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The Reader-to-Leader Framework: Motivating Technology-Mediated Social Participation

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Abstract

Billions of people participate in online social activities. Most users participate as readers of discussion boards, searchers of blog posts, or viewers of photos. A fraction of users become contributors of user-generated content by writing consumer product reviews, uploading travel photos, or expressing political opinions. Some users move beyond such individual efforts to become collaborators, forming tightly connected groups with lively discussions whose outcome might be a Wikipedia article or a carefully edited YouTube video. A small fraction of users becomes leaders, who participate in governance by setting and upholding policies, repairing vandalized materials, or mentoring novices. We analyze these activities and offer the Reader-to-Leader Framework with the goal of helping researchers, designers, and managers understand what motivates technology-mediated social participation. This will enable them to improve interface design and social support for their companies, government agencies, and non-governmental organizations. These improvements could reduce the number of failed projects, while accelerating the application of social media for national priorities such as healthcare, energy sustainability, emergency response, economic development, education, and more.

Keywords: Social participation, motivation, technology mediated communication, a Reader-to-Leader framework, online community, social networks, contribution, collaboration

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INTRODUCTION

YouTube, whose 10 billion video views per month makes it the third most active website in the world, has become the location of choice to present personal videos, new product demos, and political agendas. Wikipedia, which has more than 10 million articles in 250 languages, has risen to be one of the top ten websites in the world. Facebook, MySpace, LinkedIn, and other social networking sites are expected to grow to 1 billion participants by 2012 (Alexa, 2009). Cell phone, text messaging, and mobile versions of web services will soon exceed 3 billion users across the world. Billions of people contribute knowledge and opinions through wikis, discussion forums, and blog communities, while others build collective intelligence by tagging photos, rating movies, reviewing restaurants, and commenting on political events. These social applications have grown immensely in the past 10 years, but still newer innovations may overtake them. Twitter, Jaiku, and other microblogging services enable friends to read about each other's activities, teens to track celebrities, families in fire-ravaged regions to scan updates from loved ones, and firefighters to keep track of their colleagues as they fight the fires.

This paper presents the Reader-to-Leader Framework, which describes how people often join social media by first reading, then marginally contributing by sending a brief note, asking a question, uploading a photo, or rating a restaurant. Some may go on to collaborate with others on a Wikipedia article or YouTube video, or they may take on a leadership role in a discussion or by helping newcomers.

This framework, supported by extensive references to the research literature, is designed to help researchers, designers, and managers understand what motivates technology-mediated social participation. This will enable them to improve interface design and social support for their companies, government agencies, and non-governmental organizations. These improvements could reduce the number of failed projects, while accelerating the application of social media in healthcare, energy sustainability, emergency response, economic development, education, and more (Shneiderman and Plaisant, 2009; Ye and Fischer, 2007).

The next section discusses the social and cultural background in which social media are used. The third section introduces some of the theoretical concepts that underpin the Reader-to-Leader Framework. The fourth section summarizes the discussion and suggests a research agenda for testing the framework.

BACKGROUND

Users can find anything being promoted, discussed, or tagged on the Internet, whether it is consumer products, scientific ideas, youthful infatuations, or terrorist agendas (Wellman and Gulia, 1999). Some online social connections are lightweight and ephemeral; some involve regular contributions; some continue online as stable collaborations that have shared purposes; and some lead to life-altering, durable, relationships that often involve face-to-face meetings. Participants who deepen their commitment by making repeated contributions or significant collaborations may grow loyal to their social connections and take on leadership efforts to strengthen their community by fixing problems (software or content), or by mentoring novices and contributing to governance.

The culture of the Internet is about much more than information transfer. It has become increasingly social and communal. The purpose of mobile devices such as cell phones has expanded beyond person-to-person communication to become the facilitator of the rich social web. While individuals' needs and characteristics initially shape interface designs, increasingly, social requirements determine the nature of technology-mediated communication (Moore and Serva, 2007). For example, many millennials – the name given to technically-savvy people under the age of 30, born between the years 1978-1996 in developed countries – use email but prefer cell phone texting and communicating via Facebook (New Politics Institute, 2007). Twitter, too, is growing in popularity with some in this age group, as it provides a steady feed of awareness information about the hundreds of people they might follow (Wu et al., 2008). Stimulated by the need to share communications tools and to leap over the expensive laptop culture that depends on thick Internet "pipelines," users and businesses in many parts of the world seek less expensive solutions that support cooperatives and microfinanced entrepreneurs. Consequently, cell phones and other mobile devices are becoming the norm across the world, vastly outnumbering web-connected laptops (Lasica, 2008).

New ways of creating and maintaining familiar applications that exploit social opportunities are emerging. Open Source software has had many successes, but now citizens are sharing skills to create numerous other services. A few years ago, it was hard to imagine that Jimmy Wales' dream of creating a continuously updated online encyclopedia free of charge, would become a highly respected and frequently consulted information source

Tagging taps into the previously inaccessible knowledge of individual citizens and creates a sense of community, as among the virtual museum goers of the Steve Museum project, a cultural heritage database (Trant et al., 2007).

Using more elaborate commenting techniques, doctors and nurses share knowledge that helps save lives across remote areas of the world.

For all the public and corporate enthusiasm and the proclamations of utopian visionaries, the reality is that many web sites fail to retain participants, tagging initiatives go quiet, and online communities become ghost towns. Many government agencies are reluctant to even try social participation, fearing public uprising, pornography, or slander. Many social applications just aren't social at all and see little or no activity (Preece, 2000).

While discretionary use of playful social applications can be successful, there are fewer stories about durable large-scale successes that deal with difficult issues such as crime reporting, disaster response (Shneiderman and Preece, 2007; Torrey et al., 2007), large scale epidemics such as AIDS, or fighting terror. Even personal health reporting websites from Google and Microsoft or the innovative PatientsLikeMe have drawn relatively few participants. Amber Alert can claim modest success in recovering abducted children, but there are many other problems in developed countries that could benefit from more social participation. Similarly, in developing nations, where leaders are struggling to achieve the United Nations Millennium Development Goals, effective social media could be helpful to aid workers, government project directors, and local entrepreneurs (Perry, 2000). Responses to many of the world's difficult challenges could be dramatically more successful if social participation could be made more consistently effective.

Unfortunately, the potency of technology-mediated social participation has been recognized by terrorists, religious extremists, and criminal organizations (Taylor et al., 2006; Simon Wiesenthal Center, 2008). Furthermore, the volume and detail of information in these social participation applications poses a severe threat to privacy. However, if public safety officials, civic-minded technology specialists, and well-intentioned citizens devote sufficient attention to the potential for misuse, it can be reduced.

