The Journal of Community Informatics, Vol 9, No 3 (2013)

The Emergence of Converging Communities via Twitter

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Introduction

Twitter, the online social networking site (SNS), is at the core of the Web 2.0 phenomenon. This Internet-based software application enables users to sign up for free and communicate with others by posting text, hyperlinks and/or images from both desktop and mobile devices. Its simple functionality and usability encourages widespread adoption. As with other online software, the Twitter application itself is an enabler of its adoption, but the key to Twitter’s success, we propose, is its sociability. The combination of functionality, usability and sociability produces successful online communities (deSouza & Preece, 2004). Twitter ought therefore to enable online communities.

The aims of this research are to evaluate the emergence of online communities in Twitter, and how users converge within those communities. With Twitter offering users the potential to 'follow' many other users, communities are potentially dynamic, evolving and constantly changing (after deSouza & Preece, 2004). We critically evaluate the constructs of this theoretical framework to inform our empirical research. We go on to discuss our research methods and findings, presenting a conceptual representation of emerging groups' convergence via Twitter.

Web 2.0, Social Networking Sites and Twitter

Twitter and other SNS utilise Web 2.0 technologies. By locating on the Internet rather than on hard drives (after O’Reilly, 2005), these new technologies represent a change in the way software is developed, distributed and used. Web 2.0 is essentially people-centric (Murugesan, 2007) with an ‘architecture of participation’ (O’Reilly, 2005). It supports real-time interactions, user-generated content, remixing and mashups, APIs and open-source software (boyd, 2008). Bauckhage et al. (2007) argue that through participation, Web 2.0 enables Internet users to contribute content, which consequently facilitates the exchange and retrieval of knowledge. Participation, exchange and synthesis enable users to engage in activities based on common goals (after Castells, 2009). We will revisit this fundamental point later.

In SNS, users set up online profiles or personal homepages, develop online social networks and interact with these networks in various ways. Users of SNS sign up to the tool but not necessarily to interest-based groups, as is the case in online chatrooms and fora. In choosing who they will connect to, users make conscious network-building decisions; for example, which people to search for, which friend requests to accept, and which people’s profiles and posts to read. This process is what we call social networking. SNS are based on social relationships and connections with people rather than on shared interests (Ofcom, 2008).

SNS users have typically formed networks with people they already know offline, as is the case with Facebook (boyd & Ellison, 2008). On Twitter, however, users can easily seek and ‘follow’ other users who interest them by searching the public timeline. These social networks are not online communities. Exchanges happen only between a small set within these declared set of connections (Huberman, Romero & Wu, 2009). We later clarify this distinction.

While SNS providers set the rules of the online environments they provide (e.g., terms of service and privacy policies), they do not dictate how users communicate. It is at the user level that modes of communication have developed and evolved. Generally online participants develop conventions of communication (Jacobson, 1996) or chat codes (Greenfield & Subrahmanyam, 2003) to facilitate understanding. Some conventions such as emoticons are well spread across the Internet, whereas others are particular to individual communities.

Early adopters without the intervention of the site providers created Twitter language conventions. The best known and useful are hashtags (e.g. #followfriday) used as labels, to classify posts (known as 'tweets') and make topic threads easier to follow. The @ symbol is used to address an individual (Honeycutt & Herring, 2009) and retweet (RT) is used to repeat and resend a tweet posted by another user. These methods now widely adopted in Twitter conversations (boyd, Golder & Lotan, 2010).

Twitter is in essence a simple tool. It asks the question ‘what’s happening?’ (previously, 'what are you doing?'), and lets users respond in 140 characters or less. The content of tweets ranges from links to news articles and blogposts, to sharing photographs, to proposals of marriage. This variety has spawned an array of users exploring its potential: making new friends, sharing news, searching for experts, marketing products and services.

Although still scarce, the literature on Twitter has identified types of users. These
Online Communities

So far we have alluded to the possibility of online communities being formed via networks of Twitter users. A bounded collection of ‘ego-based’ social networks can be represented as a community network (Arnold, 2007). A bounded community network builds its own infrastructure, limits ramified access, and provides a group space as an ongoing default for its members. It is a hybrid between a hierarchy and a heterarchy (Arnold, 2007). Community is a focal point where members’ daily needs are satisfied (Logan & Molotch, 1987 cited by Stoecker, 2005). It provides informal support networks, a sense of physical and psychic security, agglomeration and a shared ethnicity.

