Implicit Many-to-One Communication in Online Communities

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1. Introduction

The recent explosive growth of popular social communities such as Flickr.com, YouTube.com and Digg.com has generated much renewed interest on the Internet as a new medium. This new movement is often considered attributable to the Web 2.0 technologies (e.g., Ajax, XML, RSS, and Wiki) and social computing concepts (e.g. blog, tagging, and voting) that make mass user interactions both easy and multi-faceted. They retain the existing ingredients of online community-based communications, such as individual relationship and message-based conversations. At the same time, non-message-based and often collective interactions, e.g., voting and ranking, enrich user communication.

The new communication features can be best summarized as a Ballot-box Communication (BBC), an enumerating mechanism that aggregates individual choices, opinion or experience, and in doing so, effectively enabling a new medium to reveal the interests of the mass population. Undoubtedly, this communication mechanism is enabled by Web 2.0 technologies, which offer a much expanded spectrum of communication choices. Compared to traditional online communications such as email, Web publishing and online message-boards, the BBC focuses on simplifying mass sharing of individual preferences through searching (searches, when observable by the community, can be considered as expression of

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individual preferences through action), tagging (sharing of content in a more structured way), voting and ranking, as well as enriched communication techniques in a community such as content sharing, private messages and blogging.

BBC also offers new, distinct features compared to traditional offline communications. First and foremost, it is non-message-based. Instead, users communicate through choices of the aforementioned, often preconfigured and preconfigured technologies. As a result, the lower cost of participation, based on user actions, not exchange of words or emotions directly, contributes to more communication activities given the explosive information available and the resulting attenuated attention one can afford for any single piece of information. If we view an online community as one that facilitates production and consumption of information, both the production and consumption sides now enjoy better understanding of the other side. On the one hand, for information consumers, the cost of expressing one's preference and opinion is lower—it is easier to click to vote on prearranged choices than to write a comment. On the other hand, because more consumers will share their preference, information producers also get to observe information consumers' aggregate preference. By reducing communication costs, BBC also facilitates collective production—even if the actual information creation is done by one individual user, multiple users' input can be and is usually taken into account. In addition, the concept of "prosumption",[1] where enthusiastic consumers also become producers, is promoted thanks to the instantaneous nature of consumption and the voluntary nature of production.

Another notable feature of BBC is that it is often a many-to-one communication, in contrast to the face-to-face thus one-to-one situation in traditional physical communication settings. New technologies enable sophisticated many-to-one communication modes in BBC-enabled communities. For example, tagging conveys multiple users' perception on the categorization of an item. Ranking and voting reflect multiple users' perception of the importance of the subject matter. Technologies, by simplifying the communication and lowering the cost, make it easier to aggregate users' opinions, strategies and choices. As a result, users' input is aggregated and represented in an easy-to-understand fashion in the community.

The above features establish BBC's role as a foundation of social computing. It enables participation of the masses in the information production and consumption process. For users, instead of simply visiting a site (and whose influence only reflected in overall site traffic), i.e. "watching from

[1] The term "prosumer", a combination of producer and consumer, is introduced by the French futurist Alvin Toffler in his book *The Third Wave* (Toffler 1981).

the sidelines", they can now become part of the community and let their voice be heard.

Despite the increasing significance of BBC and the need to understand it, we still know very little how BBC-enabled communities work. On the one hand, as technology advances, many technical features, especially the aforementioned non-message-based ones, can be easily implemented in an online community. On the other hand, it is recognized, mainly through costly failures, that not all technically feasible features can benefit the growth and sustainability of a community. As entrepreneurs and investors build and manage new online communities, due to little theoretical guidance, they have no choice but to use trial-and-error to find the "right" technologies. Not surprisingly, the result is hit-or-miss: some grandest failures of the dot com bust featured online communities (Bobala 2001). Even for those that did work so far, e.g., YouTube.com, it is not clear if and how they can survive.

Existing literature may offer some guidance to our understanding of this new phenomenon. An important stream of research is the communications network literature, reviewed extensively in Monge and Contractor (2003). Even though communication networks differ from the BBC in that that former "are the patterns of contact that are created by the flow of messages among communicators through time and space" while the latter does not rely on messages, the theories (e.g., self-interest (Coleman 1986), structural holes (Burt 1992), transaction cost theory (Williamson 1975, 1985), weak ties (Granovetter 1973), small world phenomenon (Watts 1999), network exchange theory (Cook 1977), homophily theory (Brass 1995) may still apply in the new context. Specifically, the theory of collective action (Markus 1990; Rafaeli and LaRose 1993) posits that the adoption of innovations may proceed smoothly once it surpasses a threshold. One can test how the theories apply (or not apply) in the new communications context when communication between users is detached and loosely defined.