Researchers, designers, and managers want to learn from successful applications and to apply this knowledge in the design and management of applications that they care about. A *unified* theory that could be applied across a range of applications and social contexts would be useful, but such a theory is elusive and may not be possible. However, some researchers in the field of motivation have admirably applied their work to sociotechnical systems. For example, Zhang (2008a, 2008b) draws on research by Reeve (2005), Norman (2004), and others to explain the impact of ICT design and to suggest guidelines. Wu develops a model of motivation to explain students' adoption of a university emergency response system (Wu, 2009). Further, Benkler and Nissenbaum (2006) advocate "virtue" in an article entitled "Commons-based peer production and virtue." These authors draw deeply on philosophy, supported by observations, and posit: "(a) that a society that provides opportunities for virtuous behavior is one that is more conducive to virtuous individuals; and (b) that the practice of effective virtuous behavior may lead to more people adopting virtues as their own, or as attributes of what they see as their self-definition" (Benkler and Nissenbaum, 2006, p. 394). Researchers frequently invoke theories relating to a range of social behavior to explain the effectiveness of design components that support reputation development, offer rewards, encourage altruism, and so forth. Many of these are addressed later in this paper.

The literature contains several examples of frameworks or models, underpinned by appropriate theory, that describe how people's online behavior changes over time. Some observant developers advocate models derived through practices that have similar components to the Reader-to-Leader Framework, except that few attempts have been made to relate their stages to theory and current research. For example, Porter's (2008) Funnel Model identifies four types of user behavior--interested, first-time use, regular-use, passionate-use--and the relative decrease in participation from 100 percent, to 30, to 20, to 2 that respectively tends to occur at each stage. Kim (2000) also proposed a version of a funnel model. Li and Bernoff (2008) develop a technique known as "social technographics profiling," which uses the results of large-scale surveys, typically involving 10,000 users. Using the data, they draw up profiles of online behavior. Both Porter's and Li and Bernoff's approaches provide a basis for research that we discuss in the next section. By distilling scientific literature, a goal of this paper is to provide a framework that enables researchers, designers, and managers to understand what motivates technology-mediated social participation.

The next section presents the Reader-to-Leader Framework with four subsections that review research on readers, contributors, collaborators, and leaders. Based on this research, we make suggestions for motivating technology-mediated social participation. In the final section, we discuss implications for researchers, designers, and managers.

THE READER-TO-LEADER FRAMEWORK

People typically start using their web and mobile devices to join a discussion group, read a blog, or tag a photo. Many decide that one look is enough to satisfy their curiosity, but a few decide to return to an application a second or third time, and some even start to contribute (Forte and Bruckman, 2008a) Usually, new users begin by doing simple things—they may edit an incorrectly spelled word or agree with someone else's comment—that don't take much effort or require them to expose themselves. Metaphorically, they dip their toe in. A few of these people return and begin

participate more actively.

The successive levels of social participation that we are concerned with can roughly be categorized as *reading*, *contributing*, *collaborating*, and *leading*. These are not perfect or complete descriptions, and users don't always progress from one to another, but this simple framework is a useful basis to describe what many users do (Figure 1). The thickness of the green arrows and smaller shapes indicate the decreasing number of people who move from one form of participation to another. The thin grey arrows indicate how people can also move in a non-linear fashion to participate in different ways.

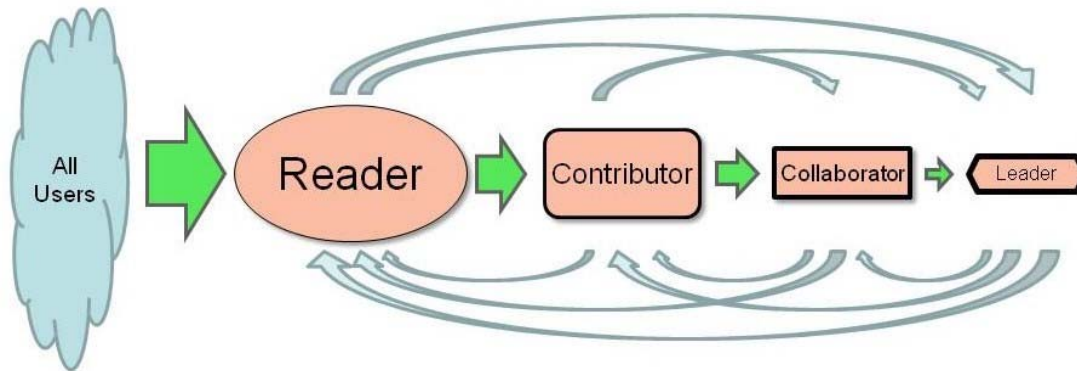


Figure 1: The Reader-to-Leader Framework: Motivating technology-mediated social participation. As users become aware of social media they become readers. Some will become contributors, then collaborators, and possibly leaders.

In addition to making these transitions to greater participation, many people terminate their participation for a variety of reasons, which is not shown explicitly in Figure 1. There is also a time dimension within the four activities. For each activity, there are the uncertain first steps, sometimes followed by repeat visits that can mature into a growing sense of confidence and increased activity as a reader, contributor, collaborator, or leader. There are at least two paths to maturation: participants may become more active within one stage or may move on to begin another stage.

Reader: Venturing in, reading, browsing, searching, returning

Creating awareness of social media can be done with an expensive advertising campaign, but an attractive alternative is word of mouth, amplified by word of blog, online reviews, testimonials from celebrities, and links from popular portals (Porter, 2008). Another important source of novice participants is from search engine results and media stories, especially in prominent media (Porter, 2008; Li and Bernoff, 2008; Fogg, 2002). Spreading the word about novel social media is a skill that must be mastered to draw in potential readers to try something new. For some people, overcoming their resistance to novelty may require strong encouragement from a trusted friend or respected authority (Fogg, 2002), while others embrace new experiences. But in a world of many choices, designers will do better if they create interesting, attractive, and relevant content (Kim, 2000). This may seem obvious, but getting it right is more difficult than it sounds. Rogers (2003) points out, for example, that innovation is more likely to be accepted if the value of the material is clear to potential users. Figure 2 shows how design features have been incorporated into the home page of the Encyclopedia of Life (2009) to describe the goal of the site, make it attractive, indicate new content, and provide help.

Swarming crowds of readers visit online discussions on topics that range from athletics to zoology, with media that range from text-only microblogs, to blogs and discussion boards, to photo and video sharing communities. Good user interface design produces accessible and universally usable applications that enable solitary reading or social interactions that meet the needs of diverse user populations (Rainie and Tancer, 2007). For example, children between the ages of seven and nine tend to have a limited vocabulary, and many don't like to read a lot, so interfaces that contain pictures and encourage them to draw tend to be popular (Komlodi et al., 2007). Similarly, software designed for early teens such as Habbohotel.com must appeal to that user group. Figure 3 shows how Habbohotel.com allows teens to control their own identities by selecting clothes and hairstyles for their avatars. Both age and gender tend to influence what children like to do in online social spaces (Komlodi et al., 2007).

