Chapter 8. Sociality through Social Network Sites

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Introduction

The global system of networked computers, servers and routers known as the Internet has transformed many aspects of modern society and social interaction. The online distribution of goods and services, for instance, has influenced almost every industry and has radically transformed many. Alongside commerce-oriented technological development has been a rise in what has been termed "social media." One of the most significant developments connected to social media is the rise of social network sites (SNSs), such as Facebook, LinkedIn, MySpace, Cyworld, and Google Plus. Although sites of this nature first emerged around 1997, they rose to cultural significance as a phenomenon in 2003, when Friendster first attracted mass media attention. Less than a decade later, millions of people of all ages across the globe have joined SNSs (Anderson & Bernoff, 2010). In the U.S., 65 percent of Internet-using United States (US) adults report using social network sites such as Facebook, MySpace, or LinkedIn (Madden & Zickuhr, 2011).

In the early stages of this phenomenon, terminology varied widely with the interchangeable use of "social networking sites," "online social networks" or even simply, "social networks" to refer to a diffuse—and sometimes improbable—range of sites and services. In 2007we attempted to stabilize the discussion by offering a definition of social network sites:

web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system. (boyd and Ellison, 2007)

This definition served a need, but the social and technical landscape of these sites has changed dramatically since then. In this chapter, we document some of the ways SNSs have evolved since 2007, place their evolution within a context of Web 2.0 and scholarship on computer-mediated communication, and discuss some of the opportunities and challenges embedded in the study of social media and social network sites.

As SNSs proliferate and evolve, defining what constitutes a social network site becomes increasingly challenging. Some of the features that initially distinguished them have faded in significance, while others have been have reproduced by other genres of social media. Media-sharing websites, gaming sites, and locative media all encourage participants to list contacts and "Friends," making this affordance a poor criterion for distinguishing between social network sites and other genres. Meanwhile, other features, such as media streams like Facebook's "News Feed," have emerged as more salient components of the SNS user experience. Blurring things further, open application programming interfaces (APIs) and other platform technologies have enabled countless third-party websites to develop on top of social network sites or to integrate the social graph from popular social network sites into other tools and sites. Search engines and news sites surface Facebook and Twitter content, while MySpace allows people to use their Facebook credentials on MySpace, blurring the distinction between the two sites. In short, the technical affordances that define a social network site have become increasingly fluid. Of course, people's practices, expectations, and social norms have also co-evolved alongside the technical features and social interaction opportunities.

Scholars face a unique challenge in trying to investigate this rapidly moving phenomenon, as they struggle to understand people's practices while the very systems through which they are enacted shift. Even efforts to describe social network sites themselves are challenged by the ongoing evolution of the phenomenon. While scholars conscientiously describe *who* they are studying, they are less likely to describe the state of the technology at the particular moment in which they are studying it. As we will argue later, this compromises scholars" ability to synthesize different studies and discern higher order patterns.

In this chapter, we begin by reconsidering how to define a social network site given the shifts in technology and practice. We examine the three primary features—profiles, connection lists, and traversing—and offer an alternate definition that we believe will provide a more useful analytic framework for interpreting and understanding social network sites as they have evolved, fully recognizing that things may continue to shift in unexpected ways. To more properly contextualize social network sites, we situate them within the broader landscapes of the entrepreneurial tech scene of "Web 2.0" and the evolution of computer-mediated communication (CMC) scholarship. We conclude by discussing the opportunities and challenges associated with research on social network sites, arguing that researchers must attend to both the technical and the social components of these socio-technical systems when they design and report their work. In sum, this paper examines how the genre of social network sites has evolved over time and offers thoughts on how scholarship might adapt to the rapid rate of innovation inherent in this space.

THE ORIGINS AND RAPID EVOLUTION OF SOCIAL NETWORK SITES

In 2007, the three defining features of a social network site appeared to be the profile, the connections lists, and the functional ability to traverse those connections. As social network sites have evolved, the salience of these features has shifted. Most notably, the role of the profile has changed, as media streams have increasingly taken a more prominent role and the activity of "updating" has become less burdensome. Meanwhile, the articulation of contacts has become more central, both because of the rise of media streams and because of third-party technologies that incorporate the "social graph" as a way of organizing content. In contrast, the act of traversing did not change from a technical perspective, but became less central over time.

A public or semi-public profile

Lacking visible bodies, self-representation in online spaces offers participants many possibilities to actively construct a representation of how they would like to be identified. In some contexts, an online identity is explicitly linked to an offline presence—for instance, online dating profiles represent a person who is, presumably, available for future offline interactions (Ellison, Hancock, & Toma, in press). In other contexts, the linkage to an offline presence is less salient. For instance, the reputation associated with a particular pseudonym on an online discussion site may exist independently of the offline identity (Donath, 1998). Yet, in all cases, making oneself visible to others requires the enactment of a digital identity. Most CMC services encourage participants to create a screenname or use another identifier—such as an email address—to uniquely identify themselves. Early on, chatrooms and bulletin boards introduced the notion of a profile, linking personal information provided by individuals to their screen name. Profiles grew out of earlier UNIX-based protocols where users entered information into .project and .plan files that were displayed when others ran a "finger" command on them. With the rise of the World Wide Web, homepages became an important site of identification, as early web users posted biographies, photos, and entertaining links for viewers who surfed to their page (Döring, 2002). Online communities and related genres of CMC began incorporating profiles into their services. Profiles were especially important for sites that were designed to broker offline relationships among members, such as online dating sites; users of these sites were typically invited to upload photos and fill out detailed questionnaires that included demographic information, interests, and open-ended spaces for self-description.