The online community literature is also of relevance to the BBC phenomenon. Nevertheless, BBC, as a new phenomenon, does not satisfy the traditional definition of online communities (Whittaker et al. 1997, p. 137), which are identified by "intense interactions, strong emotional ties and shared activities" and members have "shared context of social conventions, language, and protocols". For example, Preece (2000) defines an online community as "group of people with a common purpose whose interaction is mediated and supported by technology and governed by formal and informal policies". The focus of this stream of research is the social interaction facilitated by online communities.

Although knowledge from the existing literature can be of guidance value in understanding BBC, they cannot be readily applied. The main hurdle lies in two unique features of BBC. The first is the lack of messages and the extremely detached mode of communication. Not only do the users communicate through actions such as voting, ranking and searching, but thanks to the lower communication costs, they also do not have much sense of bonding. This leads to extremely loosely connected communities, which most users just regard as a source for information or entertainment, and less as a human-based community. The second feature of BBC is its many-to-one nature. Because the communication is through programs and user actions, the communication is even less personal than, say, online message boards. Therefore, the impact users can have on others is always imposed in a collective fashion. Furthermore, it is not clear how the aggregate of large number of users' often insignificant actions can have impact on other users' behavior. It may also be a function of the characteristic of the technology involved, as technologies that make it easier to express one's preference also means users tend to participate more. Yet the technology is evolving constantly, with the development of features that might affect people's behavior hard to predict. As a result, the ensuing communications between users, as detached, multi-faceted and idiosyncratic as it can be, is determined by the interaction of three parties: the users, the community and the technology. The aggregate of user behavior, reflected through their actions and recorded by the technology, determines the overall characteristics of the community such as total resources (e.g., total available content) and cost of using the resources (e.g., network congestions). Any individual user's behavior, in turn, is affected by the community-level characteristics. The designer and manager of the community can then observe these characteristics and adjust technical configurations to change how users can communicate, while realizing implementing all the most technologically advanced features may not guarantee ideal communication in the community. With interactions so complicated, the outcome is hard to characterize and its impact is even harder to gauge.

2. The BBC Framework

Now that we know what BBC entails and witnessed how popular this form of communication has become with the rise of Web 2.0, the natural question is "why is BBC so popular?" Many observers attribute its vitality to the emerging trend of digital democracy in online social communities (Gapper 2006). They argue that the technologies that enabled BBC also

"democratize" the web with their abilities to induce mass participation in online communications in an efficient manner. Thanks to the technologies, the masses of users are no longer invisible and their "voices" can be heard. The emergence of new, more interactive media, made many believe the "old" media are now much less influential, e.g., the competition between blogs vs. newspapers, YouTube video clips vs. TV programs, podcasts vs. radio programs, wiki vs. publishing.

What is less ideological, but perhaps has more profound implications is the lowered cost of communications and the now multi-faceted channels. This is facilitated by three forces. First is the increasing sophistication of the technology. Programmers and community designers want to give users more choices to create and enhance stickiness of the communities. They are able to implement features in online communities that may facilitate a wide spectrum of interaction options thanks to the lower technical barrier. Second, new technologies and ideas aim to simplify communication methods between users, thus lowering the cost of communication. Even though sophisticated technologies are available, entrepreneurs strive to offer users various channels of easy-to-use communications. For example, XML enables sharing of semantic information between programs. Compared to HTML, the language for web documents, XML's popularity mainly stems from its semantic ability—with XML web sites can communicate automatically with each other without the user's intervention. For example, a new comment on a post in a forum can be transferred in XML format to another site where it is more convenient for the original poster to read. However, an XML document is still rich in information and requires much user investment in time and effort to create. On the other hand, ranking and voting require significantly less user input thus are much easier to participate. When visiting a site, a user can interact with the other users by voting and ranking their posts. While technologically unsophisticated, simplified options like voting and ranking give people more choices in participation. This is important because for any individual user, there is so much information overloading on the web that he can only be "fully" engaged in a small number of communities. At the same time, it is also easier for the receiving side of the communication to get to know the voice of the crowd, without incurring the high cost of, say going through all the comments. The same argument of information overloading also applies here.