Good interface design should facilitate discovery of relevant content by browsing and by search, with easy mechanisms to bookmark, print, email, tag, privately annotate, and publicly comment on interesting items (Fischer, 2007). Support mechanisms for readers include a summary of the intended audience, the purpose of the site,

important policies such as privacy protection, and flexible tools that support the community in developing its own governance structures, as in some wikis (Butler et al., 2008). Other helpful content includes contact information for site managers, a statement of ownership, a list of Frequently Asked Questions (FAQ) with well-written answers (Hansen et al., 2007), indicators of new material, lists of popular items, and easy facilities for contacting friends (Porter, 2008). A major managerial decision is whether to require login for reading, which may be seen as a nuisance by some and a valid protection by others (Preece et al., 2004). Charging a fee for reading is rare, but for services that provide valuable information, this can be the major source of revenue.

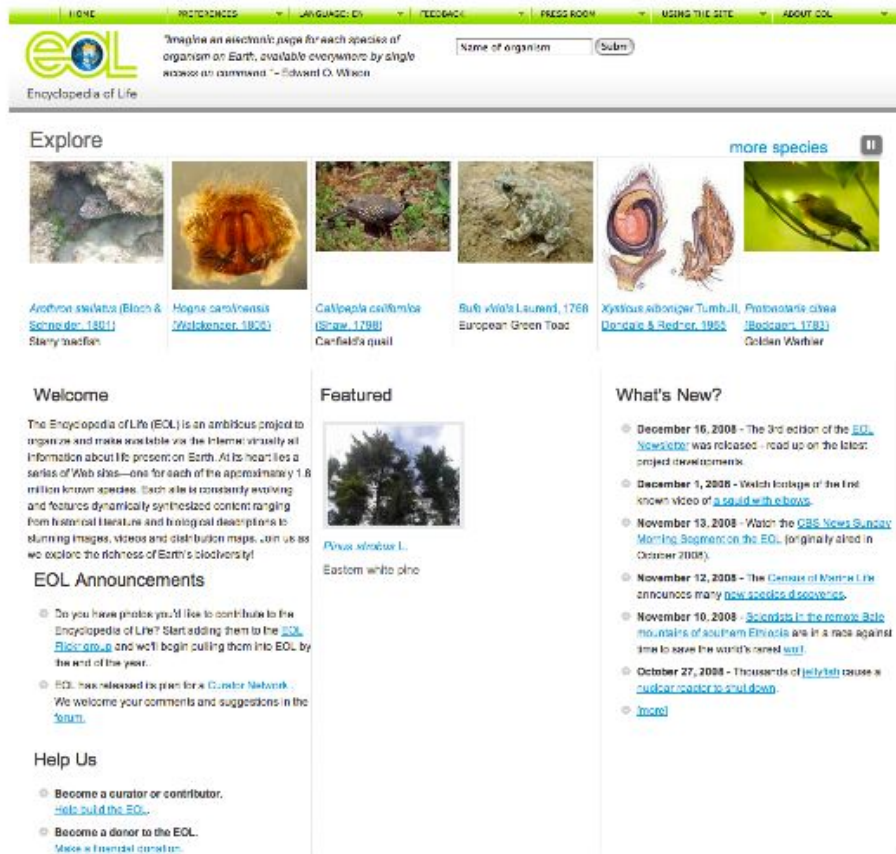


Figure 2: Encyclopedia of Life (2009) has attractive content that clearly describes its purpose and provides a welcome message and invitation to become involved.

Reading user-generated content posted by other participants is a typical first step toward more active participation (Nonnecke and Preece, 2000; Preece et al., 2004; Yeow et al., 2006). While reading can be thought of as legitimate peripheral participation (Lave and Wenger, 1991), some researchers have coined the term “lurking” to describe this and other activities that do not produce a visible contribution (Kollock, 1999).

People may be enticed to adopt an artifact or practice if others they know and trust are already involved (Rogers, 2003). This principle of trust transference can underpin social software applications, and it is being used increasingly in social network applications (Golbeck, 2006, 2007).

The most understandable motivation for people to read user-generated content is that they personally benefit from doing so. Most readers of health discussions, consumer product reviews, or Wikipedia articles presumably are looking for information that they plan to use. Sometimes people may read to gain information that benefits others, such as family members, friends, or colleagues (Maloney-Krichmar and Preece, 2005). An equally powerful motivation is that reading blogs or viewing videos is fun.

A successful first reading experience can generate positive word-of-mouth commentary that encourages other newcomers, while a bad experience will discourage even a second visit. Getting return visitors is a major challenge for most social media managers as a majority of visitors do not return. However, some visitors become intensely involved, returning dozens of times a day and becoming satisfied daily visitors for years. Regular readers come to

recognize active contributors, discriminate about the quality of contributions, and develop a strong sense of belonging to a community, even if they have limited personal contact with individuals in the community.



Figure 3: Habbhotel.com – a community for early teens in which they can choose the gender of their avatar and then select different kinds of clothes and hair.

New users need assurance that social media are safe. Harsh or sarcastic remarks deter participation, so clear policies are needed that assure participants that they are safe online (Beschastnikh et al., 2008). Other strategies include providing “Getting Started” guides for new users to explain the application and the behavior that is expected (Kim, 2000) or setting up visitor and newcomer areas, such as sandboxes in wikis (Hansen et al., 2007). Training manuals, video introductions, and personal mentoring are other ways to encourage participation, as is providing a window so that onlookers can see discussions and other activities without going through a login procedure. This latter approach is more likely to succeed than a link, particularly if that link is surrounded by other information that makes it hard to spot (Maloney-Krichmar and Preece, 2005).

A critical mass of new content (Rainie and Tancer, 2007) and user interaction that engages but does not overwhelm (Cheng and Vassileva, 2005; 2006) helps to entice people to come back often. Making the effort to login, only to find the same old messages or pictures, is annoying.

To summarize, the factors discussed above can be grouped according to whether they influence usability or sociability. Usability factors are of most interest to designers, and sociability factors are of interest to community participants, site owners, and managers. Some usability and sociability factors (Preece, 2001) that motivate readers for technology-mediated social participation are included in Table 1.