Early social network sites like Friendster were designed with dating in mind and were thus profile-centric in nature, organized explicitly around a set of profiles that represented individuals within the system. Friendster's profiles closely resembled those typically found in online dating sites and included options for uploading a profile photograph and fields for self-descriptive text. Early social network sites generally adopted this same profile format, with two notable differences. Unlike online dating profiles, SNS profiles included a Friends list, consisting of names and photos representing a subset of the user's connections (e.g., MySpace's "Top 8" and a public space for visitor-supplied comments (e.g., "Testimonials" on Friendster or the "Wall" on Facebook).

The first SNS profiles were primarily designed to be relatively static portraits, explicitly constructed through text and other media provided by the profile owner, and only updated when the individual felt the need to do so. Yet, because of the Friends list and comments section, SNS profiles were often updated simply through the actions of others—a change in a Friend's photograph or a new "Testimonial" would alter the content on that individual's profile. Because social network site profiles are located within a web of relationships and those relationships are made visible on profiles, social network site profiles are *co-constructed*. Current SNS profiles increasingly include multiple channels through which individuals can contribute to and shape the profiles of their Friends.

In 2007, two types of SNSs were dominant: profile-centric sites, like LinkedIn and MySpace, and media-centric sites like LiveJournal, Flickr, and YouTube. A third type of SNS—location-focused services like Dodgeball—were still primarily the domain of early adopters in urban centers. While media-centric sites also included profiles, profiles were de-emphasized as destinations; rather, the structure of these sites highlighted the most recently updated content. While many contemporary location-based services like Foursquare and Gowalla technically have

profiles, they are very rarely accessed. As social network sites matured as a genre, profiles simultaneously lost their centrality and also became the product of aggregated media, personal updates, and system-generated content based on user activity.

Over time, SNSs introduced various features that made it possible for individuals to easily update their profiles. Although present in the beginning, commenting became more central with the rise of media sharing and the popularization of updating. Facebook's "status updates," Twitter's "tweets," and MySpace's "status and mood" are all examples of opportunities that SNSs provide to encourage users to create content to share with their contacts in response to prompts like "[username] is….", "Tell your friends what you are doing right now" or "What are you doing right now?" As the cost of storing photos and videos declined, SNSs also began to support large-scale media sharing; mobile applications made posting photographs and videos easy. Features that made it easier for users to post lightweight content to their profiles while simultaneously sharing it with Friends enhanced profiles by making them more dynamic, but in the process made the basic profile increasingly irrelevant as a destination.

Over time, the profile has shifted from a self-presentational message created by the individual to a portrait of an individual as an expression of action, a node in a series of groups, and a repository of self and other-provided data. This combats one of the central problems that emerged with social network site profiles—they grew stale and, as such, started to resemble an abandoned space. By 2011, sites like Friendster felt like a dormant snapshot of 2003, a collection of portraits that have been left unaltered since users abandoned the site for more vibrant spaces. Streams of quotidian, ephemeral content encourage people to participate more in that they provide an initial artifact around which others can engage. Features that support actions associated with status updates—the ability to post comments to, share, or register interest in an update—also encourage a stream of activity that is prompted by an update but often takes on a life of its own in the central stream. Today's SNSs are more like news aggregators than they are like profile-based contexts, even if the algorithm for displaying content is quite obfuscated. On some SNSs, a user's "profile" might consist solely of their activities on the site (such as media they have contributed) and list of contacts, with none of the user-supplied biographical data associated with traditional profiles.

Today's profiles are not simply self-descriptive, static text, but rather a dynamic combination of content provided by the user (such as status updates), activity reports (such as groups they've joined), content provided by others (such as virtual gifts that are displayed on the profile or "tagged" photographs uploaded by others), and/or system-provided content (such as a subset of one's Friend network and activities on third-party sites.)

The "friends" list

The ability to delineate someone as a public contact—or "Friend" [1]—and thus create an aggregated list that constitutes one's network on the site is the key differentiating feature of SNSs. Earlier communication tools enabled individuals to create a private list of contacts (for instance a buddy list on instant messaging), to establish a group of contacts that were shared by

[1] We capitalize Friends when we are referring to the connections on a SNS in order to differentiate these connections from the colloquial reference to friendship. When people use SNSs, they often identify friends, acquaintances, celebrities, and many others as "Friends" (Parks, 2010).

others (such as a listserv membership list), or to publish a list of related links (such as a blogroll), but SNSs extended the practice of creating a publicly visible, personally curated list of contacts and made it a mainstream practice.

The connections between people—and, thus, profiles—serve multiple purposes on a social network site. They are employed to mark and display relationships, delineate who can access what content, and serve as a filter through which viewers can browse profiles and discover friends in common. For users, these connections represent what sociologists refer to as a person's *social network*—the collection of social relations of varying strengths and importance that a person maintains.

Friending practices are at the core of SNS activity, but are often misunderstood by popular press narratives that assume that because these sites use a global term, users are unable to distinguish among kinds of relationships in their circle. An early study noted that the global label of "Friends" may have introduced confusion among users: "it is often difficult for two users who both call each other a friend to know if they are talking about the same thing" (Fono & Raynes-Goldie 2006). Yet, there is no evidence that SNS users are unable to distinguish different kinds of relationships within their SNS network. When asked, users report about 25-30 percent of their total Facebook Friends are "actual" friends (Ellison, Steinfield, & Lampe, 2011; Ellison, Vitak, Gray & Lampe, 2011), suggesting that users are in fact able to discern between these relationships although they all use the same label on the SNS.

