

# The Community is Where the Rapport Is – On Sense and Structure in the YouTube Community

Dana Rotman  
College of Information Studies  
University of Maryland  
drotman@umd.edu

Jennifer Golbeck  
College of Information Studies  
University of Maryland  
jgolbeck@umd.edu

Jennifer Preece  
College of Information Studies  
University of Maryland  
preece@umd.edu

## ABSTRACT

YouTube is a video sharing repository, enabling users to post, share and discuss videos. Its stated mission is to create "an online video community"; however, YouTube is not commonly thought of as a community. Our aim in this study is to answer the question whether users have a "sense of community" towards YouTube, and if such feelings exist – are they reflected in the explicit ties among members. To accomplish this, YouTube was examined using two different and complementing methods. Using Grounded Theory, we performed a detailed analysis of more than 30 videos and their corresponding textual comments, which discussed two topics: users' feelings about the YouTube community, and users' accounts of interaction within the community. We then performed a structural analysis on the ties these users display on their YouTube channels. This analysis showed that although users perceive YouTube to be a cohesive community, the explicit relationships in the friendship and subscription network are almost random. We suggest that users' sense of community is not necessarily related to the structure of the YouTube network, and may result from subjective affinity towards other users. This study also points out the importance of triangulating qualitative and quantitative data to get a deeper understanding of the nature of an online community.

## Categories and Subject Descriptors

H.5.3 Group and Organization Interfaces - Web-based Interaction

## General Terms

Human Factors, Measurement

## Keywords

Online communities, Social networks, Small worlds, YouTube, Video-sharing, Grounded Theory.

## 1. INTRODUCTION

YouTube is a video-sharing repository that allows users to upload their videos and interact on the site, by using various

embedded communication tools (e.g. video and textual comments and personal bulletin boards). In much the same manner as other social networking sites, YouTube provides users with personal pages ("channels") on which they can display lists of their friends and subscribers. Though YouTube is not often considered an online community, the rich user-generated content and personal communication tools that are offered to YouTube users may aid in creating a cohesive users' community.

The aim of this study is to explore a sub-group YouTube users – those who engage in self expression through authoring video-blogs (Vlogs). We examine whether users' reported sense of community compares with their reported interaction patterns, as well as with the structure of the YouTube network.

Previous analysis of a sub-group of YouTube users, chronicling their engagement with fellow users, showed that they believe a thriving online community exists on YouTube [1]. This sub-group of users expressed strong attachment to the YouTube community: to them, it is a platform for communication and interaction rather than a mere broadcasting application. In it they find a group of people engaged in a shared interest, interacting with each other and creating a unique communal culture. Their YouTube community promotes mutual support and emotional attachment, creating a "sense of community" [2, 3].

To further address the question of the YouTube community, and attain a comprehensive view of it, we used complementing qualitative and quantitative methods, that afforded us with three different perspectives of the community - a detailed Grounded Theory analysis of the videos, created by community members, and the comments attached to these videos, presented: (i) users' sense of community; (ii) their reported interaction patterns; this analysis was enhanced by (iii) a structural analysis of the YouTube network.

Our results show that although individual users believe they are participating in a community on YouTube, this is not reflected in the network formed by friendships or subscriptions. This indicates that participation in a community of users can take place within a larger system without being visible in the structure of the network. It also demonstrates the need for both quantitative and qualitative analysis. A quantitative structural analysis alone does not reveal the community that users see. A qualitative analysis of a sub-group of users does not recognize the structure of the larger network, or the lack of community there. Only with both types of analysis is a complete picture available.

The rest of the paper is organized as follows: we present the fundamentals of the online community; detail the methods used and their outcome and discuss the findings. We conclude by discussing the implications of our findings and suggesting future research.

## 2. THE FUNDAMENTALS OF THE ONLINE COMMUNITY

The need for companionship and social interaction is habitual to most people. People lean on each other, communicate, and learn from others. The idea of a community stems from people's need to congregate and share the positive and joyous aspects of life or lean on their communities in times of need [4]. The nature of communities, which was initially based on geographical proximity and physical presence [5], changed with time to focus on social cohesion and common values. This resulted in a paradigm shift in the definition of community, which nowadays includes interpersonal relations as a crucial component in the creation of a community [6, 7]. This change, along with technological advances, allowed the creation of online communities.

Online communities are characterized by being groups of people brought together by a shared interest, who create, through interaction on an online platform, a joint repertoire and common culture [8-12]. A community is built upon the premise of an open arena for communication; in turn, this communication fosters close, intimate, relationships between the group's members. The ongoing rapport between community members generates densely aggregated groups [13-16], in which interpersonal relationships create many routes of communication, some reciprocal (e.g. dialogs), and others of more peripheral nature (e.g. conversations in which participants engage sporadically with each other), all contributing to the "collective efficacy" related to the community.