Table 1 Usability and sociability factors that may influence reading

Usability	Sociability
Interesting and relevant content presented in attractive, well-organized layouts	Encouragement by friends, family, respected authorities, advertising
Frequently updated content with highlighting to encourage return visits	Repeated visibility in online, print, television and other media
Support for newcomers through tutorials, animated demos, FAQs, help, mentors, contacts	Understandable and clear norms or policies
Clear navigation paths so that users have a sense of mastery and control	A sense of belonging based on recognition of familiar people and activities
Universal usability to support novice/expert, small/large display, slow/fast network, multilingual, and users with disabilities	Charismatic leaders with visionary goals
Interface design features to support reading, browsing, searching, and sharing	Safety and privacy

Contributor: Rating, tagging, reviewing, posting, uploading

Curiosity is a wonderful human trait. People venture into online social media spaces looking for something – information, support, content, company or excitement. But it is challenging to get them to return a second, third, or fourth time and eventually to become a contributor. A contribution is an individual act that adds to a larger communal effort—for example, adding a picture or a comment to a website—when there may be no intention of collaborating,

communicating, or forming a relationship. Contributors often start by making a correction on a wiki, tagging a photograph, or rating a film. This approach of modest first steps has been observed in open source software development, where people report bugs (Ye and Kishida, 2003), and in Wikipedia, where people make small edits (Schroer and Hertel, 2009; Bryant et al., 2005; Forte and Bruckman, 2008a, 2008b). In this way, people move from legitimate peripheral participation in which they hover on the sidelines reading content, watching others, to gradually making small contributions that become larger and more frequent as their confidence grows and they feel empowered and appreciated (Lave and Wenger, 1991; Wenger, 1998).

A design feature that promotes contributions is visibility to the author and community, possibly with the contributor being identified by a login name. This visibility offers contributors recognition that adds to their social presence online, which has been observed to motivate tagging in Flickr (Ames and Naaman, 2007; Nov et al., 2008) and to increase editing contributions in Wikipedia (Nov, 2007), in turn, creating a growing reputation (Farzan et al., 2008).

Some applications keep track of the most prolific contributors so that they can be seen and appreciated (Viégas and Smith, 2004) but quantity is only one virtue; quality of contribution can be even more important. For instance, Wikipedians who specialize in a certain topic become distinguished from those who make numerous small fixes. In their world, writing an article that gets chosen to be the daily featured article is among the highest achievements.

Microsoft Discussion Groups cover hundreds of technical topics related to Microsoft products in dozens of languages. User-to-user assistance is a virtue in itself, but Microsoft recognizes the value to its customers by rewarding hundreds of Most Valuable Professionals (MVPs) each year with professional recognition that includes invitations to a face-to-face event and free Microsoft products. This recognition also benefits the MVPs, since their visibility may get them consulting contracts. Microsoft describes its review process:

In order to receive the Microsoft MVP Award, MVP nominees undergo a rigorous review process. Technical community members, current MVPs, and Microsoft personnel may nominate candidates. A panel that includes MVP team members and product group teams evaluate each nominee's technical expertise and voluntary community contributions for the past year. The panel considers the quality, quantity, and level of impact of the MVP nominee's contributions. Active MVPs receive the same level of scrutiny as other candidates each year.

Rating systems capitalize on a trend in popular culture -- people's desire to stand out in a crowd. Reality shows; talent competitions; YouTube, blog, and microblog revelations of intimate personal details; and Flickr posts of provocative pictures are all manifestations of the need to be noticed. They also fuel and make real the belief that anyone can be famous. Thus, acknowledging, recognizing, and rewarding contributions and, in so doing, enabling the contributors to stand out (Hemetsberger, 2001; Kollock, 1999; Huffaker, 2007) are techniques used by researchers and designers (Kollock, 1999; Lampel and Bhalla, 2007; Kolbitsch and Maurer, 2006) to encourage online contributions. One approach to providing recognition is to encourage others to rate the quantity or quality of contributions. These systems provide a way for people, including peers and complete strangers, to recognize and evaluate another's contribution. Beginning with eBay's popular rating system by which purchasers rate vendors according to the condition of the goods purchased, the timeliness of delivery, the quality of the purchase, and so on, peer evaluation systems have proliferated (Cheng and Vassileva, 2005). Variations on this theme involve rating people's ratings (Cialdini, 2001), rewarding contributions with money (Hars and Qu, 2002; Hemetsberger, 2001; Kollock, 1999; Hummel et al., 2005), and awarding points in learning systems (Vassileva, 2003).

In scientific communities, recognition as a reviewer, author, organizer, or mentor is essential to professional advancement and university promotion. In creative communities, the rewards might include winning art jury prizes or simply gaining a strong reputation that comes with a high number of YouTube downloads (Fischer and Giaccardi, 2006; Shneiderman, 2007). Outstanding contributors may receive much publicity in web-based, mobile, or traditional media.

Rating systems supported by credible information about those being rated can also be helpful. For example, Figure 4 shows Amazon.com top reviewers with the number of reviews each has done and the number of helpful votes. Notice the description of the top reviewer, Harriet Klausner, on the left. The number of reviews she has submitted seems unbelievable; however, clicking on her name, the reader discovers that she is a speed-reader and a retired librarian with few family responsibilities, which provides insight into her motivation and assurance that her reviews are credible. Relative rankings of contributions strongly motivate contributions to information repositories (Cheshire and Antin, 2008).

Acknowledging and celebrating status brings value to the community as well as to the individual. The biologist E.O. Wilson, who acquired funding from the MacArthur Foundation to create The Encyclopedia of Life, is a world-renown scientist. Including pictures of him on the website might help to persuade scientists and citizens that the site has scientific integrity. It might also help to persuade skeptics that developing 1.8 million pages of taxonomic descriptions is an achievable goal.

The image shows a comparison between two Amazon reviewer ranking systems. The top system, 'New Reviewer Rank', shows a list of reviewers with their names, total reviews, and helpful votes. The bottom system, 'Classic Reviewer Rank', shows a similar list but with less information.

Rank	Customer Reviewer	Total Reviews	Helpful Votes
#1	Harriet Klausner <small>See all 17,909 reviews</small>	17,909	71,600
#2	Lawrance M. Bernabo <small>See all 6,666 reviews</small>	6,666	51,263
#3	Gail Cooke <small>See all 4,454 reviews</small>	4,454	22,993

Figure 4: The list on the left shows the old-style Amazon rating system. The one on the right shows the new rating system with more information about the reviewers.

Furthermore, individual contributions can bring substantial benefits to all participants, even though there is no direct communication between individuals. For example, people can post photos on Flickr or videos on YouTube for the whole world to view. Others tag these photos or videos with a brief comment, such as “nice pix” or “ugh!” or informative comments, such as “that building was designed by Frank Lloyd Wright” or “portrait of Vollard by Picasso.” In online political discussion groups, information catalysts promote discussions by inserting information that often comes from traditional media (Himmelboim et al., 2008).

