Fostering User Contribution and Interaction in Online Communities

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Abstract

Online communities have become very pervasive in modern society. Many young people are familiar with Facebook, a community for college students, or MySpace and Friendster, "social networking" communities. However, online communities need not be purely social; communities exist for employees of companies, people with common interests, and projects such as those in the open source community. As these communities continue to grow and new communities form, it is important to understand what makes for a thriving online community with a dedicated membership base. I will explore several techniques to engage members in an attempt to thwart the largest problem faced by most online communities today: under-contribution by the majority of members.

1. Introduction

Whatever form the online community takes or function it tries to fulfill, almost all online communities have the same problem: under-contribution. In other words, a small percentage of users are often responsible for a large percentage of the content. For example, it was found that in open source communities, four percent of members contribute 88% of the new code and 66% of code fixes [2]. This trend can also be seen in newsgroups and music sharing services such as Gnutella.

It is unclear why exactly this happens, and even more elusive how to overcome it. To better understand under-contribution, I will explore what motivates people to become active, contributing members of communities from sociological, physiological, and personal perspectives. To do so, I will combine the ideas of several studies of online communities to lay out the design of an online community that has a high likelihood of success.

1.1. "Being There" to "Beyond Being There"

Online communities often try to take the place of or provide a viable alternative to physical community gathering places. For example, some cities and towns might have a YMCA, JCC (Jewish community center) or library that doubles as a community gathering place. University students typically have a Student Union with message boards, student hang outs and meeting rooms. For an online community to be successful, not only will it need engaged members, but also need to offer, as a bare minimum, the features offered at real community centers. In the Computer Supported Collaborative Work field this is called "Being There" – giving users the same capabilities online that they have in physical community centers. However "Being There" is not enough to ensure contributing members; if members are to forgo a visit to the real community center for a visit to the online center, the online community must offer some set of features that members cannot find at the real center – in other words it must go "Beyond Being There."

In designing an ideal online community, I will first look to physical community centers for design ideas to find what makes those communities successful. Once that is established, I will investigate several social theories that will be useful in motivating user contributions, and finally I will introduce features into the design that will offer the "Beyond Being There" experience.

2. Modeling Online Communities after Physical Communities

Community centers typically are meeting places where members of the community can come together to discuss issues, meet others living in their area, engage in social activities, post news effecting the community, etc. These features are the bare essentials that must be present in the online community as well.

2.1. Architecture

Modeling the online community after the physical architecture of the real community center might help the site be more intuitive to use (especially for members not very familiar with online communities). The online community could be made up of virtual "rooms" – the users would always enter through the lobby, where the most up-to-date information about the site could be posted. Users could enter more specialized rooms for clubs, civic groups, local politics, help-wanted etc. Figure 1 shows the lobby of an online community center created for suburban Boston residents by Millen and Patterson [1] following the design structure of a physical community center.

2.2. Calendars

One of the bare necessities of an online community center is a calendar easily updateable by members. Community calendars are very useful in alerting members of upcoming events and become very important in large communities with a substantial number of events, such as universities. Searching a lengthy discussion forum for an event posting might be more time-intensive than simply looking at the calendar. In the University setting, UNC has a central, master calendar with events across disciplines and departments. In addition, the calendar should have filtering functionality to only see concert events, or town council meetings. If there is an agenda for the council meeting, or if the meeting is to discuss a controversial issue and council members would like to solicit input from the public, they could create a link from the calendar to a related discussion forum.

2.3. Discussion Forums

A discussion forum to facilitate communication between members also seems essential, as well as messages boards, where members could post documents or links. Forums are often very useful for members with common interests, such as bird watching or running. When community members have exceptionally good or bad experiences – for example, if a local cable provider was providing community members with sub-par service – members could post their opinions to the discussion forum.

2.4. Patronage

The success of a physical community center is often dependent on patronage – how many members are using the center. To provide the virtual feeling that other members are present and active in the online community, a visitor metric displaying the number of total page views, and the number of current viewers might be a good approach.

Figure 1: Online community center modeled around a physical community center. The Carlisle Community Center was created by Millen and Patterson to better understand what causes members to contribute.