To appreciate the benefits of these technologies, perhaps one has to take a broader perspective than the traditional view of computer-mediated communications (e.g., defined by Kiesler and Sproull 1992 and December 1996, 1997). The implicit assumptions in CMC are 1) they are message-based and 2) technologies are there to facilitate the exchange of messages

between users. However, the new BBC technologies actually minimize the exchange of messages and they compress the exchange content to almost binary format (e.g., ranking and voting). In doing so, the information volume between any given pair of users is greatly reduced. Such artificial reduction of information would likely not be welcome in the definition of CMC. Yet, it addresses a more pressing issue brought about by the Internet—information overloading. Because of information overloading, for a user, important information may be crowded out by other insignificant competitors. Thanks to BBC technologies, there is now a rich spectrum of communication choices, ranging from the most involved (blogging and commenting) to the less attached (ranking, voting, tagging). This enables users to choose the one that best fit their communication needs at any given time—the menu of choices means that the cost of user interaction is vastly reduced.

The most typical BBC-enabled communities are online sharing communities, which are built for the purpose of content sharing. The video sharing site YouTube.com and the picture sharing site Flickr.com are all good examples of sharing communities. On these sites, even though each content file often has a section for user comments, few people choose to post. Contributors get more information about users' opinion on their content through aggregate measures such as number of views and, if the features are available, total rating or votes. Another feature is that, increasingly, sharing and downloading are often down by scripts, agent programs mobilized by users to automate the task. The two features are typical of the BBC type. This also means message-based, direct user interaction is getting rarer.

BBC also enhances web-enabled communities. Table 1 lists the difference between traditional online communities and BBC-enabled communities. There are a few pronounced differences between the two concepts. First, the interaction is no longer one-to-one or few-to-one, but many-to-one. Second, the object of attention is no longer messages, but content files or media. It is natural, therefore, for users to express their opinion through actions such as voting, ranking, instead of words. More importantly, because BBC can accurately and efficiently reflect mass users' feedback, the production and consumption process becomes highly interactive, in an aggregate fashion. Content producers and contributors adjust their offerings to cater to user demand, which can be expressed instantaneously and efficiently. In other words, the often voluntary (non-financial incentives to contribute) and spontaneous (instant feedback) nature of the communication, enabled by new technologies, makes interaction between supply and

demand much frequent and transparent. This greatly improves the social welfare of both the producers and the consumers.

Table 1: Comparison of BBC and Traditional Online Communications

	Traditional individual conversation	BBC
User types	Lurker/contributor	Role players (producers) and followers (passive consumers) More user types but not as many as the physical community. User has many choices that fit their needs perfectly. (need to discuss)
Message-based	Yes	No. Voting, observable activities
Cost of communication	High cost associated with finding, reading, commenting, and posting	Low and passive feedback generated by actual consumption (because of available choices, accommodates the heterogeneity of user preferences)
Role of technology	Managing messages, processing semantic content	Reduce the barrier of participation (by Offering a multitude of communication channels)
Evaluation of a community	How many people are watching: total number of visits (impressions) and visitors (eyeballs)	How many people are doing how much in what fashion: activities of different types of users
User involvement	Eyeball economy	Vote-by-foot economy
Analogy	"The crowd is watching."	"The crowd is talking/living"

Now that we see that BBC has great potential, the next question is how to build a successful BBC-enabled community. We believe the same lessons we learned about e-commerce (mainly through the failures) can be applied to the BBC case. That is, to build successful BBC-enabled communities one still encounters the same challenges faced by businesses: production (content), marketing (getting people to know) and sales (having people continue to contribute to or buy products from your site).

The current Web 2.0 movement, for all its publicity and explosive growth, is a hodgepodge of implementations of often unrelated technologies, such as AJAX, RSS. It is a marketing term coined by O'Reilley

(http://oreilley.com) but its true meaning is often a topic of debate (Markoff 2006; O'Reilley 2006). Some of the features are BBC. For example, among the most well-known Web 2.0 sites are Digg.com, a news posting site based on popular vote, and de.li.cio.us, a social bookmarking site. Yet the sustainability of these sites remains a challenge for site operators due to the following reasons. First, the interaction between users is highly non-message-based, which may not help in creating the "stickiness" of the community. It also means that the user population may be highly dynamic thus whose collective behavior hard to predict. Second, because the actions are standard and a simplification of the real, complex user opinions and preferences, it is hard to read into these actions and make any prediction based on them. Last, the community is affected by the aggregate user actions and behavior, which, due to their low cost for the user, may have a lot of randomness to them.