Initially, SNS "Friends lists" were predominantly reciprocal, meaning that a link between two people was only instantiated when both parties agreed. As Twitter grew popular, so did the notion that relationships could be uni-directional, with people following others who did not reciprocate. Google Plus launched with directed connections and, in 2011, Facebook began allow people to "follow" others. Even for systems in which reciprocal friendship links are necessary, the ability to "hide" updates from a Friend or to limit the ability of some Friends to see updates allows for more asymmetrical disclosure of information. These more flexible arrangements may give users more freedom to express complex connections, but the tools to negotiate these relationships are often too complicated to be truly usable.

In offline contexts, we maintain many different kinds of relationships, ranging from weak ties to strong connections, which exist in multiple contexts such as work, family, and hobby or school-based groups. Having to simultaneously present oneself to different groups in the same social encounter can be challenging and predates the Internet (Meyrowitz, 1985; Leary, 1995). As SNSs became more popular with a wider range of individuals, many individuals" contact lists became more diverse as these users Friended people representing a range of contexts (family, professional contacts, church members, etc.). This growing diversity has contributed to cases of "context collapse," which describes the ways in which individuals that we know from different social contexts come together in SNSs in potentially uncomfortable ways (Marwick & boyd 2010). Over time, the size of users' Friends lists has grown, in part because SNS users don't tend to delete old connections, even if they lose touch with those people.

Social network site designers have developed different approaches to help people manage large networks. MySpace introduced the "Top 8" (eventually relabeled "Top Friends') to allow participants to choose eight contacts that would be highlighted on their profile page; MySpace assumed that people would list the people whose profiles they visited the most often, but this feature was often used to publicly display important connections. Facebook took a more

algorithmic approach, attempting to assess the importance of a user's Friends in order to prioritize updates but allowing users to tweak these formulae by "hiding" certain kinds of content in their news stream. Some SNSs—including Facebook, Twitter, Google Plus and YouTube—have allowed people to create different types of lists to organize their connections privately so that participants can consume only content from or limit content to people on those lists. Google Plus allows users to place others into "circles" as a way of organizing incoming and outgoing content and does not require symmetrical linking.

The rise of open APIs and developer platforms means that these collections of articulated contacts became valuable in contexts outside that particular SNS. Engineers and entrepreneurs alike began talking about the "social graph"—the global network of linkages between all individuals within a system (Fitzpatrick & Recordon, 2007). This language emerged at a time when commercial entities began to believe that the social graph had value beyond the individual's relationship with a given social network site. Marketers started recognizing the economic potential of using the social graph for advertising purposes, while media companies realized that they could leverage the social graph to shape the flow of information. From an engineering perspective, user experience designers recognized that the more accurately a system could discern the relationship between two users, the more valuable its recommendations would be and the more relevant the content displayed to the user.

As the social graph has risen in significance, companies have begun leveraging it to do more complex algorithmic work such as suggest relevant content, offer recommended contacts, and provide targeted advertisements. At a broader industry level, SNSs are metamorphosing from a destination site to a platform that enables third-party developers to build software on top of the social graph. Companies have begun exposing the social graph through APIs and negotiating deals to help connect information with people through their relationships.[2] For example, technologies like "Facebook Connect" allow other websites to suggest unique content based on a person's Facebook Friends list. In this way, the social graph of SNSs is increasingly used beyond the bounded space of the SNS itself.

View and traverse connections

When people first flocked to SNSs, the ability to traverse one's own connections and those of others was a critical and defining component of SNSs. Yet, as profiles faded, media streams emerged and Friends' lists have become more infrastructural; traversing connections has lost its salience as the core participation activity. The ability to see—and traverse—others' contact lists was innovative and important in several ways. From an adoption perspective it enabled users to find shared contacts easily, thus lowering the barriers to initiating contact with other users and enabling users to harness network effects more easily. From a social perspective, it allowed people to easily see the relationships between others, to reconnect with old friends and acquaintances, and to travel through the network in a way that enhanced social interactions. Although some SNSs, such as Google Plus, may enable users to hide portions of their network, the critical point here is that the design of the site makes it possible to display one's articulated network and that this is the default and typical setting.

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[2] Google, Facebook, and Twitter all provide APIs that allow third parties to leverage the social graph. Conferences like O'Reilly's Strata connect people who are working with the kinds of data provided by these APIs. And books like Russell (2011) provide technical guidance for engineers.

Prior to social network sites, the closest analog to the traversable Friends list was the construction of blogrolls on blogs. Individual bloggers often listed other sites that they respected, providing an HTML link pointing to them. This allowed visitors on Blog A to surf to Blog B. The flow of information was unilateral, though, so visitors who stumbled upon Blog B were unable to see that Blog A recommended Blog B. This was because blogrolls were, by and large, manually inserted and maintained and the structure of many blog platforms did not support display of this information. Services like LiveJournal and Xanga—retrospectively viewable as a cross between blog platforms and SNSs—were some of the first services to make traversing the network possible.

The visibility and traversibility of connections through articulated tie lists of "Friends" or—in the case of directed networks like Twitter, "Followers"—is still common on SNSs, but it has become an assumed property of publicly accessible Friends lists. Yet, one significant shift has unfolded: the traversibility of connections has become more important for machines than users. As APIs make the social graph available to broader audiences, algorithms are being designed to traverse the graph and learn about the individual nodes' relationship to one another. Such machine learning is the backbone of search engine technology, but it is increasingly central to the development of social network sites.