2.5. Notification

However, many aspects of community centers are difficult, if not impossible, to emulate online. For example, many centers are places where members can come together to play sports, attend performances, or hold meetings. Often as a by product of these visits, members will see new posts to community message boards, or learn about upcoming events. The online community center does not have this happenstance to take advantage of – users must visit the site specifically to read new posts to forums, new documents, etc. The challenge is how to make this visitation part of the users' everyday lives

Email notification is the most obvious solution – each day an email could be sent notifying users of all new material posted to the site. Users could also tailor these messages to come at different frequencies, or only inform them of updates to the local politics room, instead of all rooms, for example.

Millen and Patterson [1] studied the effect of email notifications and found that members were twice as likely to post to the community forums on days when an alert was sent. Additionally, as shown in Figure 2, they found that the greater the number of new messages referenced in the email alert, the greater number of posts to the site. This indicates the forming of a positive feedback loop – the greater number messages included in the email, the greater number of posts to the site, which in turns means an even greater number of messages referenced in the next email. This also implies that if posting begins to fall off the cycle will reverse. Millen and Patterson [1] also found that drops in participation can be related to decreases in posting frequency (Figure 3). So, sustaining daily activity is important, as is informing users of this activity.

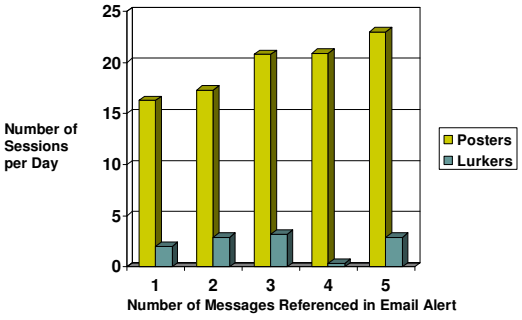

Figure 2: The greater number of messages referenced in the email alert, the greater number of sessions (meaning user logins) per day.

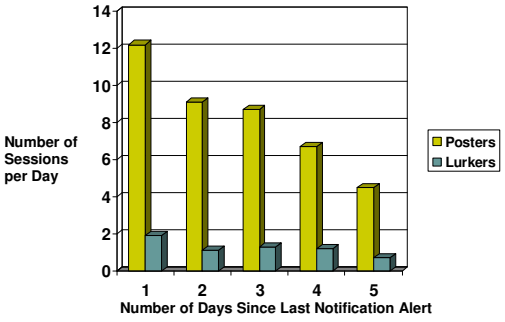

Figure 3: For each day that went by where members did not receive an email alert, the less likely they were to login to the community.

2.6. Discussion

According to Millen and Patterson [1], the lobby was by far the most visited virtual room. Though other rooms were popular as well, none compared to the lobby. These finding reflect that having a centralized location notifying members of new updates across the site was very effective. The authors also performed an analysis of what topics prompted the longest discussion threads. Anything politically charged, controversial or provocative elicited the most discussion. Interestingly, the virtual "swap shed" also received a significant amount of traffic as well – this room allowed members to trade goods and services. A physical swap shed already existed in the community; however the online version must have offered "Beyond Being There" benefits that persuaded some users to switch.

By moving the community center online, several "Beyond Being There" features were innately introduced. Members no longer had to drive or walk to the physical community center; they could find out about new events from the comfort of their own homes. The online community is also never closed – members can read and post to discussion forums at literally any time. In addition, many of the features, such as calendars, message boards and forums, can easily be customized to save a history. For example, if members of the UNC Computer Science department wanted to know the date the drinking water filters in the water fountains were lasted changed (which

might have been months before), they could easily search previous months, whereas old copies of a paper calendar might be thrown away or lost.

The online community that Millen and Patterson [1] built, as shown in Figure 1, experienced the same problem as most other online communities: under-contribution in the form of 20% of the members accounted for 50% of the content. Though the authors did create an community with a core group of frequently contributing members, the goal of social interaction through contribution by most users was not accomplished, despite the presence of several "Beyond Being There" features.