Many websites invite ratings, which can involve a single click on a scale or may be supplemented with a comment. These are social media that mostly invite social contributions that only occasionally lead to relationship development. Other social contribution websites are designed to encourage reporting. For example, a birder notes the first bufflehead ducks to arrive on the Chesapeake Bay on November 1, and others contribute their sightings. Some sites have request lists of specific contributions that are desired, so as to guide contributors' efforts.

Konstan and Chen (2007) look at the motivational power of different kinds of online messages for encouraging participants to rate movies online. Other researchers claim that telling participants their contributions are needed because of their expertise (Ling et al., 2005) or their values (Kuznetsov, 2006; Vassileva, 2003) are stronger motivators.

As weeks and months of making contributions go by, participants may feel they are part of a community and engaged in relationships with others, even if they work independently. If one family member uploads recent wedding photos, others may tag the photos or upload other photos from the same event, earlier family weddings, or family heritage photos from decades ago. There may not be any coordinating emails, but one good contribution can encourage many others. Similarly, messages on patient sites such as CaringBridge.com can trigger others to contribute supportive comments or healthcare suggestions. Contributions are independent, but this visible, yet silent coordination can begin to feel like a collaborative effort for many of the participants. Unfortunately, the same phenomenon occurs on hate group web sites in which one contribution triggers even more virulent attacks (Preece, 2000).

Many of the factors that motivate readers are also important to contributors as they gain confidence: for example, a sense of belonging, a welcoming environment, safety, support for newcomers, and contacts to ask questions. Additional factors that contributors look for include ease of making small contributions, visibility for their contributions, recognition of quality and quantity of contributions, rewards, etc.

To summarize, we include some usability and sociability factors that motivate technology-mediated contributing are included in Table 2.

Collaborator: Developing relationships, working together, setting goals

Revisiting social media spaces a second, third, or more times is an important step toward becoming a committed, regular contributor and possibly a collaborator. Collaboration involves two or more contributors discussing, cooperating, and working together to create something or share information (Denning and Yaholkovsky, 2008). An

essential element in this process is the development of common ground – that is, mutual understanding, shared beliefs and assumptions (Convertino et al., 2008). Common ground facilitates communication and collaboration as collaborators work together to develop a Wikipedia article or discuss a medical problem in an online patient support community. Close coordination in the early stages of a project is especially important to laying the foundation for a successful outcome (Kittur and Kraut, 2008).

Table 2 Usability and sociability factors that may influence contributing

Usability	Sociability
Low threshold interfaces for easily making small contributions, e.g., no login	Support for legitimate peripheral participation so that readers can gradually edge into contributing
High ceiling interfaces that allow large and frequent contributions	A chance to build their reputation over time while performing satisfying tasks
Visibility for users' contributions and frequency of views; aggregated over time	Recognition for the highest quality and quantity of contributions
Visibility of ratings and comments by community members	Recognition of a person's specific expertise
Tools to undo vandalism, limit malicious users, control pornography and libel	Policies and norms for appropriate contributions

Collaborations can be lightweight—for example, an agreement between two people lasting only minutes—or durable; for example, a group effort by hundreds of people lasting years. Some collaborations are handled democratically with no hierarchical structure, while others may require engaging a well-structured corporate unit to deliver on repeated milestones. Other collaborations may occur in structured environments such as those provided by panel discussions (Daugherty et al., 2005) or purpose-built, large-scale laboratories for facilitating scientific data sharing (Bos et al., 2007; Zimmerman and Finholt, 2007).

Sometimes people shift quickly from contribution to collaboration and back again. For example, an ornithologist contributor to Wikipedia bird articles may be closely collaborating with a group of bird watchers in making sure that an entry about Greater Scaups on the Chesapeake Bay is correct. But she gets distracted by a friend's email to read an entry about a café in London, whose address is listed as "Upper Road" in Islington, so she corrects it to "Upper Street." In the first instance, she is involved in a collaboration in which she learns who has a deep knowledge about wildlife on the Bay. In the second instance, she merely contributes the correct address but does not interact with anyone.

A satisfying discussion that holds one's interest often triggers a contribution that may turn into a collaboration (Sharratt and Usoro, 2003; Schroer and Hertel, 2008). Another ingredient for successful collaboration is social capital – the social investments that are the foundation for thriving communities. Social capital is the social equivalent of financial capital. Instead of money, social contributions provide the glue that holds people together. Examples of acts that increase social capital include donating one's time and skills, doing neighborly good deeds, and organizing social events (Putnam, 2000; Vassileva, 2003). By contrast, those who take without giving back – the "free riders" (Kollock, 1999) -- do not contribute social capital and may strain the good will of others. Encouraging people to contribute is achieved in the many ways discussed above, especially by making contributions visible, which may lead to exchanges that can develop into collaborations.

Trust and empathy also play a large role in encouraging people to work and play together online just as they do offline (Preece, 1999; Maloney-Krichmar and Preece, 2005). People who trust each other often do so because they see similarities between themselves and the other people (Torrey et al., 2008), so they encourage each other to participate (Wu and Tsang, 2008). Designers of the patient support community Patientslikeme.com (Figure 5) have explicitly used this knowledge in their site design. They make it easy for patients to find others like them in terms of gender, age, medical problems, and so forth. Everyone can find a picture on the homepage that helps them to find similar others, which can lead to collaborations on stories and exchanges of helpful tips for dealing with a health problem.

Altruism has also been identified as a major motivator for encouraging contribution and collaboration (Maloney-Krichmar and Preece 2005; Vassileva, 2003), as is the desire to give back, that is, "reciprocity" (Axelrod, 2006; Hemetsberger, 2001; Kollock, 1999; Lampel and Bhalla, 2007). Generalized reciprocity, a process in which an individual gives back to the community, rather than directly to the person from whom the contribution was received, has also been observed online (Wellman and Gulia, 1999; Wasko and Faraj, 2000). For example, older people are often motivated to mentor younger people online and in face-to-face situations (Huffaker and Lai, 2007; Hars and Qu, 2002). In addition to altruism, Batson et al. (2002) describe a variant of reciprocity that they call "collectivism," which refers to the belief in helping members of a person's community. Their theory argues that the more well-defined and narrow the community, the more likely users are to contribute and collaborate – a characteristic that has been observed in online patient support communities, hate groups, and other communities. They also argue about the

importance of “principlism,” that is, users who have been taught principles such as “do unto others, as you would have them do unto you” often act on these principles. Benkler and Nissenbaum’s (2006) concept of “virtuous behavior,” discussed earlier, and how this can impact and influence others, is similar.