As social network sites have become mainstream, traversing the connections between people to view profiles is no longer the sole—or, even primary—way of participation. Content is surfaced through streams and each piece of content is embedded with numerous links to other content nuggets. While early iterations of sites like Friendster allowed users to browse interests to find other people, more recent SNSs have evolved to make nearly everything traversable. Features like Twitter's "hashtags" allow people to pivot off of topics; clicking on a hashtag will reveal all other posts referencing that term. On Facebook, the vast majority of profile content has become clickable, allowing people to traverse everything from alma mater to tagged content. Although early social network sites provided numerous points of navigation, Friends lists were the most notable; today, they have faded into the background as sites increasingly offer countless alternate discovery pathways.

DEFINITION 2.0

Given the evolution of social network sites—and the importance of these sites in popular culture—it is important to reconsider how to define them. The definition that we offered in 2007, while useful, does not accurately describe the landscape of SNSs today. As of this writing, we believe the following is a more accurate and nuanced definition.

> A social network site is a *networked communication platform* in which participants 1) have *uniquely identifiable profiles* that consist of user-supplied content, content provided by other users, and/or system-provided data; 2) can *publicly articulate connections* that can be viewed and traversed by others; and 3) can consume, produce, and/or interact with *streams of user-generated content* provided by their connections on the site.

We still believe the term "social network sites" is more accurate than "social networks" (which is a sociological term for one's social relationships), "social networking" (which evokes a practice of actively seeking connections and also happens offline), "online social networks" (one's online connections more generally) or "social networking sites" (which emphasizes connecting to new

people). The term "social network site" rightfully emphasizes that these are sites that enable individuals to articulate public lists of connections—to present a social network and to view others' networks. This ability is what differentiates social network sites from earlier forms of online interaction spaces and the term "social network site" highlights the role of the network (as a noun) as opposed to the practice of networking (as a verb).

The desire to communicate and share content is a primary driver of SNS use. These interactions are supported through a variety of communication-oriented features. Almost every aspect of SNS user activity is fundamentally enhanced by the ability of SNSs to lower the barriers to communication and sharing and thus reshape the kinds of networks that people are able to build and support. Many of the weak tie relationships articulated on SNSs would fade away were it not for ease with which people can communicate, share, and maintain simple connections. For this reason, this new definition positions social network sites first and foremost as a communication platform while also highlighting the importance of sharing content, typically consumed through a stream.

All SNSs support multiple modes of communication: one-to-many and one-to-one, synchronous and asynchronous, textual and media-based. On most social network sites, these features can be public or more private. Features like comments on Facebook, @replies on Twitter, and shouts on Foursquare allow people to communicate with their network of Friends in ways that are visible to broad audiences. Meanwhile, many SNSs have private messaging or chat features that allow for more intimate dialogue. Importantly, through features such as the ability to comment on Friends' content or social gaming, users are able to communicate with the networks of their Friends. These Friends of Friends may be useful sources of novel information and diverse perspectives. The context of the SNS—such as the fact that these users share a Friend in common and are communicating in a semi-public forum—may support more productive exchanges than those that take place in other online fora such as anonymous chat rooms where accountability and motivation are lower.

As part of a broader shift echoed in other social media, SNSs have become more media-centric and less profile-centric. By 2011, most social network sites were organized around a stream of recently updated content, whether in the form of Facebook's News Feed or as the landing page on Twitter and Tumblr. Naaman, Boase, and Lai (2010) refer to these streams as "social awareness streams." On most social network sites, each person's stream is populated with content provided by those that they've chosen to Friend or follow. Spaces for media sharing—whether text, video, or photos—are also nearly universal on popular social network sites; the availability of this content is often announced in the stream of updates. On some sites, automated messages about people's actions on the site are also posted in the stream. The aggregated collection of media and text from one's Friends serves as the point of departure for other activities on the site or the Web, replacing the act of surfing from profile to profile to discover updated content.

Social network sites have evolved but their foundational activities—sharing content with a bounded group of users—are fundamentally the same. The significance of profiles in the user experience has declined, but profiles as spaces for self-presentation and content distribution are still the anchor of social network sites. Friends lists are still the core organizing principle, but have gone from being a way of knitting together profiles to becoming the "social graph" backbone. Most importantly, the implicit role of communication and information sharing has become the driving motivator for participation.

SITUATING SOCIAL NETWORK SITES IN CONTEXT

In essence, social network sites are a computer-mediated communication (CMC) genre that emerged during an industry-wide innovation boom referred to as the "Web 2.0" phenomenon and thus is part of a category of tools referred to as "social media." In order to understand the significance of SNSs and the practices that unfolded around them, it is important to contextualize them against the backdrop of Web 2.0 and situate them within the framework of CMC scholarship more generally.

The web 2.0 phenomenon

When Friendster first gained widespread attention in 2003—prompting numerous imitators—social network sites were quickly labeled as one type of "social software" in what would be later described as the "Web 2.0" phenomenon. While many scholars have eschewed these labels, arguing that there's nothing about "social software" that couldn't be addressed through existing academic frames such as "virtual communities" or "computer-supported cooperative work," many in Silicon Valley were enamored by the potential of this new wave of innovation.