The question now becomes how might we modify or enhance our current online community to appeal to a larger user base and entice those users to contributing.

3. Ratings

Another feature that might further engage those in the community would be a rating or polling system. Members of the community could rate local restaurants, businesses, movies, complete surveys on political issues, or any type of activity that would generate results that members could then use for future reference. For example, if a member was looking for a good restaurant or hardware store, or if a local politician was interested in how the community felt about a new Wal-Mart coming to town, they could quickly search the online community forums.

However, simply adding a rating feature might not be enough to garnish new interest in the site. Millen and Patterson [1] established the importance of email alerts, so instead of only alerting members of new messages, could we somehow subconsciously lure users into contributing by tying the alerts into the ratings feature? To find the best strategy to do so, it might be best to first understand why members usually do not contribute in the first place, and how to reverse that behavior with the email alerts.

3.1. Social Loafing

Beenan et al. [2] identified a possible phenomenon that might explain the lack on contributions: social loafing. Social loafing, or free riding, is the human tendency to contribute less on a group task than on an individual task, especially if the individual contributions will be indistinguishable in the end result. This behavior might manifest itself in a discussion forum, if someone has already posted a comment similar to another member's thoughts, or in a member survey where most participants are of the same opinion. Whenever members feel as though they are making a redundant contribution, they are much more likely not to contribute. Beenan et al. [2] observed this phenomenon with a movie ratings community, MovieLens, where members review movies and in turn receive recommendations for other movies based on these reviews.

3.2. Uniqueness and Benefit

Two mechanisms have been found to effectively combat social loafing: uniqueness and benefit. If a member perceives his/her contribution is unique and he/she has a chance in influencing the outcome of the task, it is much less likely he/she will free ride [2]. This is also true if members can clearly see the benefit of their contributions. In the case of MovieLens, this would be increased accuracy of recommendations for all members.

To put these theories to the test, the authors sent out targeted email messages addressing either the degree of uniqueness or degree of benefit to the members.

The members who received the uniqueness email were either told they were a member with unusual tastes and were particularly valuable to the movie rating community, or someone of "fairly typical tastes". To address benefit, members were sent emails emphasizing one of four conditions: no benefit, only self-benefit (rating more movies helps you), only group-benefit (rating more movies helps the community), or a combination of group and self benefit (rating more movies helps you and the community).

3.3. Discussion

Beenan et al. [2] found that members who received the uniqueness email emphasizing their value to the community rated 18% more movies than those who were told they were average. This confirms the authors' hypothesis that promoting uniqueness does increase members' motivation to contribute.

The results of the benefit emails are not as straightforward, as Figure 4 illustrates. Members who received the no benefit and those who received the self and group benefit emails rated more movies than members who were told only of self benefit or only of group benefit. The authors were unsure how to explain this; perhaps the users were primarily interested in rating movies to improve the community as a whole, thus reminding them of their personal benefit from rating went against this belief.

However, Beenan et al. [2] proved that reminding members via email of the importance of contribution is an effective technique to solicit participation in an online community. Furthermore, the content of these emails makes a difference.

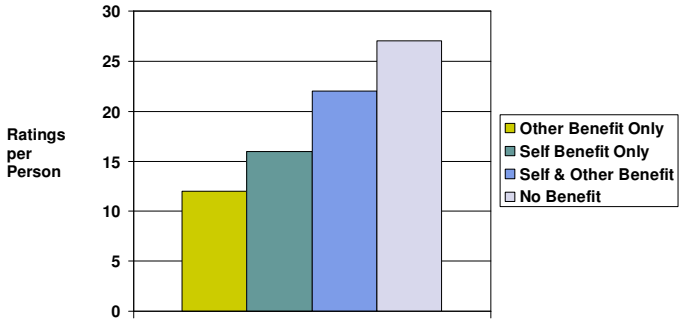

Figure 4: Effect of benefit manipulation on ratings.