As communities center more on content, it is crucial that production and provision of content is encouraged. However, the technologies in BBC have no built-in incentive mechanisms. Moreover, technologies may alter users' ability and their incentives to communicate. While it is easier than before to adjust the configuration thus change users' options, it is also not clear how these changes affect users' choice. In addition, the complex and highly dynamic interaction between different types of users and the administrators of the community also makes it increasingly challenging to predict how a change is going to affect the communications.

3. Business Issues in Online Communities

There are also many business-related issues in online sharing communities characterized by BBC. As many such communities have been started by entrepreneurs, there is a pressing need to identify a working business model so the communities can self-sustain. While the current Web 2.0 trend values user-generated content, it is not clear how it can sustain by itself and what business models will work. Currently, advertising seems to be the only business model for such online communities. However, when one tries to explore business value from online communities, BBC may be distorted since a lot of the power resides in the community operator's hands. Viral marketing techniques take advantage of the community to promote products but the results are mixed.

In summary, BBC is a new phenomenon and we believe it is so unique that more academic attention should be directed to it as a new mode of communication. The research can have contributions both in our under-

standing in online communications, which can also lead to better business models for the online community entrepreneurs.

4. References

Bobala, B. 2001. Last breaths of theglobe.com? The Motley Fool, August 6, http://www.fool.com/news/2001/tglo010806.htm. Last retrieved on June 1, 2006.

Brass, D.J. (1995). A social network perspective on human resources management. Research in Peronnel and Human Resources Management, 13, 39—79.

Burt, R.S. (1992). Structural Holes: the Social Structure of Competition. Harvard University Press, Boston, MA.

Coleman, J.S. (1986) Individual Interests and Collective Action: Select Essays. Cambridge University Press, New York, NY.

Contractor, N.S., O'Keefe, B.J. & Jones, P.M. (1997) IKNOW: Inquring Knowledge Networks on the Web. [Computer software. University of Illinois.] Available at http://iknow.spcomm.uiuc.edu.

Cook, K.S. (1977). Exchange and power in networks of interorganizational relations. Sociological Quarterly, 18, 62—82.

December, J. (1996). Units of analysis for Internet communication. Journal of Computer-Mediated Communication, 1(4) / Journal of Communication, 46(1).

December, J. (1997). Notes on defining of computer-mediated communication. Computer-Mediated Communication Magazine, (3):1.

Gapper, John. (2006). The digital democracy's emerging elites. The Financial Times, Sept. 25.

Granovetter, M. (1973). The strength of weak ties. American Journal of Sociology, 81, 1287-1303.

Kiesler, S. & Sproull, L. (1992). Group decision making and communication technology, Organizational Behavior and Human Decision Processes, 52, 96-123.

Markoff, J. (2006). Entrepreneurs see a web guided by common sense. New York Times, November 12.

Markus, M.L. (1990). Toward a "critical mass" theory of interactive media. In J. Fult & C. Steinfield (Eds.), Organizations and Communication Technology (pp. 194-218). Sage, Newbury Park, CA.

Monge, P. & Contractor, N. (1999). Emergence of communication networks, in Handbook of Organizational Communication, 2nd Ed. Jablin, F.M. & Putnam, L.L. (Eds), Thousand Oaks, CA.

Monge, P. & Contractor, N. (2003). Theories of Communication Networks. Oxford University Press, New York, NY.

O'Reilley, T. (2006). Web 3.0? Maybe when we get there. Blog post. http://radar.oreilly.com/archives/2006/11/web_30_maybe_wh.html .Retrieved on November 13, 2006.

Rafaeli, S., & LaRose, R.J. (1993). Electronic bulletin boards and "Public Goods" explanations of collaborative mass media. Communication Research, 20, 277-297.

Toffler, A. (1981). The Third Wave. Bantam Book, New York, NY.

Watts, D.J. (1999). Small Worlds: The Dynamics of Networks Between Order and Randomness. Princeton University Press, Princeton, NJ.

Wellman, B., Salaff, J., Dimitrova, D., Garton, L., Gulia, M. & Haythornthwaite, C. (1996). Computer networks as social networks: collaborative work, telework, and virtual community. Annual Review of Sociology, 22, 213-238.

Whitaker, S., Issacs, E., & O'Day, V. (1997). Widening the net. Workshop report on the theory and practice of physical and network communities. SIGHCI Bulletin, 29(3), 27-30.

Williamson, O.E. (1975). Markets and Hierarchies: Analysis and Antitrust Implications, a Study of the Economics of Internal Organization. Free Press, New York, NY.

Williamson, O.E. (1985). The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting. Free Press, New York, NY.