Social capital plays an important role in community engagement, offering a collective identity (Pigg & Duffy Crank, 2004) and making life easier in a community (Putnam, 1995). Pigg & Duffy Crank (2004) find five dimensions of social capital that combine to create collective identity: networks, resources for action, reciprocity transactions, bounded solidarity, and enforceable trust. These dimensions in turn facilitate coordination and communication to amplify reputation and allow dilemmas of collective action to be resolved (Putnam, 1995). Thus where there is a lack of hierarchy, social capital offers a community its social template. Individuals gain a sense of civic duty for the greater good of the community rather than for their own individual benefit. When social capital breaks down, so does the community (after Putnam, 1995). Whether the conditions of community and social capital exist in online spaces is at question here.

Several authors find that online and/or virtual communities exist, using these terms interchangeably. Yet virtual spaces need not necessarily be online. Hence we view ‘virtual’ as an overarching concept, of which online is a part. We adopt the latter term because we are researching internet-based groups, but we review literature here that uses both terms.

Castells (2009) defines virtual communities as self-elected networks of interactive communications organised around a shared interest or purpose, with communication sometimes becoming the goal itself. This definition derives from that of online communities as “social aggregations that emerge from the Net when enough people carry on public discussions long enough with sufficient human feeling, to form webs of personal relationships in cyberspace” (Rheingold, 1994, p5). Online communities have specific purposes and their members share common interests that define the content of their interactions (Porter, 2004). They are dynamic and evolving (deSouza and Preece, 2004). They are fluid (Proulx and Latzko-Toth, 2005), with ‘fuzzy’ online community boundaries (Preece and Maloney-Krichmar, 2005) defined by community membership and the comparison of new members with existing ones. Porter (2004) shows that participants join Web 2.0-based online communities to seek or provide information, affirming its value. deSouza and Preece (2004) report a sense of community or membership amongst users, who are also engaged in meaningful participation and can commit to relationships with other members. These relationships can be nurtured and strengthened in those online spaces, leading to real friendships (see for example Parks, 1996).

There are several typologies of online community members. These typologies describe members via their participation relative to fellow members. In a study of an online community of journalists Millen and Dray (2000) identified types of contributors by their degree of participation: frequent, sporadic, infrequent, and lurker. Similarly McDaniel et al. (1996) identified primary, secondary, and marginal contributors to online conversations.

Online communities are guided by policies that include norms and rules (in the case of SNS, set by the site providers), supported by software (Preece and Maloney-Krichmar, 2005). Norms and values are aligned to the purposes and the nature of their participants (Millen & Dray, 2000). In general, individual members are able to enforce such rules through their own participation. Indeed, Elliott and Scacchi’s (2003) study of a virtual organization of free software developers showed how online participants can successfully collaborate to resolve online conflicts. However, interestingly, Pigg & Duffy Crank (2004) find a lack of empirical evidence for such online communities displaying their five dimensions of social capital discussed above. Yet without social capital or hierarchy, online communities would not display such self-regulation but would dissolve into anarchy.

Castells (2009) discusses this issue at length. Virtual communities can be relatively formalised, but it remains to be seen how sociable they are and what the cultural implications will be. Castells cites Mitchell (1995; 1999) and Turkle (1995), stating that new forms of sociability and urban life adapted to new technology spaces such as the Web are emerging, where users play roles and build identities (e.g., online gaming). Yet
Returning to the theories of community and social capital, Castells (2009) draws on the various works of Wellman and of Putnam to observe that virtual communities don't follow the same conventions of communication and interaction as physical communities do. This observation does not, however, imply that virtual communities are unreal—merely that they operate on a different level. Virtual communities are made up of social networks based on highly diversified and specialised but weak ties. They are, nevertheless, able to provide reciprocity and support sustained interaction (Castells, 2009). Diversification and specialisation come from individuals creating their own personal communities or portfolios (Wellman & Golia, 1999). Users join the online shared interest networks identified by Porter (2004), creating many weak ties with others (in an egalitarian pattern) to open up opportunities for themselves (Wellman & Golia, 1999). In so doing, these users link themselves to others with different social characteristics to expand their sociability beyond the socially defined boundaries of self-recognition (Castells, 2009). Examples include Facebook users with hundreds of ‘friends’ and Twitter users with thousands of ‘followers’.