Focusing on the rapport among community members as a facilitator of the community's cohesiveness, McMillan and Charvis [2] defined a four-point "sense of community", that is obtained by being a member of a group. The four elements are: (i) membership – a feeling of belonging or relating to other group-members; (ii) influence - of the group on its members, and a reciprocal influence of each member on the group's actions; (iii) fulfillment - of some or all of the member's needs, such as security or status; and (iv) shared emotional connection – joint history and closeness found among the group's members. All these, and especially the latter element, are definitive for a thriving community, and are based on the quality of interaction among the community's members. A greater bond and a "sense of community" are created where interaction leads to a positive shared emotional connection among group members.

Structurally, online communities are viewed in the literature as a complex matrix of personal ties and continuous communications. They are not merely dyadic or nodal relationships, rather a cluster of interactions [17-19]. The ties among the community members may be weak or strong: in some cases a person may respond to another and the two will then engage in a close interaction, producing emotional intimacy [20]; in other cases, the interaction between members is shaped differently - members of the community interact with others, in a collective discussion that is available on the community's main

gathering place (e.g. message board), and is open for all other members to participate in. The community members can decide whether to join the discussion or maintain a passive presence in regards to it.

When applying a "sense of community" principle to interaction patterns in online communities, we can assume that active and animated interaction that involves many of the community members will lead to a stronger sense of community among them, encourage deeper involvement with the community, and will attract new members to the community in a manner that will stimulate its growth and success.

Web-based social networks and online communities exist on the same continuum. Web-based social networks were defined by boyd and Ellison [21] as "allowing individuals to: (i) construct a public or semi-public profile within a bounded system, (ii) articulate a list of other users with whom they share a connection, and (iii) view and traverse their list of connections and those made by others within the system. The online component was added by Golbeck [22] to prior definitions. Web-based social networks bring together users who have a mutual interest or that are connected by a socially meaningful relationship [23]. Most web-based social networks (e.g. Facebook, MySpace) combine communication and interaction tools that create rapport among members, based on their mutual interests and personal affinity. The joint repertoire and culture that are created as a result of such interaction, are similar to those typifying online communities. Thus, web-based social networks can be defined as a distinctive form of online communities, or at least as platforms for creating such communities.

However, an important difference between "traditional" online communities and web-based social networks is the ability to observe connections among their members, and to infer upon these observations how the community or network is constructed. In online communities members' ties are implicit, and can be inferred only from the patterns of interaction and the content of messages that are posted on a communal arena (e.g. message boards). In comparison, web-based social networks are based on explicit displays of social ties, and afford us with a clear look at the structure of connections among the network's members, leading to easier understanding of the web-based social network's structure.

YouTube is the largest online video-sharing repository [24]. It allows members not only to post video segments and share them with others, but to communicate among themselves through various means: from comments (visual or textual) to personal bulletin boards; it also provides them with social-networking tools such as public friends' and subscribers' lists. Although not usually considered an online community, either because of its enormous size or its primary purpose as a media-sharing website, YouTube may, indeed, hold the attributes of a community. The combination of social networking tools and interaction among YouTube members raises the question whether members have a "sense of community" in regards to YouTube, and if such a feeling exists is it reflected in the explicit connections that members display on their personal pages ("channels")?

### 3. METHODOLOGY

Our aim in this study was to compare users' sense of community and their actual interaction patterns on YouTube. To accomplish this, a sub-section of YouTube was examined using two different, complementing, methods: a qualitative analysis of users' feelings about the community and their interaction patterns, and a quantitative analysis of the actual YouTube structure as created by their articulated ties.

In the first part of the study our focus was users' "sense of community", as well as on the actions resulting from it. Our purpose was not to present a representative sample of the population of users, rather to focus closely on a sub-group of users who openly discuss their views about the nature of the YouTube community. The videos that were analyzed were chosen from the sizeable body of works published on a daily, even hourly, basis on YouTube [25]. The magnitude of YouTube video corpus complicates the ability to obtain a representative sample of all videos; thus a purposeful sample [26] of videos was selected, based on each video's properties and the category it belongs to. In focusing on users' depiction of the community we chose to explore the Vlogging (video-blogging) category. Vlogs are characterized by being a platform for expressing personal views and opinions, and tend to present fewer commercial video segments. The videos that were selected are the ones in which users personally appeared in front of the camera and talked to an undefined audience. Videos that represented other artistic endeavors or included segments of commercial films/entertainment shows were discarded. The process of selecting sample videos was done through an iterative in-site search, using the key words "community" and "YouTube" in conjunction. The in-site search returns tags attached to the video, its title and description (as provided by the author), as well as additional textual comments, which makes the retrieval relatively comprehensive. However, a textual search of video content is not possible. The search results were refined and delimited to include solely videos that related to the research question. More than a 100 videos were watched and the comments attached to them were read and recorded. Textual comments hold a special place in this analysis, as they bring the perspective of corresponding members' views, and complete the picture the video-posts present. More than 30 videos that discussed users' views about the YouTube community were transcribed from visual and vocal media to text, and the textual comments attached to them were recorded. The data was analyzed, and videos were added to the sample, until "conceptual saturation"[27] was achieved.