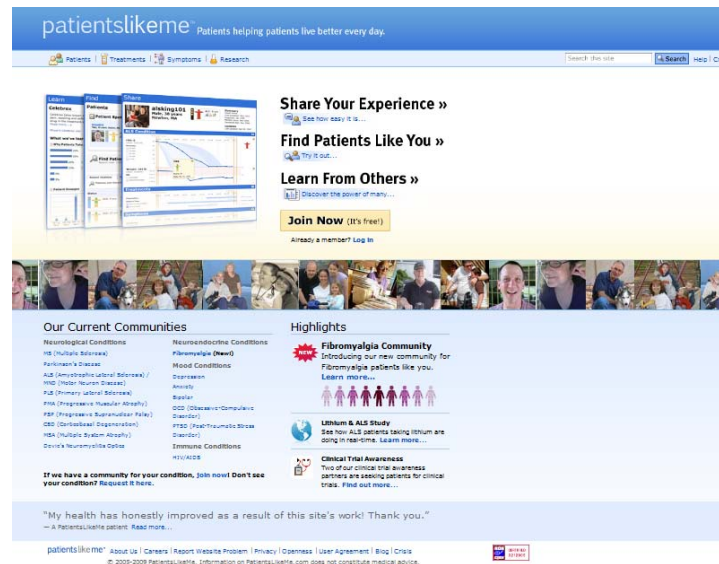


Figure 5: Homepage of Patientslikeme.com show pictures with which others can identify.

Karau’s and Williams’ collective effort model (CEU) (Karau and Williams, 1993) embodies many of these ideas. It is based on the belief that one’s efforts contribute to the common good of the group (Ardichvilli et al., 2003; Wang and Fesnmaier, 2003; Weisz et al., 2006). Being identifiable within the group and liking the group are known to promote collective effort in face-to-face communities and also online (Rashid et al., 2006). This suggests that identity is not only a key component in online communication; it is also an important motivator.

Latour and Woolgar’s seminal research (1986) on the “cycle of credit” in science research provides another lens for considering the role of reputation as a motivator for contribution and collaboration. They pointed out that scientists develop credit for their research, which is an incentive to continue. Wikipedia contributors go through a similar cycle as their contributions become known, recognized, trusted (Kittur et al., 2008; Suh et al., 2008) and appreciated by others (Forte and Bruckman, 2008a) High quality contributions can generate requests for assistance or invitations to collaborate on more ambitious projects.

Name recognition, a form of reputation, has been found to encourage participation by younger contributors in a knowledge commons (Huffaker and Lai, 2007). Latour and Woolgar also go to some length to distinguish status from reputation. Status, they claim, is the long-term recognition that comes from developing a reputation over a period of time and involves sustained recognition by a collaborative group of peers, whereas they define reputation as informal and maybe short-lived. Status is valued by scientists when seeking funding and submitting publications, and it depends on a network of peer collaborators who review and evaluate each other’s work (Latour and Woolgar, 1986).

In offline situations, when high status people defer to lower status people, the lower status person’s status is raised (Lampel and Bhalla, 2007; Podolny, 2005). Various tactics can be used to heighten awareness of status. A commonly used ploy is to restrict access to allow only those with higher status to participate (Saranow, 2005). This tactic is used in elite clubs where entry is expensive or must be sponsored by a member, which heightens the desirability of membership. Some researchers are exploring these concepts online. For example, work by Lampel and Bhalla (2007) describes how Amazon’s Top 10 reviewers develop status, while others focus on reputation (Vassileva, 2003; Oreg and Nov, 2008).

Research indicates that a very small number of members in open source software communities such as sourceforge.net do most of the software development. Within that community there are known experts -- the highly skilled programmers (Ye and Kishida, 2003). But other tasks need to be done, too, such as checking chunks of code for bugs. Similarly, in a patient support community, there are several different roles including supporters, information providers, and caregivers (Maloney-Krichmar and Preece, 2005). Welser et al. (2007) identify and describe the importance of “answer people” in discussion communities; these are people who may answer dozens or even hundreds of questions a day, while they rarely pose any questions themselves. Social taggers in a large international company take roles that include being an expert contributor on a specific topic, community seeker, community builder, evangelist, publisher, and team leader (Thom-Santelli et al., 2008).

Other participants are motivated to do particular tasks that fulfill social needs (Himmelboim et al., 2007). For example, many Facebook users are eager to track down lost acquaintances and to find out where they are and what they are doing in life, while others seek constant contact with important friends (Joinson, 2008). Identifying the motivation that underlies these roles and user needs is a driver for developers to design tools to support online participation (Brandzaeg and Heim, 2009).

Many of the usability and sociability factors that motivate readers and contributors are also desired by collaborators. In addition, we include some specific motivators for technology-mediated collaborators in Table 3.

Table 3 Usability and sociability factors that may influence collaborating

Usability	Sociability
Ways to locate relevant and competent individuals to form collaborations	An atmosphere of empathy and trust that promotes belonging to the community and willingness to work within groups to produce something larger
Tools to collaborate: communicate within groups, schedule projects, assign tasks, share work products, request assistance	Altruism: a desire to support the community, desire to give back, willingness to reciprocate
Visible recognition and rewards for collaborators, e.g., authorship, citations, links, acknowledgements	The desire to develop a reputation for themselves and their collaborators, their group or community; the need to develop and maintain one's status within the group
Ways to resolve differences (e.g., voting), mediate disputes, and deal with unhelpful collaborators	Respect for one's status within the community

Leader: Promoting participation, mentoring novices, setting and upholding policies

Wellman and Gulia (1999) and others claim that just about everything that happens in face-to-face interactions also happens online -- it just happens differently. Even leadership manifests differently online. The business community is particularly eager to find out how leaders emerge online, what motivates them, what rewards they expect, and how online leadership differs from leadership in face-to-face situations (Tapscott and Williams, 2007).

While individual contributions and group collaborations are the most visible aspects of social media participation, every social system must have some way of establishing community norms and explicit policies if it is to survive (Butler et al., 2008; Burke and Kraut, 2008). Setting longer range goals, defining the desired audiences, and enforcing policies are a few of the other roles of community leaders.

Some common characteristics of online leaders are that they typically contribute the largest number of comments and are the most active (Yoo & Alavi, 2004; Cassell et al., 2006; Huffaker, 2007; Ortega et al., 2008). In Slashdot.org fewer than 10 percent of participants contribute 90 percent of the comments online (Ortega et al., 2008). A study of emerging leaders in Wikipedia further reveals that leaders typically use multiple discourse channels to broadcast themselves and their messages (Forte and Bruckman, 2008a).

Leaders also tend to be synthesizers. They synthesize discussions and arguments that they then articulate for others (Cassell et al., 2006). What is more, leaders tend to be passionate and to show both positive and negative emotions (Huffaker, 2007). They are not afraid to reveal their identity and, typically, they have a coherent online identity, which usually matches their real identity (Joyce and Kraut, 2006). Credibility also contributes to leadership, which can be seen in the editing histories of Wikipedia (Forte and Bruckman, 2008a), shown in Figure 6. These characteristics make leaders noticed, and they tend to like this recognition (Kim, 2000).