Strong ties with each ‘friend’ or ‘follower’ cannot be maintained. In anthropology, the maximum number of strong ties any individual can maintain is approximately 150. This is known as Dunbar’s number, a pattern observed throughout the natural world (Dunbar, 2003). Whilst few strong ties exist within virtual communities, there is reciprocal supportiveness between those connected by weak ties, evidenced by uninhibited discussion that enables sincerity (Castells, 2009). Yet with such weak constructs, there is a high mortality of online ‘friendships’.

Castells (2009) goes on to conclude that these many weak ties in virtual communities transcend distance. They are asynchronous, combining rapid dissemination of mass media with pervasive personal communications at a low cost. Twitter is a prime example. SNS such as Twitter therefore enable, and we would add encourage, individual users to join multiple ‘partial communities’. These partial communities, Castells (2009) argues, reinforce a trend towards the ‘privatisation of sociability’, where social networks are being rebuilt around individuals developing personal communities in both the online and physical worlds.

If it is the case that online communities are redefining what it is to be sociable, we ask how these personal communities emerge and converge in Twitter.

Research Methods

In our research we identified a group of 80 users who joined Twitter separately and with different intentions but who met online and have formed ties. This group was located by firstly meeting a Twitter user and, with his consent, identifying his personal community (after Castells, 2009) by tracking his online discussions, followers, and Twitter lists (lists users can create to identify and classify subgroups of their following lists). The user maintains a list called ‘the Crowd’ to identify other Twitter users he has formed ties with. At the time of our data collection his list identified 80 people as being members of the Crowd. Many of those users on his list were found to identify themselves as being a part of the Crowd, by compiling similar lists with common members, and meeting face-to-face regularly at ‘tweet up’ events. Not all members of the Crowd know each other, or indeed follow one another, but they are connected through association with others in this personal community. We aimed to capture rich and meaningful insights of these Twitter users’ accounts from their everyday use of the social networking site. By combining the ideas about ethnography from Harvey and Myers (1995), virtual ethnography from Hine (2000) and cyber-ethnography from Ward (1999) we developed a mixed ethnographic approach consisting of online participant observation via the Twitter public timeline and face-to-face interviews with a sample of members.

The public tweets of the Crowd members between December 2009 and March 2010 were observed via the Twitter public timeline. To provide a rich picture of the Crowd, participant observation consisted of analysing their Twitter profiles to identify who they follow and who is following them using the free Friend or Follow application (http://friendorfollow.com/). This was combined with brief interactions with members of the Crowd and observation of their following, follower and Twitter lists, allowing the researchers to ‘see and begin to experience’ (Marshall and Rossman, 1989, p106) Twitter as the Crowd do. All of this information is publicly available via Twitter. However we have anonymised our findings as much as possible.

Our participant observation data are triangulated with interview data to verify our preliminary findings with users. Members of the Crowd were approached via Twitter direct messages to request interviews. Six volunteered. Ethnographic interviews (Flick, 2006, p156) were employed in the form of face-to-face semi-structured interviews within a friendly and conversational atmosphere. The interviewees range from early adopters to relatively new users, and from social users to business users. We further classified these users by asking them a series of questions designed to elicit how they perceived their use of Twitter and other SNS. Those questions were informed by existent typologies of Twitter and community users as explained above.

A total of approximately six hours of interview audio was captured. These interviews were transcribed and analysed to identify users’ individual use patterns, convergences as their participation evolved, and their engagement over time. The interviews captured data that
verified the outcomes of participant observation regarding the Crowd’s general use of the tool, the online communities in which they interact and their roles within those communities (after Java et al, 2007; after Krishnamurthy et al, 2008 and McDaniel et al., 1996; Millen and Dray, 2000). In addition, interviews provided perceptions of the transition of online communities from interest-driven social networks to friendship-driven personal communities. Furthermore, we sought to understand how Twitter users integrate that particular tool with other SNS sites and their real (i.e., physical) worlds.

From our findings discussed below we present a conceptual framework of how communities evolve and converge via Twitter.

Findings

Data from the online ethnography uncovered the existence of the Crowd as an identifiable personal community. Members have a variety of interests and goals, but share at least one interest and/or goal with the creator of the Crowd list. Through an analysis of Crowd participant observation we identified members' patterns of use since December 2009. Data from interviews provided deeper insights into their broader participation in Twitter social networking. The following section will describe the Crowd and its characteristics. From these analyses we later develop our conceptual framework.

The Crowd

The Crowd is a personal community of users who are connected to each other via friendship links, although not everyone follows each other in this community. Whilst all share at least commonality with the Crowd list creator, they do not necessarily have shared interests or goals with each other. Our data suggest that the Crowd emerged around May 2009. Members of the Crowd live, have connections to or are interested in Melbourne, Australia and are active Twitter users.