Functionally speaking, there was very little new about social software—or, as the technologies would later be called, "social media." Many of the prominent features, such as the ability to host photographs online or the ability to update a webpage, had existed for years. What makes "social media" significant as a category is not the technology, but, rather, the socio-technical dynamics that unfolded as millions of people embraced the technology and used it to collaborate, share information, and socialize. Popular genres of social media integrated the public nature of interest-driven CMC with the more intimate dynamics of interpersonal CMC. For instance, news aggregator sites like Reddit and Digg enable individuals to post links to news stories online as well as comment and vote on them, reshaping the economics of attention in a way that enabled bottom-up filtering of online content. Meanwhile, SNSs have become a genre of social media that lowers barriers to communication, facilitates the display of identity information, and enables like-minded individuals to easily discern their common ground, thus helping users cultivate socially relevant interactions (Ellison, Steinfield, & Lampe, 2011). Of course, such a distinction is clouded by features like Facebook's "Like" button, which is used to increase the visibility of certain content in an individual's feed.

Web 2.0 means different things to different people. Tim O'Reilly is usually credited with popularizing the term, although the moniker dates back to the 1990s. In organizing the first Web 2.0 conference, O'Reilly and John Battelle sought to discuss how the web could serve as a platform (O'Reilly, 2005). Their approach paralleled how technologists and entrepreneurs generally viewed Web 2.0.

At a technical level, Web 2.0 signaled a shift from server-driven back-end websites to front-end centric ones powered by Javascript, Ruby on Rails, and other web development packages. Procedurally, Web 2.0 meant moving from a model of "design, develop, and deploy" to an iterative development process known as the "perpetual beta." MySpace's approach to development illustrates this mindset. In the early years of the site, MySpace launched new features frequently based on watching what people did with the service, eschewing traditional in-house quality control and instead relying on users to indicate what was working and what wasn't, what they liked and what they didn't.

For the business community, Web 2.0 represented a potential return to the irrational exuberance of the dot com boom. In many ways, the "2.0" moniker refers to the potential for Silicon Valley to recover from the collapse of the first web-related boom. As such, Web 2.0 signaled a return of venture capitalists, entrepreneurs, and a new battle over power and status in the technology scene (Marwick, 2010).

While the technical and business aspects of Web 2.0 are significant in and of themselves, more germane to this discussion are the cultural shifts that came with Web 2.0. In short, Web 2.0 brought online communities into the mainstream. Although online communities have been in existence since the earliest days of the internet—and services like AOL made online communities accessible to more mainstream internet users—they have not been the central focus of most internet users. Prior to Web 2.0, people spent the bulk of their time online browsing websites and engaging with email, instant messaging, and casual gaming; actively participating in online communities was still considered geeky. Social network sites reconfigured people's engagement with online communities because they signaled a shift from interest-driven to friendship-driven spaces. Rather than going to an online community to meet others who were interested in a particular topic or hobby, people primarily turned to social network sites like Facebook to publicly engage with people they already knew (Ellison, Steinfield & Lampe, 2007; 2011). The focus on one's personal network and the familiarity between participants made social media feel very different than previous varieties of online communities.

The concept of "Web 2.0" was an industry-driven phenomenon, hyped by the news media and by business analysts alike. Many of the technologies that were eventually labeled Web 2.0 were developed years earlier. For example, the structural foundations of blogging were first created during the dot com bubble with services like LiveJournal and Blogger, both founded in 1999. Still, blogging started rising out of the post-crash ashes circa 2003 and, in 2004, the US presidential election took blogging mainstream and news agencies began critiquing the role that "web diarists" could play as amateur journalists (Lee, 2004). Likewise, the functional components of social network sites date back to at least 1997, but Friendster got people excited in part because it was seen as a new type of online dating site and online dating sites were one of the few profitable services in 2001, after the economic downturn.

Web 1.0 veterans—bored, out of work, and still enamored by the Internet, which, at the time, was being described as a "fad" by analysts—began developing new applications for communicating and sharing information. People were exploring blogging, tagging, social bookmarking, podcasting, photo sharing, video sharing, and social gaming. Old CMC tools were being revisited and reconsidered while the industry itself began making claims about innovation that excited investors. For example, buzzwords like "user-generated content" became widespread in order to signal a shift from commercially edited or curated content to content provided by individuals. Social network sites emerged out of the Web 2.0 and social media phenomena, mixing new technologies and older CMC practices infused by tech industry ideals.

Genres of computer-mediated communication

SNS-enabled communication patterns both differ from and incorporate aspects of earlier forms of online communication, including email, instant messaging, and MUDs. While SNSs emerged at a moment in the Internet's history where mediated interactions were increasingly widespread, in part because the Internet was being broadly embraced, they owe a lot to earlier CMC genres.

In fact, many SNS features were incorporated from earlier tools. Although the true historical origins of CMC are found in the introduction of print, which enabled communication to span temporal and geographical boundaries for the first time, the first instances of *computer*-mediated communication are located in the exchange of text messages over the Internet which occurred soon after the first file transfers over ARPANET and soon constituted the majority of the system's traffic. Since these early exchanges, the ability of the Internet to support social interaction has played a central role in its adoption.

Early CMC genres can typically be understood across two axes: synchronous versus asynchronous, one-to-one versus one-to many. One-to-one CMC channels were primarily for connecting people directly in more intimate fashions, while one-to-many channels connected strangers, typically around shared interests. For instance, motorcycles aficionados went to Usenet's rec.motorcycles to find like-minded communication partners while close friends often communicated via IM or email. The tools for interpersonal group communication and the tools for topically-oriented gatherings often blurred, with mailing lists serving both as a forum for groups of people who knew each other and as places where strangers could gather around a topic. Likewise, some channels blurred synchronous and asynchronous communication, such as MUDs—environments where users created fantastical representations of self and communicated with others in text-based environments.