The qualitative analysis of these videos was based on a Grounded Theory approach [27]. The transcribed videos were coded to reveal repeated patterns and common themes. Codes were constantly compared to create higher-level concepts. The final set of themes, after iteratively referencing them against each other was: forms of participation; reasons for participation; boundaries and distinction between members and outsiders; communal practices; shared purpose; common culture; face-to-face interaction; online interaction practices; community properties and structure; content; feelings and emotional attachment. These concepts were axially referenced to ensure complete accurate representation of the data.

This segment of the study resulted in a comprehensive illumination of the way users' view their interaction patterns, and a first hand account of the actual course of interaction on YouTube. To complement users' personal perspectives, we wanted to compare their accounts against the actual structure of the YouTube network ties.

In the second part of the study, a structural analysis was conducted to uncover the actual structure of the YouTube social network formed by explicit friendship ties or by the subscriptions users had to each other's content. A subset of the YouTube network was gathered by starting with the users considered in the qualitative part of the study and crawling out from there. We used the YouTube API to gather complete friend lists for each user. Two factors prevented us from gathering a full adjacency list of the entire YouTube network. Many users made access to their friend list private, and thus it was inaccessible through the API. Second, at arbitrary points, the API would cut off our requests, so the spider stopped. The largest graph we obtained had 31,727 users. However, since we were not able to access the adjacency lists for many of these users, and thus we could be missing connections they had to others in the network, we only considered users and edges between users for whom we accessed the adjacency list. This yielded a total of 1,512 users with 2,238 edges.

#### 3.1. Grounded Theory Analysis of Users' Views

##### 3.1.1. Sense of Community

In the videos that were analyzed, users were almost unanimous in their strong feelings about YouTube being an established community. They asserted that YouTube is a social space that offers the conditions needed to cultivate a community, such as emotional support, joint interests and communal culture [1]. Phrases such as "*A community means a bunch of people who are interested in the same thing, get together and do what they like to do – that's what YouTube is*" (Participant 1) or "*YouTube has to be a community; the reason that it is a community is that without other people watching our videos, we wouldn't have anyone to try to make new videos for*" (Participant 12), were repeated throughout the videos.

Users detailed their own experience as members of the YouTube community in a way that illuminates their "sense of community". They reported close-knit relations with others, which evolved into feelings of intimacy and closeness:

*"Initially I just want to get my work seen. And then I started to get into communicating with people in this community I made really good friends, people I started talking to everyday, who I have known for most of a year. Some of which are very close friends I can talk to about personal things"* (Participant 15).

*"I've made all kinds of friends, all through this site. Even people who live in this city that I would not have met otherwise. [I also] met people from across the world"* (Participant 2)

*"A lot of people it seems are meeting in real life, talk on the phone, do collaborations, there's been a few people that have hooked up and moved in together, there's been a lot of romances happening and there's some deep genuine friendships"* (Participant 30)

The personal interaction within YouTube transcended it from a video-publishing and broadcasting outlet to a community, and its users became not just broadcasters but members of the community.

### 3.1.2 Interaction pattern

The community is based not only on reciprocal interaction among members, but on a pattern of communication resulting in a dense hub of cross-relations. Such interaction pattern will attest to the existence of a cohesive online community within YouTube. Reports of solitary, nodal, interaction that involves pairs or very small groups of users will lead us to believe that YouTube presents an image of loose ties among users, that attesting to YouTube being more of a broadcasting platform than a community.

Users explicitly described the YouTube interaction pattern as that of a hub-like online community:

*"[the YouTube community is] a spiderweb, because everyone interacts with each other, and everyone is a sender and a receiver. And this is me [points to himself] and I interact with all these different people"* (Participant 22)

That said, when we examined the ways users depicted their interaction patterns on YouTube, we observed a behavior less cohesive. Users' accounts revealed that most relationships actually exhibit a nodal model: they involve a small number of participants, usually two or three, who personally interact with changing degrees of frequency.