4. Goals

Perhaps another way to combat under-contribution is to make apparent the amount of contribution expected by members. As we have seen, this can be implicitly done by targeted email messages, but what would happen if members are explicitly told how much to contribute? In a purely social community this may seem counter-intuitive; however publishing expectations is common for the workplace and could be easily transferred to work or research oriented communities. So, it seems reasonable to apply a goal oriented approach in social settings. The goals need not be strictly enforced; a recommendation of weekly or monthly contribution might be the best method. No one would be kicked out of the community for not contributing, however they might receive emails reminding them of their under contribution and how important contributing is to the success of the community.

4.1. Goal Setting

The next logical question is then how to set the goals – is it more effective to ask users to do their best, or would specific goals solicit more contributions? Much research has been done on this very question, and many studies [2] have suggested that specific, challenging goals elicit better performance from participants than asking them to "do their best." Goals have also been found to be more effective during shorter duration periods than longer durations [2].

Beenan et al. [2] set out to test this theory in the online community environment. They sent out emails to members asking them to rate either 8, 16, 32, or 64 movies during the upcoming week, or to "do their best". The members need not watch that many movies – the idea is more that they have most likely watched movies in the past and forgotten to rate them. To determine where to set the goals, the authors looked at the mean number of reviews in the past and used that number, 8, as the low challenge goal. The author's did not provide details as to why they chose 16, 32 or 64 goals.

4.2. Discussion

Members with specific goals outperformed members with the "do your best" goal. Furthermore, the authors established that there is an upper limit when setting goals – performance of members with the 64 movies/week goal actually dropped. After attempting to reach the goal, the members might have realized it was so far out of reach that they stopped trying.

Another interesting finding is that over half of the members in each goal group did not achieve their goal. The goals did serve their purpose in motivating members to contribute, but in designing group goals it is best to keep in mind that the majority of users will not actually achieve the goal, though their contributions will likely increase.

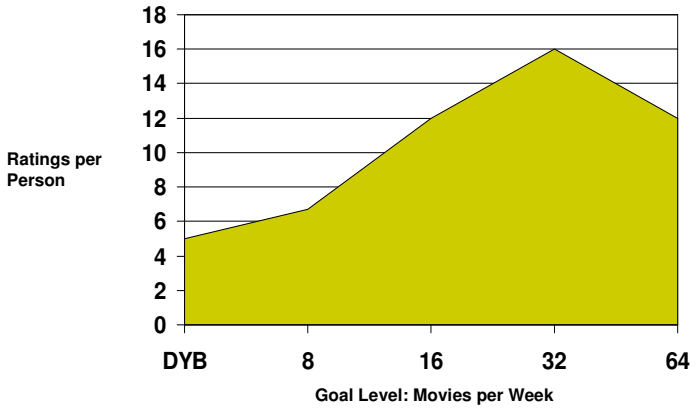

Figure 5: All goal levels outperformed those with the DYB (do your best) goal. The higher the goal, the better performance, except in the case of 64 movies/per week

5. Putting Faces to Names

In the MovieLens community only the site administrators knew how much each member was contributing. If the online community published this information, it may be possible to use social pressure to also influence contribution. In other words, members could take pride in their contributions if it was easily and quickly apparent how involved they are in the community, and they could encourage other members to do the same. Several studies have shown that recognizing and attributing participation is very important for encouraging future contributions [3].

However, as of now our ideal community is composed only of discussion forums, rating/polling rooms, and statistics of how many users had visited each room, viewed each poll, etc. There currently does not exist a method to easily display amount and type of contributions of individual users.

5.1. User Profile

To accomplish the goal of letting other members easily identify key contributors, it is necessary to add a user profile feature to the online community. The profile has no specific or prescribed use – it should support users uploading photos, writing brief biographies, and include how often the user logs into the community. The profile could also include a summary of the member's favorite movies, restaurants, etc. and which discussion forums they are frequent contributors to.

Without a profile, members would only be known as names. The inability of members to display any personal information stymies the forming of social relationships in the community. However, if users were able to form social bonds, they might be more inclined to socially interact with other members and contribute to the online community.