While groups of friends often met at collectively agreed-upon online spaces—and online communities like the Whole Earth 'Lectronic Link (WELL) initially formed through networks of friends—many online communities in the 90s were not designed to support pre-existing friend groups. Rather, they served as interest-focused conversational hubs that brought together people based on shared interests—not just shared geography—and enabled them to "form webs of personal relationships in cyberspace" (Rheingold, 1993). This first generation of virtual communities was, for the most part, built upon people encountering one another for the first time in an online context that grouped people by interest, not geography. Some of these relationships moved to other communication channels, including face-to-face (Parks & Floyd, 1996), especially when they were associated with a particular geographical nexus (such as the WELL in the Bay Area of California). Later work found similar patterns: DiGennaro and Dutton (2007) find that 20 percent of their sample of Internet users report meeting new friends online and Tufekci (2010) reports that people who are looking to make friends online often do.

Early research on virtual communities explored how these collections of individuals transformed into communities with distinctive cultures, norms, and a sense of connection. For instance, Nancy Baym's (2000) ethnographic account of a newsgroup devoted to soap operas highlights the shared norms that developed among participants as they created a space for communication and community. Rheingold (1993) documented the development of the WELL and coined the phrase "virtual community." Sherry Turkle's (1995) analysis of MUDs described a space where interactions that occurred outside of traditional embodied experiences were heady and liberating. As one of Turkle's participants explains, "[real life] is just one more window, and it's not usually my best one" (Turkle, 1995, p. 13).

The notion that individuals could develop intimate friendships and emotional connections with people they had never met "in real life" was surprising to those who didn't use these tools, and some of the early laboratory studies reinforced the notion that CMC was less effective than face-to-face for group communication processes (e.g., Kiesler, Siegel & McGuire, 1984). Although the hundreds of listservs and newsgroups that flourished during this time reflected a diverse set

of interests, the userbase powering them was far less diverse. During this period, the typical Internet user was more likely to be white, male, tech-savvy, older, and wealthier than those who were not online. And most of them spoke English and were passionate about geeky topics. Thus, even as strangers encountered each other online, they often had quite a lot in common.

Many of the features underlying early CMC tools have been incorporated into SNSs. Being able to group users by interest, describe oneself textually, and engage in both synchronous and asynchronous communication are key aspects of the SNS user experience today. As with these earlier communication forums, individuals are using SNSs to achieve a multitude of personal and professional goals.

Early research on the topic suggested that SNS users were more likely to articulate existing relationships on social network sites than meet new people (see boyd & Ellison, 2007, for a review). Recent research on Facebook suggests that connecting with close friends is more common than using the site to meet new people, but that using the site to find out more information about peripheral others, such as casual acquaintances or someone one has met socially, is also a strategy employed by users (Ellison, Steinfield & Lampe, 2011; Joinson, 2008). On other sites, different practices have evolved. Early research on the topic found that MySpace users appeared more likely than Facebook users to meet new people (Dwyer, Hiltz & Passerini, 2007). On Twitter, which allows asymmetrical relationships, it is more common to follow accounts of those whom one does not know personally (Marwick & boyd, 2011), reconfiguring how connection and intimacy are managed (Crawford, 2009).

The infrastructure behind social network sites—particularly the articulation and navigation of pre-existing relationships—also complicates how "community" can be conceptualized. While online forums that are organized around topic or interests can be reasonably understood as a discrete group, networks of people connected to disparate others are not as easy to categorize. Similar to the way in which early users might belong to multiple discussion forums—each with its own culture, norms, and history—SNS users may interact with different groups that they see as communities on SNSs. For instance, a college student may have Friends that include fraternity brothers, chemistry major friends, high school friends and family members. While there are tools for segmenting these individuals into lists for the purposes of sharing and restricting content, these features are often challenging to use.[3] Instead, individuals are recreating their communities on an individual basis as opposed to accessing a commonly held distribution list, as is typical in many other forms of online interaction. Rainie and Wellman (2012) point out that, in networked societies, we are likely to connect with multiple shifting networks that meet our informational or other needs at that moment, as opposed to a smaller number of static groups that serve all our needs.

SNSs incorporate features from earlier forms of CMC, but they do so in a way that amplifies the power of these features because they are placed in a social context. For instance, consider the profile. Profiles that are linked to a group of contacts are often more accurate than those that exist in a social vacuum; the presence of these contacts implicitly vets presentational claims and third-party comments are perceived as more credible than self-reported information (Walther et al., 2008). In this way, people's self-presentations on social network sites may be less highly

[3] Google Plus attempts to address this design issue with its "Circles" but, at the time of publication, it is not yet clear whether or not their SNS will be broadly adopted, let alone how the "Circles" feature will be used.

embellished when compared to sites without visible social connections, such as online dating sites. Earlier forms of mediated communication allow for identity information to be shared, but SNSs do this in different and potentially more powerful ways due to the presence of the third-party Friends network. Other features are similarly amplified through the Friends list. One reason SNSs are a compelling focus for the field of CMC is that they are well-designed to support interaction and are adopted by so many diverse kinds of individuals who are connecting with one another in novel ways, leveraging existing tools to do unexpected things, and reconfiguring CMC technologies to meet their needs. Much of what is novel stems from how participants incorporate an articulated list of connections—or Friends—into their online practices.

RESEARCH CHALLENGES

SNS scholarship offers scholars in a diverse range of fields the opportunity to study empirical questions as wide-ranging as how the number of Friends one accumulates on an SNS affects impressions (Tong et al., 2008), how participants leverage SNSs to get their questions answered (Morris et al., 2010a; 2010b), how social media connects journalists and citizens during political uprisings (Lotan et al., 2011), or how constructing one's profile can effect one's view of self (Gonzalez & Hancock, 2008).[4] Arguably, the range of activities and goals that users are employing SNSs to meet, and the diversity of the userbase, make social network sites a relevant context for scholarship in almost every discipline.