The Crowd are extremely active online. They integrate Twitter with other online tools including SNS such as Facebook and LinkedIn. They are heavy users, most of them tweeting far more than the reported norm of 5 to 30 times per week (Zhao and Rosson, 2009, p245). For example, one member of the Crowd had posted in excess of 11,590 tweets, as at May 14th 2010, since joining Twitter on January 30th 2009-an average of 161 tweets per week. Members of the Crowd joined Twitter for different reasons such as to do business (e.g., sales and marketing), to build a professional image, to follow groups of interest (e.g., sports) or to meet new people. Some members did not have clear objectives when they joined Twitter. However they did develop 'following' approaches once they interacted with other users and learned the conventions of Twitter. We found it is quite common for new users to open an account but not actively use it until they have gained a significant following. Depending on a user's approach this period may be days or months. A common approach is to search for other Twitter users using hashtagged terms such as #Melbourne or #rugby. Once other users discussing those topics (and thus having shared interests) have been found and followed, users may then merely observe the others' tweets (i.e., lurk), or attempt to interact with them by actively participating in those conversations.

When growing a Twitter following, another key enabler is known as the 'tweet up'. Adapted from 'meet up', some Twitter users typically arrange tweet ups and advertise them via the public timeline. This approach is also popular amongst the Crowd for meeting other users with shared interests or goals who had not previously encountered this personal community. In Melbourne there are at present at least five regular tweet ups, each attracting different types of users. The Crowd span each of these tweet ups, with different members having different interests (e.g., to discuss social media developments over breakfast, or to have drinks with likeminded people at a bar). These events can indeed be the focal point of a personal community, with the event itself being a community’s shared goal. The Melbourne Twitter Urban Brigade (MTUB) is one such example; its users, from a variety of backgrounds, meet approximately once a month in person, discussing the event before and after, but not otherwise maintaining those weak ties. Yet meeting other Twitter users in the real world does enable the strengthening of ties with a select few others by communicating at greater length and realising that users share more than one interest or goal. Thus the Crowd converged and emerged.

The Crowd are conscientious users. They look after their Twitter accounts, choosing carefully whom they follow and checking regularly who follows them. This action is not normally collective, but might be perceived as a form of community boundary self-regulation if enough of the crowd follow or unfollow the same user at around the same time. As individuals, they carefully construct the image they portray online and are aware that people are following their activities on a daily basis. Although some of the members show their real names, many retain some privacy, tweeting with a certain level of anonymity or locking their accounts to restrict access to their feed.

Whilst the personal community boundaries of those users with Twitter lists similar to the Crowd could be identified, those who do not maintain lists were not easily identified. The identification had to be made through participation and examination of people’s @ reply tweets to each other. This examination showed that Twitter lists do not define communities but are one of their possible manifestations. Respondents displayed a sense
From our ethnographic account, we have developed a conceptual framework that explains the Crowd, but that it is at the core of their interactions. Our findings reveal that Twitter is one of many on- and offline tools that are used by conventional communication tools facilitate approaches that help the Crowd maintain their conversations. Many of the Crowd stay in touch on multiple platforms, from texting to MSN Messenger. And geo-location-based applications such as Foursquare (commonly integrated with Twitter) are also used to let the others know where they are. Blending SNS and conventional communication tools facilitate approaches that help the Crowd maintain their friendships through direct messages for privacy. Not all conversations need necessarily be on the public timeline, although many are. This practice acts as both a reinforcer of existing ties and as an attractor to new followers. Furthermore, some members of the Crowd use hashtags to organise tweet-ups and other smaller gatherings separately, taking their friendships out of the Twitter domain.

Within the overlapping personal communities observed, we identified two distinct member roles. As identified above, there is a core group who participate more often than others, lead off-line meetings, and are present in most of the Twitter lists we have observed. There is also a marginal group whose participation is less frequent. The configuration of this second group is unclear because of its scarce participation as well as the irregular presence of its individuals in the lists of the core group. Its defining characteristic, inferred from the content of the interchanged tweets that we observed, is shared interests with members of the core group.

