

Online and Offline Interactions in Online Communities

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ABSTRACT

Online communities, while primarily enacted through technology-mediated environments, can also include offline meetings between members, promoting interactivity and community building. This study explores the offline interactions of online community members and its subsequent impact on online participation. We argue that offline interactions have a counterintuitive impact on online participation. Although these offline interactions strengthen relationships, these relationships undermine the community's sustainability in terms of site participation. Participation has been defined as contribution of content to the online community. A multi-method analysis technique using content analysis, qualitative interviews, and server level quantitative data of users in Everything2.com supports our claim.

Categories and Subject Descriptors

K.4.3 [Computers and Society]: Organizational Impacts – *Computer-Supported Collaborative Work*

General Terms

Human Factors.

Keywords

Online Communities, Offline Interaction, Everything2, Online Contribution.

1. INTRODUCTION

Many groups that usually conduct their activities in a distributed fashion occasionally encourage their members to meet offline as well. For example, Wikimania is an annual meeting, held since 2005, of contributors to the Wikimedia Foundation's wiki projects. Local Wikimania-type events occur frequently, allowing Wikipedians in different cities and countries to meet and discuss their online technology-mediated collaborations. Several other groups that also conduct their businesses online hold semi-regular face-to-face meetings; eBay conducts the annual eBay Live! event to promote networking among its vendors. Similarly, World of Warcraft guilds hold regular offline events for their members to meet and socialize, and Open Source software developers commonly meet in a collocated

fashion at events like OScon, held annually by O'Reilly publishers. Rheingold [21] described how members of the WELL would meet through BBS communications, and some would seek each other out in person as well. Research communities, hobby enthusiasts, and members of shared work disciplines have often found advantages of regularly scheduled collocated events. Through conferences and conventions, shared interest communities overcome geographical dispersion.

While some online communities exist primarily to help people meet offline, as in the case of dating sites or social introduction sites like Meet-ups, others are more focused on peer production of shared content. Many wikis and other large-scale user-generated content sites fall into this latter category. These online communities may benefit from face-to-face meetings to fulfill a variety of needs and motivations for both the users and the site. Meeting face-to-face could lead to more trust between users, as they learn more about each other or create relationships that in turn increase user dedication to the site where those relationships are usually engaged. It could be that meeting offline offers a rich context of cues about other users that facilitates interactions online.

This paper examines the complex interplay between online and offline interactions for a group whose major form of interaction is through the construction of a wiki-like online community. Using interviews, analysis of server logs, and content analysis of articles about meetings, the present research shows how users of a wiki-like user-generated content site, Everything2.com, interacted around these offline gatherings, and how users behaved on the website after meeting offline.

2. LITERATURE REVIEW

Several studies have looked at why members of online communities are motivated to meet offline, and what the consequences of those meetings are for the online community. Research on Cybercity, an online community that relies on offline gatherings, demonstrated the usefulness of anonymity to begin relationships. However, subsequent offline interactions helped to connect people and facilitate interaction [3]. Parks and Floyd [17] argued that interaction online naturally led to subsequent forms of communication outside of the site, including email, phone, and mail. Sessions [23] described offline gatherings as an important element for users of the online discussion community, Metafilter. In each case, researchers pointed to a sense of community with others in the online environment, leading to a desire for a more in-depth interaction offline.

Forms of community participation are dynamic. Analysis of the online writing community, Everything2 (<http://everything2.com>), concluded that individuals'

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participation differs among users who began using the site guided by specific motivations, typically seeking information or entertainment, but were enticed to stay for completely different reasons, social interaction being the most common [8]. At the same time, the users who describe this online experience is only a small percentage of the total number of site users. For example, Wikipedia reported, in 2005, that less than 2% of the community members were contributing more than 72% of the articles [16]. These studies represent an enormous number of people who may feel online communities provide useful information, but many individuals are unwilling or unable to make contributions.

Where Wikipedia has a broad and objective focus for their information, Communities of Practice provide a more targeted approach to their membership. While the Community of Practice framework [9, 13] has often been used to describe user development within online communities [1], the interactions on these sites may lead social learning regarding the topics or practice of the online community. For example, users of a bodybuilder website reported online interaction as a significant factor in their continued physical development [18].

In other general online communities, the amount of feedback that individuals received from others, in the form of encouragement or even simple recognition, influences the extent to which an individual is willing to continue contribution [2]. As users become more embedded in the community, it reduces their likelihood of freeloading off other members [12]. As individuals continue to seek interaction with, and motivation from others in the community, it is likely that challenges present in computer-mediated communication can begin to cause strain because the ability to provide this feedback diminishes.