Through their profile, members could build an online identity, thus shifting the focus of the community to the people that compose it, instead of the community itself. Girgensohn and Lee [3] point out that "without people, there is no community", so this natural shift should be, from a sociological perspective, important to further integrating the online community into the members' lives. The authors also point out that people are more likely to communicate with people they know, like and are similar to themselves, so adding a profile feature should foster this inter-community communication.

5.2. "Social Browsing Tools"

Girgensohn and Lee [3] implemented several other features in their online community that took advantage of the profile: a gallery of random members were displayed each time a member logged in, as well as a list of new

members. The authors thought this might help in getting members of the community better acquainted. The authors also created a profile directory to make finding other members based on certain criteria (university, interests, etc.) quick and easy.

Figure 6: Girgensohn and Lee [3] created "CHIPlace", an online community for participants in the ACM CHI 2002 conference. The community included a user profiles section, as well as several tools designed to advertise the profiles as well as make them easily accessible.

5.3. Trivias

Connecting the profile to other features of the site seems like the next logical progression in building an online community. Each user should have to ability to create polls – quick questions other users can vote on, and then view the results. The polls should prominently display their author, how many previous polls the author has created, and allow for participants to click on the author's name to go to their profile. Girgensohn and Lee [3] called the polls "trivias." They hoped the trivias would be a quick way of showing how engaged each trivia author was in the site, and how many people were interested in the trivia topic (as shown by the total number of participants in the trivia).

Trivias also serve another purpose: a quick, easy alternative to contributing to discussion forums. The authors point out that contributing to discussion forums is a very high-overhead task; whereas the low-effort task of voting in a trivia might better gauge the interest of members in a topic.

5.4. Incentives

The communities built by Girgensohn and Lee [3] offered incentives to solicit participation – contests where entry was dependent upon number of contributions to discussion threads. One community, CHIPlace, did not require registration but offered additional features if one did register. Another community, Portkey, designed for IBM summer interns, offer cash prizes for members if they completed their profiles and made a minimum number of contributions to the community. However, for a community to be successful and self-sustaining, incentives should not be the sole reason members contribute. Incentives might be a good method to employ when the community is just starting to get members to initially join, but only sporadically in the long run.

5.5. Discussion

When Girgensohn and Lee [3] analyzed usage patterns of their communities, they found accesses of people profiles dominated most of the traffic in the community where new members were joining regularly. Browsing people pages was approximately 4 times more popular than the discussion forums, which were roughly the second most popular activity. The authors found that many members would refresh the home page just to see a new random selection of members.

To generalize, adding profile capability to online communities does have wide appeal, and frequent accesses of profiles most likely translates to increased contributions. The authors tracked the usage patterns of the site by

grouping all pages into certain categories. For example, the "People" category included all profiles, the people directory, and main people page with random members' photos. The "Discussion" category held all pages related to the discussion forums, threads and messages. The authors then logged the users' navigation patterns, capturing how many pages in each category a typical user would access, and the likelihood a member would transition from one category to another; for example if users would navigate from people to discussion but not vice versa, etc. Figure 7 is a graphical depiction of these patterns and page transitions – the larger the circle, the higher the activity in that category. The thicker the arrow, the more likely the user would follow that path.

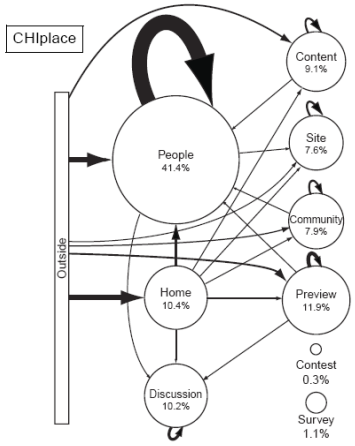

Figure 7: Page transitions for the CHIPlace community. Most users went straight to the People pages after logging into the community.

The authors found that having profiles most likely increases traffic to discussion forums, which may help to increase contributions. Girgensohn and Lee [3] also found that incentives were not necessary to fuel contributions. Few people met the prescribed criteria for entering the contests, but still contributed to the site in other fashions.