*"YouTube has strongly made for personal connections. I know people from around the globe. You've seen my videos with each person [who] visits me from all over"* (Participant 32)

Though personal meetings and intimate artistic collaborations were often discussed and highly regarded by users (*"I've had jumps in subscribers when I've done collaborations with other people"* (Participant 27)), they were limited to small number of users, usually 2-4. Reports of group activities or large scale discussions were relatively rare, and included mostly public group meetings based on geographical proximity or solitary efforts towards a common cause such as fundraisers and support videos. The latter were usually star-shaped occurrences, where support videos that users contributed were directed at a specific user or cause, with minimal mutual interaction among the different users participated in the occurrence.

### 3.1.3. The Role of Comments in Creating the YouTube Interaction

The nodal pattern of interaction is best exemplified by the way users communicate through the tools YouTube offers. When posting comments or video-comments, users tend to exhibit two types of interaction:

1. ongoing communication with pre-existing friends or family
2. incidental comments posted on other users' channels

Examples for both types of interaction were found. When broadcasting to pre-existing friends and family, users utilized videos and comments to update viewers on their whereabouts, thoughts and experiences:

*"I've built my page to exactly how I want it, use the site to talk to others and share videos with my friends in real life not just other YouTubers"* (Participant 25)

*"YouTube is the new personal communications medium, significant as the way the phone was"* (Participant 31)

*"My reason for being on YouTube, my number-one reason, is that my children can see who I am, and what I do"* (Participant 14)

From the comments we read, it appears that friends and relatives that are invited to watch a video tend to respond to them, and to post consecutive personal comments.

Another form of comments is used by users as a way to initiate communication among users, or between users and occasional visitors to their channels. Most comments are brief and relate to specific videos; for example, comments may be used to discuss the content of the videos, or to express appreciation or dislike to them or to the user who authored them. Comments do not generally create a prolonged discussion, and most are left unanswered. However, YouTube users highly value these comments and the number of commentators they have, as a way to establish prominence and visibility among other YouTube users:

*"I don't have a whole lot of subscribers but the ones I have are talkative, they comment and respond, and I like to comment and respond. I like to get to know these people"* (Participant 14)

*"[I'm used to] Waking up at 6:30am and turning on the computer and going directly to YouTube to check out who has commented on my vids and comment back"* (Participant 23)

*"I try to leave comments, let people know what I think of their videos. I leave positive comments most of the time, I'm with the old school that if you don't have*

*anything good to say don't say anything about it at all."* (Participant 33)

It is important to note that while occasional comments from incidental visitors to a user's channel are common and greatly appreciated, they do not result in more encompassing rapport. Comments – whether textual or visual - create, at best, an interaction that culminates in 2-3 exchanges, and is seldom addressed by users other than the channel-owner and the original commentator. Personal communication is most often done by email or other external means, which create "back-channels". Comments also did not directly lead to subscriptions, friendship offers or to the creation of personal ties among users. As one user reported, comments were prevalent, but subscriptions and friendship offers were less frequent:

*"[I] come here on a daily basis leave plenty of comments, on YouTube, and I subscribe to the occasional YouTuber"* (Participant 28)

Some of the users complained about the lack of effective community-wide communication mechanisms:

*"There are things that are lip-service to the community, but YouTube could do to encourage us. They fix things that are not broken, and things that we need to improve our communication and better facilitate the community aspect they do nothing about"* (Participant 32)

Patterns of ongoing discussions and complex conversations in which multiple users are engaged, which are prevalent in typical online communities, were not observed in this study, perhaps due to the lack of relevant communication tools. This created a gap between users' perception of the YouTube community and their positive actions.

As was concluded by one of the users:

*"It's not really that interactive conversation you have on a chat. It's more composed, more thoughtful"* (Participant 31)

Users' depiction of their communication patterns are substantially different from what could be expected based on their accounts of the sense of community they feel. Comments did not lead to conversations; meetings were based on personal affinity and usually involved a small number of users; community-wide happenings were mostly unidirectional: users expressing support or contributing independently to a common cause. All these move YouTube further away from the being the typical online community.

### **3.2. Structural Analysis of the YouTube Network**

As we observed the difference between users' sense of community and their positive actions, another step was required to elucidate the actual structure of the YouTube network. Our

aim in this part of the study was to find corroboration to either the sense of community users expressed, or to the individualistic pattern of interaction users detailed.