When asked about the suitability of Twitter to maintain their community ties and friendships, respondents stated that Twitter was a great place to meet new people and to keep in contact with others. Twitter’s functionality works at a community level, helping them to find people in their area of business or identify potential future friends. They also stated that it helps to keep them updated with news and events in their local area and globally. Some respondents stated that they integrate Twitter with Facebook, LinkedIn, and blogs, amongst other SNS, to build an image of active participation. On the other hand, respondents stated that Twitter was good for initiating friendships but not sufficient on its own to strengthen them. Members of the Crowd have therefore resorted to other means to build and maintain strong ties, the most important of which is face-to-face meetings such as the tweet ups discussed previously. Thus physical proximity is important to some members. This is one of the reasons why the Crowd is a Melbourne-centric group. However, its members are not necessarily interested in Melbourne as a topic for discussion, but are interested in people and events based in that location. In fact, most observed tweets referred to shared interests, work, leisure and social activities including tweet-ups. Members who have not met the core group in person have not been able to strengthen their ties to the same extent.

As ties have strengthened and friendships developed in the core group, its members have taken some of their relationships offline, communicating via more conventional means such as the telephone. Other SNS tools are also used to help them communicate at different levels and nurture their ties via software such as Facebook, where they can chat privately and limit the circulation of certain event invitations. Some interviewees stated that they also communicated with the Crowd through Twitter direct messages for privacy. Not all conversations need necessarily be on the public timeline, although many are. This timeline acts as a message board to enable others, including ourselves, to join in conversations. Many of the Crowd stay in touch on multiple platforms, from texting to MSN Messenger. And geo-location-based applications such as Foursquare (commonly integrated with Twitter) are also used to let the others know where they are. Blending SNS and conventional communication tools facilitate approaches that help the Crowd maintain their friendships, whilst at the same time keeping the metaphorical doors open to others to join them. Our findings reveal that Twitter is one of many on- and offline tools that are used by the Crowd, but that it is at the core of their interactions.

**Conceptual Framework on Community Formation and Convergence on Twitter**

From our ethnographic account, we have developed a conceptual framework that explains...
how personal communities emerge and converge on Twitter. See Figure 1.

Using data collected from participant observation and ethnographic interviews we have identified three layers of participation and relationships. According to our framework, Twitter users participate at each layer in different ways and with different intentions. Users can actively participate in more than one layer or just the first. This means that participation on Twitter can be multi-dimensional, as different layers can co-exist.

We find that users join Twitter at layer 1, following others with similar interests but not necessarily interacting (e.g., addressing other users by using @ or RT). They may then develop their participation towards layer 2 by becoming actively involved in interest-driven communities. Some users may then consciously or not seek friendships with members of more than one interest-driven community (combining Twitter interactions with other SNS communication and real world events), which leads to layer 3, as represented in our framework.

Users may choose to stay in layer 1, limiting their participation to broadcasting with no particular intentions, neither engaging in interactions with other users nor becoming part of a group. Layers 2 and 3 imply the development of commitment and (interest-driven, friendship-driven) purposes by users.

In the case of the Crowd, its members had begun their ‘lives’ on Twitter at layer 1 at different times before becoming familiar with interest-driven communities (layer 2). Some then met and strengthened their initially weak ties to form the core friendship-driven group (layer 3). Participant observation showed that all three layers co-exist for individuals in the Crowd core group in their daily Twitter participation. In other words, whilst they maintain their friendships at layer 3 via chatter on the Twitter public timeline and other media (e.g., Facebook status updates), they also foster their layer 2 interest-driven communities through frequent participation, and seek out information (layer 1) as and when it suits them. For example, it was observed that members of the Crowd intercalated tweets at different layers of the framework, either by dedicating times of the day to a layer (e.g., broadcasting information early in the morning) or by participating on layers depending on participation of other people.

The business users interviewed discussed this hierarchy of use in terms of building business relationships. For example, two interviewees, both small business owners, use layer 1 to ‘lurk’ (after Millen & Dray, 2000) for other Twitter users who may be interested in their services. They then aim to participate in those other users’ interest-driven (layer 2) communities, or draw them into one of their own layer 2 communities to pitch their services. To ‘close the deal’ they then meet face-to-face and invite them into other SNS fora such as LinkedIn and Facebook. Twitter is for them a ‘shop window’ in which to sell their wares.

Ties and communities in layers 1 and 2 are constantly reconfiguring as people follow or unfollow each other. Those are weak ties. As discussed above, the Crowd’s membership is reconfigured at the discretion of its owner. The Crowd is therefore a personal community (after Castells, 2009) located within layer 2 of our framework. Other Crowd members have their own layer 2 personal communities. We observed the presence of social capital at layer 2 in a collective identity, of which the Crowd is a prime example. Layer 2 communities are bound by networks (e.g., following, follower and Twitter lists, @ and RT interactions), resources (e.g., tweet-ups), reciprocity (e.g., exchanging knowledge), solidarity (e.g., expressing shared world views on current affairs), and to some extent trust (e.g., exchanging personal information such as an email address) (after Pigg & Duffy Crank, 2004).