Systems that are designed to support the characteristics listed above, such as good editing and synthesis tools, will help effective leaders emerge (Butler et al., 2002). For example, Burke and Kraut (2008) describe self-evaluation tools that Wikipedia editors can use to evaluate their skills and potential for becoming an admin – a person with administrative responsibilities in Wikipedia. Selecting good admins is essential for maintaining the quality, reputation, and positive community spirit in Wikipedia, especially with the influx of so many authors over the last couple of years. Support for easy posting of pictures, personal descriptions, and links to home pages enables participants to reveal their identity online and their credibility to be checked. Most leaders look for acknowledgment of a job well done, so making it easy for others to show their appreciation is helpful, especially as people often assume that leaders are prominent people who don't need to be acknowledged.

Leadership also involves taking responsibility when problems occur, mediating disputes among contributors, and dealing with threats from troubling participants. Vigorous real-world conflicts over controversial topics, such as abortion, can also be seen in Wikipedia. Therefore, leaders may have to lock pages or block access on certain topics

and also deal with legal challenges on copyright, privacy, slander, bias, and so forth.

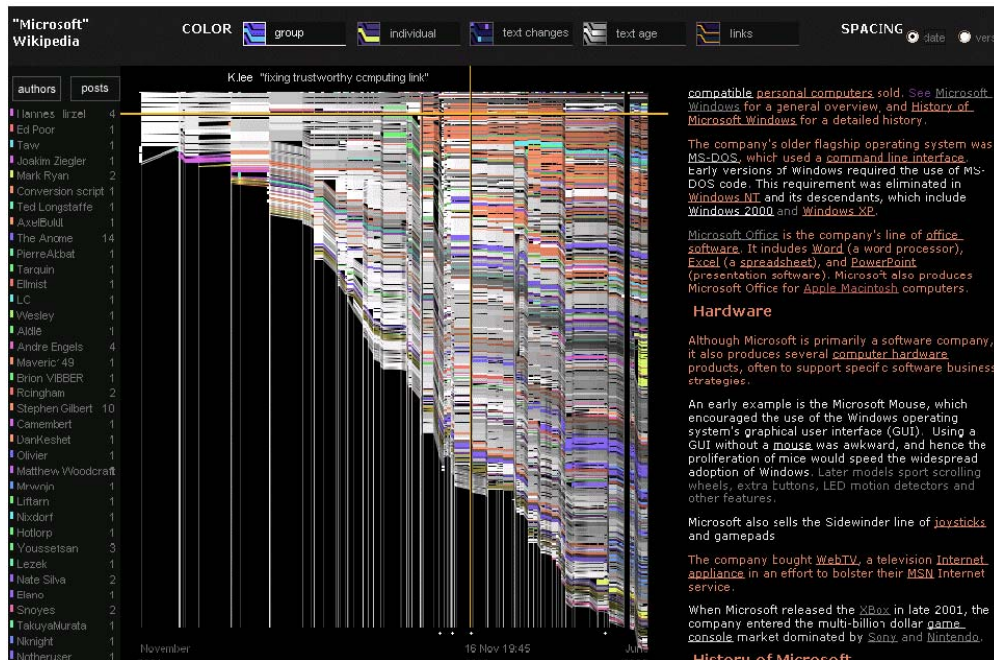


Figure 6: HistoryFlow is rather like a geological section. The different colors and their thickness tells who edited an article, when, how much, and how often.

We separate leadership of the content from management of financial and technical support. Many leadership and management issues are intertwined, so close communications between content leaders and managers is important.

Leadership is a higher calling to which only a small fraction of readers, contributors, and collaborators aspire. Leaders may be motivated to improve the community, to prevent abuses that they have experienced, or to mentor newcomers. Leaders are typically able to synthesize and communicate ideas more efficiently and effectively than others. They usually enjoy the challenge and chance to lead others, and, in exchange, seek power, honor, or respect. They want to contribute to something meaningful that goes beyond their personal gain. To summarize, we include some usability and sociability factors that motivate technology-mediated leadership in Table 4.

Table 4 Usability and sociability factors that may influence leadership

Usability	Sociability
Leaders are given higher visibility, and their efforts are highlighted, sometimes with historical narratives, special tributes, or rewards	Leadership is valued and given an honored position and expected to meet expectations
Leaders are given special powers, e.g., to promote agendas, expend resources, or limit malicious users	Respect is offered for helping others and dealing with problems
Mentorship efforts are visibly celebrated, e.g., with comments from mentees	Mentors are cultivated and encouraged

DISCUSSION: A RESEARCH AGENDA

The Reader-to-Leader Framework, characterizing the evolution from reader, to contributor, to collaborator, and finally, to leader, is a simplified but helpful model of reality. Synthesizing and analyzing this large body of research helps justify our claim for the Reader-to-Leader Framework. We also hope that we have advanced the discussion in that, though others talk about the different ways that users participate in social spaces, there is little research evidence to support claims for an overall framework. Even though our framework and discussion of its components are supported by research, the framework needs empirical testing, which is an obvious next stage of this work. Li and Bernoff's (2008) social technographic profiling and Porter's (2008) Funnel provide some leads for doing this. They offer partial methods that can be adapted and built on. They also strive to identify rudimentary metrics that are essential for studying the success of design and social interventions for encouraging participation. What our paper contributes is a

framing of the many possible interventions that can be tried to entice different types of participation.

An important component of scientific research is the development of appropriate metrics in order to gauge progress, identify problems, and predict future performance. Common metrics for readers include numbers of members, views, or downloads on a daily, weekly or monthly rate so as to study temporal patterns, impacts of holidays, or competition between social media applications. Metrics for contributions, such as number of postings, comments, photos, videos, or contribs (as contributions are called in Wikipedia), is helpful to track rising or falling interest. Metrics of contribution quality are more difficult to produce automatically, but user ratings can indicate rising or falling quality. It is a more difficult research challenge to come up with metrics for collaboration (maybe they would be called collabs) and leadership.

However, these metrics only capture activity. The development of more potent measures of efficacy in achieving personal and community goals would be a big breakthrough. Can highly active healthcare discussion groups lead to lower mortality or morbidity? Can community crime reporting applications create safer neighborhoods? Can international development or world peace be advanced by social media? Collecting activity metrics and studying efficacy will require advances in data analysis, statistics, and visualization tools that deal with large distributed data sets and high volume transaction rates. For example, managing participation online, particularly in large open structures such as Wikipedia, requires visualization and other tools to support coordination and to manage conflicts (Kittur et al., 2007).