6. Profile ++

The popularity of the people profiles shows how interested users of the online community are in other members. To build upon that interest, adding additional features to the profiles might help foster even more contribution. Allowing members to further customize their profile, in terms of colors and layouts could be a valuable addition, as well as allowing members to create lists of friends who are also members of the community. This might keep users engaged when visiting the site – after visiting one profile, the may in turn visit the profile of that member's friends.

In most online communities today friend lists are unstructured; however introducing structure might be beneficial in communities, even those that are purely social. For example, in an open source community, a member could have a list of other members who are subject matter experts in areas of the application the member frequently interacts with. In research communities a member might have a list of his/her frequent collaborators, research advisors, etc. Members could create custom labels and groups for their friends – this would make for a much less daunting task when a new member to the open source community is looking for a guru in Linux driver development, for example.

Currently, most popular online communities do not allow this fine grained categorization. MySpace does not allow for any structuring (not even alphabetical), so if users are looking for a specific friend of a friend, they might have to maually search through hundreds of people. In Facebook, only a limited structuring is available and members cannot create their own labels.

6.1. Blogging

Blogging is a popular activity that could be integrated into the member profile. Blogging is a communication method where a single person or group maintains an online diary or journal. Blogging has been found to be very social in nature, and can foster the formation of social relationships and networks. The blogger's audience will often comment and provide feedback about the member's blog, and the blogger in turn takes this feedback into consideration when posting. Nardi et al. [4] found that "blogging begets blogging". That is, peer bloggers and

readers encourage blogging through reading and commenting, which then the blogger takes into account when formulating posts that would likely solicit comments from readers.

The authors also found that about 20% of bloggers surveyed started a blog because a friend asked them to. In an online community, if one user started a blog and asked all their friends to start as well, then eventually the community may have many bloggers, thus, giving members another reason to use and contribute to the community.

A blog could be used to keep users up-to-date on new features to the online community, or progress made on bug fixes. Instead of newsletters or alerts emailed to members, the members could receive an email when a new post is made to the community maintenance blog.

6.2 Discussion

To my knowledge, no formal study has been done on whether allowing profiles customizations or including blogging functionality increases contributions and level of involvement of online community users. It would seem intuitively that this would be the case, but more work would need to be performed.

7. Conclusions

Though many of the online community features I have discussed intuitively should keep members interested and contributing, the purpose of my survey is to provide solid evidence one way or another as to the value of these features.

Email notifications, alerts and newsletters are common across all communities surveyed, and in each instance they were found to act as catalysts in motivating users to visit the community. If additional users are visiting the site, there is a higher likelihood they will contribute, since users who don't visit the community will obviously not contribute. Tight coupling with email is of utmost importance – most users check their email more frequently than they visit the online community, so community designers should take advantage of this.

Additionally, the content of the emails can make a difference as well. If members are reminded how unique they are in the community, it is more likely they will contribute. General reminders work well also and there no need to tell users how beneficial their contributions are.

If participation slows, periodic incentives could be offered if members meet specific contribution goals. Though incentives are not completely necessary, they might entice users into becoming more engaged in the community initially or after droughts of contribution. Specific goals are also far superior for eliciting contributions than telling users to "do their best."

Most importantly, online communities must be people-centric if they are to succeed. Overall, members are much more interested in other community members than in the other content of the site. Several popular sites, such as MySpace, have survived on people profiles alone. Though a community may have loftier intensions than solely social networking, having people profiles and directories to find those profiles is a necessity. Promoting members' activities in the community is also key – people are not only interested in people, but what kind of activities the members are engaged in within the community. Attributing and recognizing people is also very important to encourage others to contribute as well.

Members should have the ability to become quickly engaged in the community as well – long discussion forums are necessary, but having quick polls are another method to quickly gauge interest in topics.

Though there is more research to be done, I have suggested two additional features that I believe will encourage user contribution: structured friend lists and blogs. Blogs have been studied independently of online communities; however no studies, to my knowledge, have been done combining the two. However, since blogging is very social, it should only encourage social interaction in the community. Structured friend/co-worker lists might also help new members avoid information overload when browsing for a member with a certain skill set or role in the community.

8. References

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