Reconfiguration is far less frequent at layer 3 where the core group is bound by strong ties. To join a layer 3 friendship group, one must be invited by an existing member, and accepted by the others. To leave a layer 3 group, friendships must be broken. Layer 3 is not a personal community but a more closely bonded group with a much stronger sense of reciprocity, solidarity and trust (after Pigg & Duffy Crank, 2004).

Returning to the fluidity of layers 1 and 2 (after Proulx & Latzko-Toth, 2005), interest-driven communities intersect as personal communities are overlaid, with individuals belonging to more than one of the former. This convergence is significant, and facilitates the discovery of information, users, and other communities. All tweets posted by a particular user are public to everyone who follows that user, enabling followers to view and act on the uploaded data (i.e., tweet). Public interchanges between people, @ replies and retweets are evidence of these convergences. Such usable Twitter functionality increase the chance of users finding other layer 2 communities they may like to join and thus advance from layer 1 through participation to gain reciprocity. To gain similar access to layer 3, we observed ‘gatekeeping’ behaviour by the core group members. Shared interests may not be enough to join such a group.
To clarify our framework:

Layer 1 - Individual interest-driven following: at this level users choose to follow other users on an individual basis, either because they find the tweets interesting or because they know of them (as in following a celebrity). Seen from the point of view of a layer 1 user, the ties formed by him or her following and followers are heterogeneous and not necessarily connected. For the user there is a lack of a coherent network, awareness of resources, reciprocity, solidarity, or trust from other users (after Pigg & Duffy Crank, 2004). Layer 1 ties are thus extremely weak with little or no social capital.

Layer 2 - Interest-driven and personal communities: members of these communities are interested in similar topics and participate in interactions relating to those topics. Community members demonstrate a sense of belonging and commitment through frequent participation. There exists an identifiable network (via @ replies and retweets), based on resources such as Facebook groups and tweet-ups; and a high reciprocity based on mutuality, solidarity, and a level of trust (after Pigg & Duffy Crank, 2004). Layer 2 ties remain relatively weak but social capital is in play. Where, for an individual user, these communities converge, a personal community is formed (e.g., the Crowd).

Layer 3 - Friendship-driven groups: this layer emerges when a self-selecting (smaller) group of Twitter users strengthen selected mutual ties by increasing their social capital. This strengthening is achieved by creating a bounded network, utilising personalised resources such as invitations to private events, a high reciprocity and solidarity evidenced by supportive and tweets, and an increased level of trust from sharing personal details (after Pigg & Duffy Crank, 2004).

Conclusions

Our framework illustrates that interest-driven and personal communities emerge and converge within Twitter via individual user participation. Our research clearly identifies that people with common interests are using this SNS tool to seek out information and each other, participate in meaningful discussions and socialise. Some users build friendships that extend beyond the realms of Twitter to meet their own personal aims, whether they be for business or friendship. The three layers of Twitter participation we identify show a hierarchy of Twitter use that, as discussed by Arnold (2007) also maintain a heterarchy of social networks. Different types of user develop and maintain a degree of participation that suits them. In this regard, the framework offers a complementary perspective to typologies of users by Java et al. (2007) and Krishnamurthy et al. (2008). Some Twitter users merely use the software to seek information from other users who share similar interests. Other users partake in interest-driven online communities. And a third type of user engages in extended participation with a subset of fellow users they call friends. Meanwhile, we find that many users maintain personal communities alongside their interest-driven ones that span different interests to maintain an equilibrium between this hierarchy of use and heterarchy of networks.

We use different levels of social capital to distinguish between the layers of our framework. As Twitter users become more involved in their online communities, their social capital increases. Users are part of several interest-driven communities develop personal communities to create ego-based collective identities around themselves. In such communities, communication can become the goal itself (after Castells, 2009). Creating a personal community to gain social capital can lead to online role-play (or a perception of elevated social status), which brings solace to those in need of communication and self-expression (after Castells, 2009). Yet such communities are based on weak ties. They are, nevertheless, able to provide reciprocity and to support sustained participation. The flipside is a high mortality of what are perceived to be online friendships (after Castells,
within these personal communities. Our research suggests that a sub-set of such ties can be strengthened into meaningful friendships or business relationships by frequently engaging with a small number of others in both on- and offline spaces. In other words, as in real world communities, it takes effort and time to truly know others. Hence our framework is useful in terms of illustrating the need to strengthen personal community ties before claiming online friendships. We do not quantify that transition point here, but that may be the subject of further research.