However, studying SNSs also poses unique challenges. By far and above the most pressing challenge for SNS scholars lies in the rapid pace at which innovations and technical changes are implemented in this space. For scholarship in this arena to develop, SNS researchers need to be mindful of the ways in which these sites evolve over time and the effects this may have on the interpersonal, psychological, and sociological processes they are studying.

The networked nature of SNS interactions provides an additional layer of complexity not experienced by earlier media scholars examining the role of television or radio. What one experiences on SNSs and the content to which one is exposed differs depending on the structure of one's network, a users' individual preferences and history, and her activities at that moment. This is quite unlike previous media like television, where the program does not change depending on who can see it. Although interpretations of media have always varied, mere access varies widely with SNSs, complicating what constitutes the object of content analysis.

Much like research on the effects of Internet use have evolved to measure granular activities as opposed to global measures of use such as time online, SNS researchers are also moving towards a consideration of specific activities on the site. Because of how people's position within the SNS shapes their experiences of it, activity-centric analyses require contextualization and translation, not unlike what social scientists studying differing cultural practices have had to do for decades.

Documenting socio-technical changes

One key challenge of studying social media is that designers of these tools are innovating at a very rapid timeframe and often with little advance notice. Given the rapidly changing

[4] For a broader sampling of research into SNSs, visit the following bibliography: http://www.danah.org/researchBibs/sns.php

infrastructure and the timeframe of academic publishing, the site at the time of data collection is likely to be very different from its incarnation at the point of publication. Furthermore, features that one scholar examines one year may simply disappear the next. Thus, two studies of a particular site that produce different findings may not be "contradictory"—they may actually have examined what is in essence two different socio-technical contexts.

We believe it is critical that SNS scholars consider the implications of technological change more explicitly in their work. As systems change, so will the practices they enable and constrain. Unless researchers attend to technology-based features, and are more careful about describing and considering the impact of the technology itself, scholarship on SNSs may become a landscape of individual, niche studies that preclude synthesis across them—a connect-the-dots canvas of points with no organizing framework that reveals the connections between them and allows the larger picture to emerge.

All technologies evolve over time (see Pinch & Bijker, 1987). As feature sets change, so too do user practices, expectations, and norms. Unlike many previous technologies—like the television or telephone—social media applications evolve far more quickly, often without warning and in ways that may have significant implications for users and their practices. Social media researchers may be halfway through data collection when they discover that an important feature has been redesigned or removed altogether. Or they may find their analysis assumes an old set of norms and features. For example, a study of manual retweeting practices on Twitter (boyd, Golder, & Lotan, 2010) quickly became outdated when Twitter launched its retweet functionality. In order to study phenomena as they are unfolding, researchers must flexibly negotiate the shifting toolset, but they must also be careful about how they document their findings.

In order to produce scholarship that will be enduring, the onus is on social media researchers to describe the technological artifact that they are analyzing with as much care as survey researchers take in describing the population sampled and with as much detail as ethnographers use when describing their field site. This is not to say that researchers must continue to describe technologies as if no one knows what they are—we are beyond the point where researchers must explain how electronic mail or "email" is like or unlike postal mail. But, rather, researchers must clearly describe the socio-technical context of the particular site, service, or application their scholarship is addressing. In addition to attending to the technology itself, and the interchange between technical and social processes, we believe SNS researchers should make a concerted effort to include the date of data collection and to describe the site at the moment of data collection and the relevant practices of its users. These descriptions will enable later researchers to synthesize across studies to identify patterns, much in the same way reporting exact effect sizes allows for future meta-analyses.

For those of us who believe that social network sites are socio-technical systems, in which social and technical factors shape one another, failing to describe the site under study ignores the fact that the technological constraints and affordances of a site will shape user practices and that social norms will emerge over time. Not including information about what the feature set was at the time of data collection forecloses the possibility of identifying patterns that emerge over time and through the accumulated scholarship across a range of sites and user samples. Unfortunately, because they have no knowledge about how things will continue to evolve and which features

will become important to track, researchers may not be able to identify the salient features to report and may struggle with devoting scarce publication space to these details, but this doesn't undermine the importance of conscientious consideration towards describing the artifact being analyzed.

Even minute technical changes can have meaningful effects on human behavior. For instance, changing the default ages that show up on the front page of major online dating sites for suggested searches might influence how searches are conducted and how individuals choose to present themselves. Online daters report shaving off a year or two from their age so as to not be "filtered out" by people searching for typical age brackets such as 35 or 40 (Ellison, Heino, & Gibbs, 2006).

These issues are more magnified when addressing larger socio-technical issues, like privacy and the shifting nature of social network site privacy settings. Unlike face-to-face contexts, where the audience for a particular utterance is usually visible (e.g., the other people in the room), content that's visible to a limited audience can be confusing to those who see them but do not know who else can and thus may not be able to discern the extent to which the information is truly "public." For example, scholars who are analyzing privacy settings and privacy practices on Facebook in 2005 (Gross & Acquisti, 2005) document very different practices than those who study privacy later (e.g., boyd & Marwick, 2011; Lampinen, Lehtinen, Lehmuskallio & Tamminen, 2011; Stutzman & Kramer-Duffield, 2010). Seeing how the default privacy settings on Facebook have changed over time highlight the rapid and meaningful nature of change on SNSs (McKeon, 2010). The introduction of features that enable users to target content to certain people, such as Facebook's "lists" feature and, more recently, Google Plus" "circles," are examples of technical changes that could reshape how users engage with others on the site and potentially force users to negotiate a new level of social complexity. Knowing whether users had access to these advanced features or just early simplistic structures for making content "public', "private," or "Friends-only" is important to know when interpreting findings from a study of SNS privacy issues.