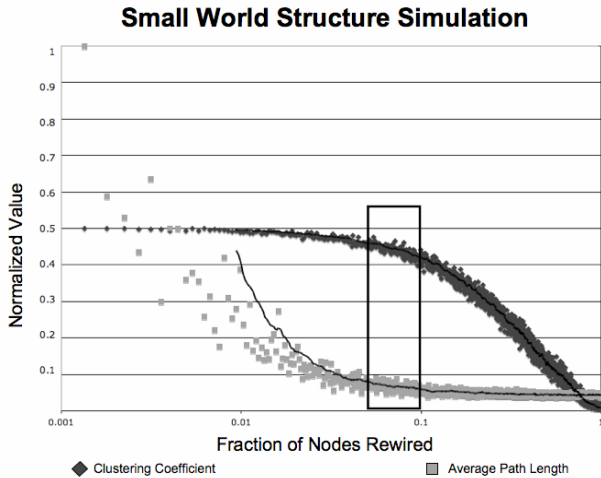
To determine if the YouTube network is structured like a social network, we must consider what a social network looks like in the first place. While there is wide variation in their size, average degree, degree distribution, and other structural characteristics, there are some features we can identify that are typical. It is well documented that social networks are Small World networks [28]. Thus, if we can show that the YouTube network has the features of a Small World network, we can claim that it has typical structural features of online social networks. To extend the analysis, we will compare some of the structural statistics of our network with those of other web-based social networks to get a sense of how they relate.

Small World networks are characterized by two structural features. They have a low average shortest path length (APL), similar to what would be found in a random graph, and a high clustering coefficient (friends of a given person are often friends with one another), similar to what would be found in a regularly connected graph. If we can identify roughly what the average path length and clustering coefficient would be for a Small World network with the size and average degree of the YouTube network, we can say whether or not our network has Small World properties.

A Small World network can be simulated by taking a regular graph and randomly rewiring a small percentage of the edges, as described by Watts [29]. At the point where the APL is low and the clustering coefficient remains high, the network has Small World properties.

To test if the YouTube friend network had the properties expected in a small world, we generated a regular graph with the same number of nodes and average degree as the friendship network. We then applied Watts's method and made the graph incrementally more random. This achieved the expected behavior as shown in Figure 1. At the point indicated in the box, the network has Small World features with an APL of approximately 5.3 and a clustering coefficient of 0.44.

In the explicit friendship network on YouTube, the APL is 5.7. This is roughly in the range of what is expected in the Small World network. However, the clustering coefficient is only 0.08. This is dramatically lower than the 0.44 expected. To reach a clustering coefficient that low in a graph with these parameters, the network would need to be almost entirely random; we only see values that low when approximately 95% of all edges have been randomly rewired in the simulation.



**Figure 1.** The results of a Small World simulation on a graph with the same size and average degree as the YouTube friend network. The box indicates the point where Small World characteristics are achieved – high clustering and low average shortest path length.

This demonstrates that the YouTube friendship network does not have Small World properties that would be expected of a social network. Rather, the YouTube network looks nearly random in its structural characteristics. It suggests that overall most of the explicit "friendships" made in YouTube do not reflect a true relationship between the users but rather a passing interest a user has in the content another user produces. This interest may invoke a "friendship" offer, but has little continuous affect on the users' interaction. The ties among YouTube users definitely do not exhibit a dense hub-like structure of a community.

The results are similar when looking at the network formed by subscriptions. We used the same methods to crawl, gather, and produce a data set to work with. The size and average degree of the network were approximately the same as the friendship network with 1,832 nodes and an average degree of 2.1. The structural statistics were similarly out of line with what would be expected in a Small World network. The APL was somewhat higher than predicted, at 8.7, though this is still within a reasonable realm of expected values based on our simulation. Again, the clustering coefficient was very low at 0.05. This is even lower than what was seen in the friendship network, and is likely to be explained by the fact that users subscribe because of an interest in another user's videos, but that carries very little expectation that the interest would be reciprocal or that fellow commentators of subscribers to that user would also produce interesting content worthy of following. Many will not be producing any content at all, and may be considered "lurkers" [30].

Relative to some other social networks, the differences of the YouTube friendship and subscription networks are also apparent, particularly with respect to the clustering. Using statistics from five other social networks for comparison – see Table 1 [22] - we can see that while the average path length of the YouTube friendship network is similar to other networks,

the clustering coefficient is much lower for both friendships and subscriptions.

**Table 1. Statistics for several web-based social networks and the YouTube networks**

Network	Size	Average Degree	APL	Clustering Coefficient
Ecademy	8,143	35.7	2.1	0.43
FilmTrust	687	3.2	4.0	0.39
Fotothing	4,584	18.2	2.4	0.25
Hamsterster	1,326	8.3	3.5	0.45
Tribe	114,639	10.0	3.3	0.34
<b>YouTube Friends</b>	<b>1,512</b>	<b>1.9</b>	<b>5.7</b>	<b>0.08</b>
<b>YouTube Subscriptions</b>	<b>1,832</b>	<b>2.1</b>	<b>8.7</b>	<b>0.05</b>

These insights into the network structure make the results of the community analysis even more interesting. We have shown, through the Grounded Theory analysis, that users believe there are strong community ties in their interactions, yet this is not reflected in the network of the site as a whole.