More fundamentally, our research empirically verifies what Castells (2009) observes as a trend towards the ‘privatisation of sociability’, where social networks are being rebuilt around individuals’ personal communities. Such online communities are said to be redefining sociability (Castells, 2009). Creating and publishing extensive personal communities in the form of Twitter lists could be perceived by others as being exceptionally sociable. Twitter users who may be viewed as ‘online socialites’ may merely maintain a series of weak ties, and therefore have relatively low social capital (as is the case of celebrities). We thus believe that whilst perceptions of sociability are changing, actions of sociability are not. Twitter users who make efforts to interact in other spaces to strengthen ties initially formed online do exist and are indeed sociable.

We recognise that this research is bound by context, both in terms of location and the SNS tool selected for our study. Yet, we show that the Twitter phenomenon combines functionality, usability and sociability (after deSouza & Preece, 2004) to cause online communities to emerge, converge and, in some instances enable strong ties to develop. As discussed, business users are exploiting Twitter’s sociability to use it as a ‘shop window’ in which to sell their wares before ‘closing the deal’ in other spaces. This analogy might also be used for those who use Twitter to initiate the strengthening of ties.

We believe the full potential of online sociability has yet to be explored. Further research is necessary to gain a greater understanding of the extent to which phenomena like Twitter, other SNS and Web 2.0 will blend into our daily lives and what that will mean for the future of socialisation. Community Informatics research clearly has a role to play in this exploration. As the pervasiveness of Web 2.0 and SNS software increases, its use will become ubiquitous in contemporary communities. These tools are not just anotherfad, but media that have the potential to improve community participation and sociability.

References

Ackoff, R. L. (1989). From data to wisdom. Journal of Applied Systems Analysis. 16, 3-9.
Arnold, M. (2007). The concept of community and the character of networks. The Journal of Community Informatics. 3(2). Retrieved 04 February 2011, from http://www.ci-journal.net/index.php/cij/article/view/327/315.
Baukhage, C., Alpcan, T., Agarwal, S., Metze, F., Wetzker, R., Ilic, M. & Albayrak, S. (2007). An intelligent knowledge sharing system for web communities. Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics (SMC 2007). October, Montreal, Canada.
Boyd, D. (2008). Understanding socio-technical phenomena in a Web 2.0 era. Retrieved 06 May 2010, from http://www.danah.org/papers/talks/MSR-NE-2008.html.
Boyd, D. & Ellison, N.B. (2008). Social network sites: Definition, history and scholarship. Journal of Computer-Mediated Communication, 13(2), 210-239.
Boyd, D., Golder, S. & Lotan, G. (2010). Tweet, tweet and retweet: Conversational aspects of retweeting in Twitter. Proceedings of the 43rd Hawaii International Conference on System Sciences (HICSS-43). Koloa, Kauai, Hawaii.
Castells, M. (2009). Information age: economy, society and culture volume 1- the rise of the network society. Blackwell. Chichester, UK.
deSouza, C.S. & Preece, J. (2004). A framework for analyzing and understanding online communities. Interacting with Computers. 16, 579-610.
Elliott, M. S. & Scacchi, W., (2003). Free software developers as an occupational community: Resolving conflicts and fostering collaboration. Proceedings of the 2003 ACM SIGGROUP conference on supporting groupwork, 21-30.
Flick, U. (2006). An introduction to qualitative research. London: Sage.
Greenfield, P. M. & Subrahmanyam, K. (2003). Online discourse in a teen chatroom: New codes and new modes of coherence in a visual medium. Applied Developmental Psychology, 24, 713-738.
Harvey, L. & Myers, M. D. (1995). Scholarship and practice: The contribution of ethnographic research methods to bridging the gap. Information Technology & People, 8(3), 13-27.
Hine, C. (2000). Virtual Ethnography. London: Sage
Honeycutt, C. & Herring, S. (2009). Beyond microblogging: conversation and collaboration via Twitter. Proceedings of the 42nd Hawaii International Conference on System Sciences (HICSS-42). Los Alamitos, CA: IEEE Press.
Huberman, B., Romero, D.M. & Wu, F. (2009). Social networks that matter: Twitter under the microscope. First Monday, 14(1). Retrieved 06 May 2010, from
Jacobson, D. (1996). Contexts and cues in cyberspace: The pragmatics of naming in text-based virtual realities. *Journal of Anthropological Research*, 52, 461-479. Retrieved 06 May 2010, from http://people.brandeis.edu/~jacobson/context_and_cues.pdf.

