into the use of social media by libraries.

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