## 4. DISCUSSION

### 4.1. The Perceived and Actual YouTube Community

We found that the sub-group of users we studied tends to think of its interaction on YouTube as one that creates a community. Users report feelings of membership, attachment to other users, fulfillment and influence through shared goals, and a feeling of belonging to the larger social body of YouTube contributors (referring to themselves as "YouTubers"), thus creating a "sense of community". Nevertheless, when their accounts of interaction are reviewed, through grounded theory analysis, users exhibit a completely different interaction pattern in which relationships among users tend to be singular, or at most they are made of very small clusters of two to three users. A complementing structural analysis demonstrated that users' explicit friendship and subscription relationships do not reflect the perceived community, and that the YouTube structure looks like a random one, differing from what might be expected based on users' accounts, as well as from other social networks (Table 1).

Interaction on YouTube is based on several prominent communication routes: video posts, reciprocal video comments, and textual comments are most common. However, such communication is located within the boundaries of a specific channel or relates to a specific video. Video posts are searchable and easily embedded in email messages, external websites, blogs, and microblogs; thus reaching larger audiences not only through the original channels, but also through various back-channels. In comparison, textual comments - which are the most often used communication tool on YouTube - rarely extend beyond the immediate viewers of the specific channel. Therefore, the effect comments (and to a lesser extent reciprocal

video-comments) have on the community-wide rapport is minimal.

The discernable gap between the way users view their interaction patterns and the ways in which these interactions are manifested in real-life can be attributed to several reasons:

1. **Social network tools do not necessarily create a community**

While YouTube offers users the ability to communicate with each other, the tools it provides for users are geared towards broadcasting and social networking. As users commented, these tools are less constructive for building a cohesive community: personal profile pages ("channels"), personal bulletin boards and comment-sections, lists of friends, subscribers and favored users, all enhance users' individual representation on the network, but do not bring large groups of users together. In the case of YouTube, the dispersed ambience created by such solitary channels, forms an almost random network structure, which lacks community-wide rapport, and does not establish a densely cohesive community.

2. **Subjective feeling of closeness and belonging**

Users reported association with the YouTube community, from protectiveness towards the community to an affinity towards other members. Though no structural evidence to the existence of a community was found when the YouTube network was analyzed, users' feelings should not be disregarded.

These feelings may be the outcome of a few personal relations formed around a specific user, or small-scale hubs of users with shared interests, such as vlogging. While minute in their overall significance among the large corpus of YouTube users, as well as in their appearance on the YouTube network, they are sufficient to kindle a subjective sense of inclusion in an entity larger than the immediate relationships users maintain, and sustain a feeling of belonging.

3. **The affect of visual recognition**

YouTube is a visual medium in which users are easily recognizable, as they share not only their thoughts but also their physical image, in a way that was reserved in the past for personal encounters. The Vlogging arena, in which the user is the focus of the video, is even more intimate. The compilation of voice, image and shared personal thoughts, bridges across unfamiliarity and incites closeness. It may also create a sense of community even where the formal structure of such community does not necessarily exist.

The scattered structure of YouTube that was observed in this study reflects the idea that communal interactions are established on virtual "gathering places" [31], which serve as the proverbial "town square" and facilitate the dense, hub-like interactions which are the essence of an online community. These commons (e.g. central message boards) are lacking from the YouTube's channel-based platform: no community-wide gathering place is offered to users, and all ties among members are created on solitary channels. Yet, as users indicated, when using social media they look for companionship, empathy and

affinity, thus initiating alternative ways to communicate with each, creating a feeling of belonging to a community even where no community structure can be found. The absence of a formal shared virtual gathering place does not prevent communal interaction from happening, but may limit it.

As our study shows, communication through alternative routes and the personal attachment that users feel due to the rapport that is created through these communication means are sufficient to sustain their semblance of community and feeling of belonging.

## 4.2 Triangulating the Structure of an Online Community Using Social Network Analysis and Qualitative Methods

We used two different methods in examining the YouTube: one centered on users' narratives of their sense of community and their interaction patterns; the second used statistical measurements to examine the actual structure of the YouTube network. The triangulation of these perspectives afforded us with a detailed image of the YouTube network. Assessing the structure of YouTube and its users' actions with only one of those methods would have resulted in incomplete perception of the level of engagement YouTube users are experiencing. Relying solely on users' narratives would have led us to assume that YouTube conforms to the common characteristics of an online community, but would not have presented us with the overall structure of YouTube. Using social network analysis we discovered that YouTube has an almost random structure, but without the grounded theory analysis we would have missed users' engagement with the YouTube community. The data from each method highlights a different facet of the YouTube interaction pattern. When one of these facets is missing a biased image may be reported.

