Some Users Pack a Wallop: Measuring the Impact of Core Users on the Participation of Others in Online Social Systems

Thomas M. Lento*, Eric Gleave, Marc A. Smith[%], Howard T. Welser^**

*Cornell University **University of Washington [%]Microsoft Research ^Ohio University
*Ithaca, NY USA **Seattle, WA, USA [%]Redmond, WA, USA ^Athens, OH, USA
*TML5@cornell.edu **egleave@u.washington.edu [%]masmith@microsoft.com ^welser@ohio.edu

Abstract

This study investigates how heavily active contributors affect recruitment and retention in online social systems. We find that core enthusiasts are more successful recruiters, their recruits are more likely to become enthusiasts, and interacting with enthusiasts makes users less likely to exit the system. We also find evidence that strong dyadic ties between non-enthusiasts help extend active careers in online social systems. Implications include considerations for community growth and retention based on the influence of these core users.

Introduction

Social media systems empower new opportunities for people to share ideas, interact, and create new resources. While these media systems vary widely in terms of goals, content, and community size, they all share the same fundamental constraint: they live and die on the creativity and enthusiasm of their contributors. Because these systems are social, the contributions and enthusiasm of each user has the potential to influence and inspire all those with whom they interact.

This study focuses on heavily active participants who serve as the core contributors to an online community. Due to their activity levels, these enthusiastic users are highly visible, which could make them influential in the same way that opinion leaders are influential in mass communications (Katz and Lazarsfeld 1955).

We investigate the degree to which highly active participants can influence other users, thus magnifying their already significant contribution to the activity of the community. We test how different patterns in social interaction and relationships among enthusiasts and between enthusiasts and other participants are related to contribution, willingness to invite others to participate, and longevity of participation.

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Data and Methods

The sample is drawn from Wallop, an online personal publishing and social networking system open to individuals via an invitation from another Wallop user (Gu et al. 2006). The sample frame includes users who joined Wallop during the first 36 weeks after its public release in October 2004, constrained to only those present for at least 5 weeks who contributed at least one message during each time period in which they participated (n=15,776). Measures are based on server logs of user behavior, such as content contribution, login behavior, and interaction with other users. We pay particular attention to comment exchanges with enthusiasts, strong ties (defined as repeated exchanges consisting of at least 4 messages sent between nodes within a given 28-day time period), interaction with enthusiasts, and receipt of invitation from an enthusiast.

Enthusiasts

Our analytic focus is on enthusiasts (n=1062). For the purposes of this study, enthusiasts are defined as users who: log in more than twice a week on average; are in the top quartile for the ratio of days of activity to log-in days; and are in the top quartile for the number of pieces of content uploaded per log-in day. Twice a week was chosen as the login frequency cutoff for enthusiasm because it places the user well within the top quartile for login frequency and guarantees enthusiasts are logging in outside of the weekends, which were peak usage periods.

Enthusiast Recruitment Patterns

The most active participants within the system are also the strongest recruiters into the system. Enthusiasts averaged 3 more invitations per person, and nearly 3 more subsequent users joined per enthusiast. A striking property of enthusiast invitation behavior is the level of enthusiast recruitment. Nearly 30% of enthusiasts were recruited by other enthusiasts, compared with 11% of the general user population. This suggests that enthusiasm may be infectious, spreading from recruiter to new user, or that enthusiasm is a function of similar social characteristics.

This also suggests that the core user population has the potential to renew itself and expand over time.

Core User Influence

Do ties to enthusiasts affect retention in social media systems? Table 1 shows discrete time analysis coefficients expressed as odds ratios for a model predicting departure from Wallop. Values less than one indicate that a unit change in the variable reduces the probability of a user exiting the system, while values greater than one indicate an increase in probability of exit. The model uses a binary variable for departure within a given 28 day period as the dependent variable. Invitation and interaction ties to enthusiasts are the key predictors, and controls for other types of social ties and activity levels are also included. Table 1 highlights the effects of the most interesting control variables in addition to the key predictors.

	Non-Enthusiasts	Enthusiasts
Variable	**Estimate**	**Estimate**
Login Days (log)	0.58***	0.45**
Activity Days (log)	0.73***	0.88
In-Degree (log)	0.96	1.24
Intense Ties (log)	0.74***	0.77*
Invited By Enthusiast	0.79***	0.67***
Enthusiast Ties (log)	0.90*	0.74**
*p < 0.05 **p < 0.01 ***p < 0.001	Intercept = 31.3	Intercept = 10.98

Table 1: Odds ratios of exit as a function of selected behavioral and social relationship variables.

The data has been split into two subsets – the enthusiast population and the rest of the user population. Controls for activity, measured both as login and content contribution days, are included as a means of accounting for a possible tendency for an active user to remain active.

Regardless of whether a user is an enthusiast or not, invitation by an enthusiast is clearly associated with continued participation. Connections to other enthusiasts have a less consistent effect on subsequent participation. These connections do reduce the probability that enthusiasts and non-enthusiasts alike will exit the system; however the magnitude of the effect for non-enthusiasts is quite small and barely significant. It appears that enthusiasts are more strongly affected by ties to other enthusiasts.

Other types of social ties have varying effects on a user's propensity to remain active in the system. Interestingly, in-degree, a measure of the social attention received by participants does not predict retention. Intense ties, though, do have a reasonably clear negative effect on a user's subsequent decision to leave Wallop, but the effect is only minimally significant for the enthusiast population. Given the similarities in the magnitude of the effect across groups, this difference may be a result of the larger group size of the non-enthusiast population. It's also possible that this result is a function of enthusiasts tending to have more strong ties to other enthusiasts.

Discussion

Connections to other enthusiasts, particularly through receiving an invitation, are generally good predictors of continued participation. The interesting dichotomy that arises out of the data is the distinction between enthusiasts and non-enthusiasts. Essentially, an enthusiast is likely to remain active in the system if she has been logging in during the prior time period and particularly if she is connected to other enthusiasts. Non-enthusiasts are likely to remain active in the system if they are heavily active in terms of both content contribution and login behavior, especially if they have strong ties to other users. Their probability of remaining active is not as closely related to connections to enthusiasts, suggesting that other users are not affected as strongly by the amount of their neighbors' activity. Rather, they are more strongly affected by activity directed at them. Enthusiasts, then, are the core users who will remain active so long as there are others around them who are similarly enthusiastic. Non-enthusiasts require a more direct social relationship: having enthusiastic neighbors is often not enough to encourage continued participation.

All of these results suggest that the enthusiasts act as a core contributing component to the social media system. They are visible, produce a great deal of content, and, crucially, contribute indirectly by helping attract and encourage other users. There are two general implications for further research and for consideration in the design and management of online social systems. First, a key to growing community may be cultivating enthusiasts because of their role in recruitment and in retention of other enthusiasts. Second, a key to retaining rank and file community members may be mechanisms that help foster intense dyadic ties between members. Testing the generality and strength of these possible affects is a promising direction for future research.

References

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