SNS scholars should aim to produce work that contributes insights and develops theory in a way that transcends the particular site at a moment in time, but rather is useful and informative even after the site design shifts. This requires historically locating the technology alongside descriptions of the population and practices.

The challenges and opportunities of large datasets

Because of both the content that people upload and also the behavioral traces that they leave behind social network sites have unprecedented quantities of data concerning human interaction. This presents unique opportunities and challenges. On one hand, SNSs offer a vibrant "living lab" and access to behavioral data at a scale inconceivable to many social scientists. On the other, the data that are available present serious research ethics questions and introduces new types of biases that must be examined (boyd & Crawford, 2011).

A lot of the core challenges stem from the opportunities, problems, and limitations to accessing server-level data. Harnessing server-level data—the data captured by the site, not just the traces made visible through the public-facing screens—provides an opportunity to study and track user behavior without the issues posed by self-report data or privacy settings, although it introduces other complications. Server-level data often provide activity data at a granular level not possible

through other methods. For instance, using Facebook server-level data, Burke and colleagues are able to identify the social capital outcomes of different kinds of activities on the site, such as passively consuming others' content or broadcasting messages (Burke et al., 2011). The cognitive load required of users to answer detailed questions about their micro-activities often precludes survey questions about these kinds of usage details, even assuming users could accurately report them.

Server-level data provides a unique opportunity to access detailed behavioral data about what people are doing on SNSs. Yet, it's not clear that those who participate on SNSs want to be observed in this way. Nor is it clear that researchers can always correctly interpret these data. Furthermore, only some researchers have access to server-level data, which limits the kinds of research questions that are explored. Interpretation requires accounting for all of the reasons behind why content may have been produced. It's easy to misinterpret data when researchers can't directly ask users about their motivations, perceptions, or attitudes. Similarly, self-reported user characteristics in profile fields are susceptible to self-presentational tendencies and response biases, so just as with survey questions, researchers need to be careful to articulate the biases in their samples. Meanwhile, access to these data is difficult to procure, often requiring collaboration with a commercial organization or requiring researchers to create social media systems in order to access data. For example, while some researchers have easy access to the Twitter 'firehose', many others do not. As Lev Manovich (2011) has argued, limited access to data may reproduce significant inequalities among researchers and limits what kinds of questions are asked. While the research challenges surrounding server-level data are not yet well understood or articulated, it is important that scholars begin interrogating this aspect of studying SNSs.

As more and more attention is given to the large datasets associated with social media applications, it is also important for researchers to recognize that many powerful inquiries about SNS practices do not require server-level access or technical analyses. Indeed, there is critical research value in understanding how individuals interpret the technological artifacts of SNSs or how individuals work to challenge expectations about how they are supposed to engage with the systems. Just because a system is designed to do something in particular does not mean that users will engage with it in that way. For example, Facebook gives users the ability to "deactivate" (as opposed to delete) their accounts so that users who regretted their decision could reactivate their account without suffering data loss. Yet, boyd and Marwick (2011) interviewed a teenage girl who repurposed this feature to make Facebook a real-time experience for privacy reasons. Every day, she logged into Facebook and reactivated her account; when she was done, she deactivated her account. Her regular de/re-activation strategy may have been visible as a glitch in the server logs, but the rationale for her behavior would be impossible to discern without direct interrogation of some kind. It is important not to lose sight of the kinds of questions that cannot be answered by server-level datasets alone.

CONCLUSION

In this chapter, we've attempted to highlight changes in social network sites over time and to introduce a definition of SNSs that more accurately articulates the features and frameworks that are salient to users. We have attempted to outline some of the ways in which SNSs have changed since their popularization, drawing attention to the ways in which technical and social changes are dependent upon one another. As a genre, SNSs are still in their adolescent stage and we expect that they will continue to evolve. By contextualizing them in light of the Web 2.0

phenomenon and revealing how they build on previous genres of CMC, we have grounded their history so that future developments can better be understood in terms of the past.

Our definition of social network sites is deeply connected to these sites' features and affordances. Yet, as we have found in our own work, focusing primarily on the technical features of a particular tool might be less useful than highlighting how the tools are used in practice. Although the feature set is the most visible characteristic—as is the case of many technologies—many of the more interesting insights emerge when we consider user practices and social implications, although it is far more challenging to measure, articulate and theorize about these kinds of changes. Thus, we acknowledge the way in which technical and social factors mutually shape one another and call for SNS researchers to attend to and describe the technical system in which they are collecting data.

Although studying SNSs introduces new challenges, this area also provides great opportunities. As a rapidly moving phenomenon, SNSs complicate researchers' traditional mode of analysis, but this also introduces new methodological opportunities. The vast amounts of behavioral and server-level data they contain is seductive, but it is important that researchers do not lose site of the value of inquiries that do not rely on large datasets. Social network sites have opened up new venues and possibilities for analyzing human interactions, but it is essential that researchers do not become too enamored with these new systems. Scholars have the potential to—and, indeed, the responsibility to—interrogate emergent phenomena with a critical eye. Thus, we invite researchers to clearly articulate the assumptions and biases of their methods, attend to the wide array of research possibilities presented by social network sites, and embrace the possibilities these contexts offer for refining existing theories and developing new ones.

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