As social networks are about people and interaction, the human factor is a crucial one for their success. Using inquiry methods that present the human perspective is essential for gaining thorough understanding of such systems. Thus, full analysis of online communities - and especially the place users hold in them - should not rely on modeling alone, nor can it solely use users' narratives. Only the combined data derived from both forms of analysis affords a complete perception.

## 5. CONCLUSION

In this study we wanted to examine a sub-group of YouTube users, who consider YouTube to be an online community, and to compare their sense of community with their actual interaction patterns. We began our study of the YouTube structure with an exploration into the ways users view their interaction onsite. Qualitative analysis of users' videos revealed an agreement about the nature of YouTube as a community, yet users mostly detailed personally focused interactions, while larger communal interaction patterns were rarely demonstrated. For the users, these singular interactions were enough to form a feeling of belonging and attachment to the amorphous community.

To further examine the discrepancy between users' feeling and their interaction patterns, a "Small World" structural analysis

revealed the structure of YouTube to be even more random than could be expected, with little or no meaningful ties among users.

The statistical analysis' results are not surprising when considering that YouTube's primary purpose is to create a repository for publishing and sharing videos. The social practices related to video sharing may be peripheral to this main purpose. Thus, most social interaction on YouTube could be equated to a casual encouraging nod when watching an interesting video, or a discouraging "boo" to another video, rather than to a continuous interaction among community members.

That said, it can be observed that this sub-group of YouTube users does not care about the "actual" structure. Although their interaction may not adhere to common perception of the online community as a set of hub-like interaction routes, for the users, the personal communication they take part in are sufficient to generate a *sense* of a community. As the members of the community are what fuels its sustainability, their opinions as to its nature and its place in their lives may be even more important than the platform's primary purpose or its communication structure.

The findings of this study shed a different light on the way we understand the ways users function within online communities. Users' definition of a community is a fluid one, centered mainly on content, interaction and personal ties, and less on the community's formal structure. They seem to long for interaction and emotional affinity with their peers, regardless of the communication tools they are given. Users are willing to work around the site's formal communication structure and objective interaction constraints in their quest for the community they want. And while social networking sites may offer users individualistic communication tools, with limited ability to create a congregation, users will utilize whatever tools or back-channels they have for the purpose of getting together, sharing, caring and communicating (see also Maloney-Krichmar and Preece [32], who found similar community reaction to an inadequately-designed bulletin board). For the community members, the community grows where rapport is created, however limited and dispersed this rapport is.

We must note though, the limitations of this study: we looked at the narrative expressed by a specific sub-group of prolific users coming from the Vlogging arena. Their perceptions of the community and interaction patterns may or may not be representative of other groups of YouTube users. However, they present an important segment of YouTube users and we believe that their narrative, coupled with the structural network analysis that extended beyond their group, provides us with an illuminating insight into the general YouTube community.

Social media designers and providers of such websites should note users' tendency to create for themselves the environment they need. Although fragmented communities may evolve from users' individual interactions, supplying users with adequate tools to build and cultivate a community within social media sites may result in building larger corpuses of users who have greater attachment to the site. Such tools should be researched in future studies, but may include a community's formal gathering place, such as a collective message board, or a shared communication mechanism that users may tap in to when they want to be updated on the occurrences on the site.

Providing users with collective interaction tools will acknowledge their need to congregate, enhance the cohesiveness of their communities and improve the communities' sustainability. Augmenting social networks with community-creating tools may lead to increased participation and heighten their popularity among Internet users. This outcome will not only enrich the community experience users will gain, but will also aid in attracting new users to the community. For web sites that are built upon user generated content, a larger number of users means more attention and more revenues.

When thinking about instituting interaction among social network users, the possibly enormous size of such networks may seem daunting. Yet, what YouTube users have taught us in this study is that even on large scale dispersed networks, users do find each other, communicate and create a deep sense of community. Helping them do so will aid in improving social networks and online social interaction.