Java, A., Song, X., Finin, T. & Tseng B. (2007). Why we Twitter: Understanding microblogging usage and communities. *Proceedings of the 9th WebKDD and 1st SNA-KDD 2007 workshop on Web mining and social network analysis*, 56-65.

Krishnamurthy, B., Gill, P. & Arlitt, M. (2008). A few chirps about Twitter. *Proceedings of the first workshop on Online social networks*, 19-24.

Marshall, C. & Rossman, G. B. (1989). *Designing qualitative research*. Newbury Park, Calif.: Sage Publications.

McDaniel, S.E., Olson, G.M. & Magee, J.C. (1996). Identifying and analyzing multiple threads in computer-mediated and face-to-face conversations. In *Proceedings of the 1996 ACM Conference on Computer Supported Cooperative Work*, 39-47.

Millen, D.R. & Dray, S.M. (2000). Information sharing in an online community of journalists. *Aslib Proceedings*, 52(5), 166-173.

Murugesan, S. (2007). Understanding Web 2.0. *IT Pro. July-August*. 34-41.

Neilsen (2010). Facebook and Twitter post large year over year gains in unique users. Retrieved 06 May 2010, from http://blog.nielsen.com/nielsenwire/global/facebook-and-Twitter-post-large-year-over-year-gains-in-unique-users/.

O’Reilly, T. (2005). *Web 2.0 compact definition?* Retrieved 04 February 2011, from http://radar.oreilly.com/archives/2005/10/web-20-compact-definition.html.

O’Reilly, T. (2006). *Web 2.0 compact definition: trying again*. Retrieved 04 February 2011, from http://radar.oreilly.com/archives/2006/12/web-20-compact-definition-tryi.html.

Ofcom (2008). *Social networking. A quantitative and qualitative research report into attitudes behaviour and use*. Retrieved 06 May 2010, from http://www.ofcom.org.uk/advice/media_literacy/medlitpub/medlitpubrss/socialnetworking/report.pdf

Parks, M.R. (1996). Making friends in cyberspace. *Journal of Computer-Mediated Communication*, 1(4). Retrieved 06 May 2010, from http://jcmc.indiana.edu/vol1/issue4/parks.html.

Pigg, K. E. & Duffy Crank, L. (2004). Building community social capital: the potential and promise of information and communications technologies. *The Journal of Community Informatics*, (2004), 1(1). 58-73.

Porter, C. E. (2004). A typology of virtual communities: a multi-disciplinary foundation for future research. *Journal of Computer-Mediated Communication*, 10(1). Retrieved 06 May 2010, from http://jcmc.indiana.edu/vol10/issue1/porter.html.

Preece, J. & Maloney-Krichmar, D. (2005). Online communities: design, theory, and practice. *Journal of Computer-Mediated Communication*, 10(4), article 1. http://jcmc.indiana.edu/vol10/issue4/preece.html.

Proulx, S. & Latzko-Toth, G. (2005). Mapping the virtual in social sciences: on the category of "virtual community." The *Journal of Community Informatics*. 2(1). 42-52.

Putnam, R. D. (1995). Bowling alone: America’s declining social capital. *Journal of Democracy*. 6(1). 65-78

Rheingold, H. (1994). *The virtual community: finding connection in a computerized world*. London: Secker & Warburg.

Stoecker, R. (2005). Is Community Informatics good for communities? Questions confronting an emerging field. *The Journal of Community Informatics*. 1(3). 13-26.

Ward, K.J. (1999). Cyber-ethnography and the emergence of the virtually new community. *Journal of Information Technology*, 14(1), 95-105.

Wellman, B. & Gulia, M. (1999). Virtual communities as communities: net surfers don’t ride alone. In Smith, M. A. & Kollock, P. (eds.). *Communities in cyberspace*. Routledge. London, UK, 167-194.

Dejin Zhao & Rosson, M.B. (2009). How and why people Twitter: the role that microblogging plays in informal communication at work. *Proceedings of the ACM 2009 International Conference on supporting group work*, 243-252.