There are numerous other research questions that this paper encourages, and we hope researchers will rise to the task. It is important to focus on each of the four stages in depth in order to study how users become aware of and venture into social media applications as a reader. Another beneficial research focus would be on what encourages or inhibits readers from returning a second and third time. Studies of high-intensity readers could guide managers in attracting and retaining their most loyal participants.

Similar research questions apply to novice contributors, collaborators, and leaders as they mature into high-intensity contributors, collaborators, and leaders. The triggers for changes from reader to contributor or from collaborator to leader are little understood. Even less discussed are the reasons why participants terminate or why they give up collaborating and return to individual contributions or merely reading. Similar questions could be tailored to each stage of the framework.

Another fruitful research question is what kinds of interfaces support these different kinds of participation? Researchers will have to be aware of many other variables such as the community size, personality of participants, vitality of the topic, and exogenous factors such as worldwide news events (Schoberth et al., 2006; Preece, 2009). Social interactions, such as conflicts over content or governance, can undermine participation, as can vandalism that seeks to destroy a community or its contributions.

The research methods of sociology and anthropology seem most relevant for developing an understanding of social participation. Observation, interview, and ethnographic strategies are effective in studying social participation, but there is a compelling new possibility. The technology-mediated nature of these forms of social participation has the huge benefit that data logging for millions of users can provide a much richer portrait of activity than has been possible in the past. However, as problems related to selective survey response are severe, large-scale surveys now made possible via the Internet need to be meticulously checked for bias.

While some social scientists engage in small-scale controlled experimentation with dozens of users or groups, the capacity to perform large-scale interventions with thousands of users opens up new opportunities for research. These intervention methods were developed by web companies, such as Amazon and Netflix, to study the impact of page layouts, product presentation graphics, or special offers on customer purchasing patterns (Kohavi et al., 2007). Similar methods can now be applied to study the impact of these interface features as well as recognition, reputation, and reward schemes. Such interventions are not carefully controlled experiments, since the users are not easily selected and assigned to groups, but repeated interventions can be carried out on tens of thousands of users within hours, so the impact of classes of changes can become understood (Shneiderman, 2008).

Sometimes natural interventions occur, as when a company changes its login or privacy policies and suffers a huge drop in participation. In these cases, before and after data logging can reveal important patterns of behavior and surprising outcomes (Schoberth et al., 2006). Planned and natural interventions are forms of social science case studies that, with replication, can accumulate evidence in support of predictive hypotheses (Yin, 2003; Konstan and Chen, 2007).

A useful research contribution would be a feature analysis of groups of social media applications, such as five photo sharing sites, 10 social networking services, 15 scientific collaboratories, or 20 healthcare discussion groups. Understanding what features are most needed in each application area would be helpful. A careful feature analysis would organize such applications in terms of their utility for readers, contributors, collaborators, and leaders.

Another goal of this paper is to encourage improved designs for social media applications that cross from discretionary, sometimes playful, social networking to more serious applications that could bring larger benefits to society. For example, we believe that disaster preparation, response, and recovery could be greatly facilitated by rich social networking through which people sign up for training, make commitments to evacuate as groups, and coordinate recovery efforts (Wu et al., 2008; Qu et al., 2009). This would be especially valuable to people with disabilities, older adults (Wu et al., 2007), and poorer residents who may lack cars for transportation and other resources to adequately care for themselves.

There are promising signs that reporting could be the first success story for civic minded web sites. Weather watcher web sites, often established by local radio stations or citizen news reporting such as ireport.com (which is operated by CNN) are already proving valuable (US Weather Watchers, 2009; Weather Matrix, 2009). Similarly, crime reporting and related sites such as Amber Alert provide authorities with tips concerning child abductions. The U.S. Geological Survey is trying "Did You Feel It?" to collect residents' reports on earthquake damage to provide guidance for officials in allocating resources. A well-designed success story, watchjeffersoncounty.net, gathers resident reports of unusual events so that authorities can piece together facts that solve crimes, record unusual events, or prevent problems. Similarly, international relief efforts and development projects can also be facilitated with better communication, sharing knowledge, and coordination of efforts (Shneiderman and Preece, 2007; Torrey et al., 2007). A notable open source project, Sahana, has produced software for relief workers to gather information, share it appropriately, and track victims and survivors.

While these applications of technology-mediated social participation are intended to produce widespread benefits, they can also be used by hate groups, terrorist organizations, and deceptive corporations. Any sufficiently powerful technology will eventually be used by those with malicious intent, so individuals, community watchdogs, and law enforcement officials will need to monitor social participation applications. While openness about leadership, transparency about funding, and accountability for identifiable organizations are potential antidotes to malicious intent, strategies to minimize dangers will also have to be developed.

The power of social participation may be seen in the 2008 U.S. Presidential election in which Barack Obama's campaign staff used social media to create an active community with more than 4 million voters, many of whom contributed unprecedented volumes of funds, volunteered time to campaign projects, or joined massive public events (Greengard, 2009). Many commentators believe that the funds and outreach generated through social media made the difference in this closely contested election that changed American politics by delivering the first African-American President.

Other political, social, and economic changes may also be tied to effective participation in social media. Changing consumer values with respect to energy consumption or driving habits could be accelerated by expanding the moderately successful U.S. Dept of Energy's EnergyStar program that employed social persuasion and community techniques. National security, especially protection from terrorism, might be enhanced by better resident communication, trust-building by social media-supported community policing, and more effective technology-mediated Neighborhood Watch or Citizen Corps programs.

Privacy will always be a concern, but attitudes toward personal privacy appear to vary considerably among generations as well as individuals. Observations of millennials and younger users suggest an attitude toward privacy that is very different from that of their parents and grandparents. Many don't worry about pictures of themselves appearing scantily clad at a student party circulating on the web and being accessible for years to come. They often ignore the potential that such behavior might jeopardize their chances of being appointed to certain jobs. Similarly, many younger users remain in constant contact with peers, which is manifest by updating their status messages dozens of times a day.

The promise of social participation applications is huge, generating a steady flow of entrepreneurs and technology activists who are experimenting with new approaches. These entrepreneurs have commercial or personal goals that will lead them to explore some of the issues raised in this review. However, the opportunity to produce startling political, social, and economic changes means that federal, state, and local agencies should begin their own pilot projects, while funding research that is aligned with national priorities. Similar U.S.-based national efforts such as the war-time Manhattan project to develop an atomic bomb, NASA's leadership in putting astronauts on the moon, and the National Institutes of Health Human Genome Project have shown how scientific breakthroughs can advance national goals. This may be the time to invest substantially in a National Initiative on Social Participation to ensure higher levels of success and safety for social media.

Those who research these issues can play a major role in harnessing the remarkable opportunities arising from uniting billions of people across the world via social technologies.

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