## 6. References

- [1] Rotman, D. and Preece, J. *The "WeTube" in Youtube – Media Sharing and the Sense of Community.*, Submitted.
- [2] McMillan, D. W. and Chavis, D. M. Sense of community: A definition and theory. *Journal of Community Psychology*, 14, 1 (1986), 6-23.
- [3] Sarason, S. B. *The psychological sense of community: Prospects for a community psychology.* Jossey-Bass, San Francisco, CA, 1974.
- [4] Chavis, D. and Wandersman, A. Sense of community in the urban environment: A catalyst for participation and community development. *American Journal of Community Psychology*, 8, 1 (1990), 55-81.
- [5] Hillery, G. A. Definitions of Community: Areas of Agreement. *Rural Sociology*, 20, 2 (1955), 111-123.
- [6] Wellman, B. *The Community Question Re-Evaluated.* Transaction Books, New Brunswick, NJ, 1988.
- [7] Putnam, R. D. *Bowling Alone: The Collapse and Revival of American Community* Simon & Schuster, New York, 2000.
- [8] Cothrel, J. and Williams, R. L. On-line Communities: Helping Them Form and Grow. *Journal of Knowledge Management*, 3, 1 (1999), 54 - 60.
- [9] Carroll, J. M., Rosson, M. B. and Zhou, J. *Collective Efficacy as a Measure of Community.* ACM, New York, NY, 2005.
- [10] Preece, J. *Online Communities: Designing Usability, Supporting Sociability.* John Wiley & Sons, Chichester, UK, 2000.
- [11] Wenger, E. *Communities of practice - Learning, meaning, and identity.* Cambridge University Press, Cambridge, MA, 1998.
- [12] Donath, J. S. *Inhabiting the Virtual City: The Design of Social Environments for Electronic Communities.* MIT Press, Boston, MA, 1998.
- [13] Radicchi, F., Castellano, C., Cecconi, F., Loreto, V. and Parisi, D. Defining and identifying communities in



- networks. *Proceedings of the National Academy of Sciences of the United States of America*, 101, 9 (March 2, 2004), 2658-2663.
- [14] Rheingold, H. *The Virtual Community: Homesteading on the Electronic Frontier*. Addison Wesley, Reading, MA, 1993.
- [15] Newman, M. E. J. and Girvan, M. Finding and evaluating community structure in networks. *Phys Rev E Stat Nonlin Soft Matter Phys.*, 69, 2 (2004), 026113.
- [16] Porter, C. E. A Typology of Virtual Communities: A Multi-Disciplinary Foundation for Future Research. *Journal of Computer-Mediated Communication* 10, 1 (2004), Article 3.
- [17] Kelly, J., W., Fisher, D. and Smith, M. Friends, foes, and fringe: norms and structure in political discussion networks. In *Proceedings of the Proceedings of the 2006 international conference on Digital government research* (San Diego, California, 2006). ACM, New York, NY (2006).
- [18] Chin, A. and Chignell, M. Identifying subcommunities using cohesive subgroups in social hypertext. In *Proceedings of the Proceedings of the eighteenth conference on Hypertext and hypermedia* (Manchester, UK, 2007). ACM, New York, NY(2007).
- [19] Smith, M., A., Farnham, S., D. and Drucker, S., M. . The social life of small graphical chat spaces. In *Proceedings of the Proceedings of the SIGCHI conference on Human factors in computing systems* (The Hague, The Netherlands, 2000). ACM New York, NY (2000).
- [20] Preece, J. Etiquette, Empathy and Trust in Communities of Practice: Stepping-Stones to Social Capital. *J. UCS*, 10, 3 (2004), 294-302.
- [21] boyd, d. m. and Ellison, N. B. Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication*, 13, 1 (2007), Article 11.
- [22] Golbeck, J. The Dynamics of Web-based Social Networks: Membership, Relationships, and Change. *First Monday*, 12, 11 (2007).
- [23] Wellman, B. *For a social network analysis of computer networks: a sociological perspective on collaborative work and virtual community*. ACM, New York, NY. 1996.
- [24] Cheng, X., Dale, C. and Liu, J. *Understanding the Characteristics of Internet Short Video Sharing: YouTube as a Case Study.*, 2007.
- [25] Nakashima, E. YouTube Ordered To Release User Data The Washington Post Washington, DC 2008
- [26] Patton, M. Q. *Qualitative Research and Evaluation Methods.* . Sage Publications Inc., Thousand Oaks, 2002.
- [27] Corbin, J. and Strauss , A. C. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. Sage Publications, Inc, Thousand Oaks, CA, 2007.
- [28] Watts, D. *Small worlds: the dynamics of networks between order and randomness*. Princeton University Press, Princeton, NJ, 1999.
- [29] Watts, D. J. and Strogatz, S. H. Collective dynamics of 'small-world' networks. *Nature*, 393(4 June 1998), 440-442.
- [30] Nonnecke, B. and Preece, J. Why lurkers lurk. In *Proceedings of the Americas Conference on Information Systems* (Boston, 2001).
- [31] Jones, Q. and Rafaeli, S. *User population and user contributions to virtual publics: a systems model*. New York, NY, 1999.
- [32] Maloney-Krichmar, D. and Preece, J. A multilevel analysis of sociability, usability, and community dynamics in an online health community. *ACM Trans. Comput.-Hum. Interact.*, 12, 2 (2005), 201-232.