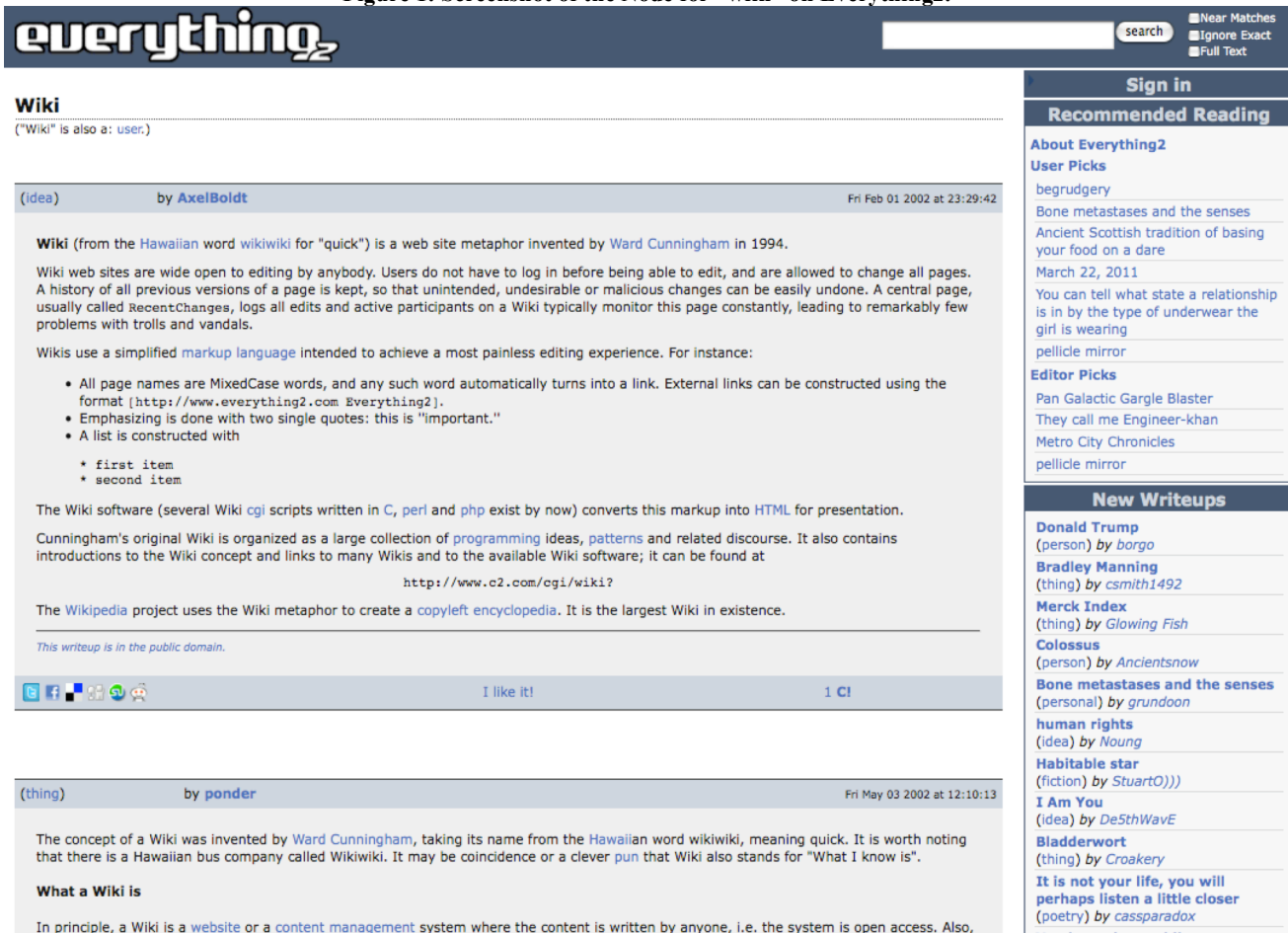
One reason users of online systems might want to meet offline is to facilitate their future collaboration by increasing what they know about other users. Olson and Olson [14] compared groups that had persistent, close face-to-face collaborations against those who operated through distant collaboration, and found that the more complicated the shared activity was, the more need there was for the richer channels of face-to-face interaction. In other words, collocation provided a rush of signals that gave collaborators clearer shared understanding that allowed them to tackle more complex collaborative tasks. Based on the work of Clark and Brennan [4], they argue that these multiple channels (sight, sound, proxemics, culture, etc.) are helpful because they create “common ground” that increases trust and facilitates working towards common goals.

In an attempt to understand the role mediation plays in cooperative work, direct comparisons have been made between mediated and non-mediated groups. For example, when distributed and collocated groups were compared in a laboratory setting, quality was found to be similar, but groups relying on computer-mediated communication took significantly longer to complete tasks [25]. Walther suggests that where channels are often constrained and users have less opportunity to perceive multiple types of cues about their collaborators, more time is needed for relationship development [26-28]. Cramton [5]

suggested that people working at a distance lack a shared perspective or sense of context, like trying to repair a car while only seeing the wheel. In other words, it is difficult to develop effective working relationships with others when information flow is limited to computer-mediated interaction. Others found that people felt closer to participants who were distant when they were partnered with someone who was collocated [29]. Donath [6] argues that people in online interactions are constantly assessing “signals” from other users to create an impression of each other. She describes some signals as conventional or easy to fake and therefore not highly trustable, and some as assessment, which are harder to fake and consequently more useful for assessing others. As an example, saying one is a female (when actually this is not true) is easy to fake, but having the physical characteristics of a female is harder to fake. In this framework, face-to-face meetings provide a wash of assessment signals that increase our ability to form impressions of others. Although Walther [27] argues these cues can be built over time digitally, occasional face-to-face meetings likely provide a strong boost to the collection of cues. Consequently, one reason for augmenting collaboration occurring primarily online with face-to-face interaction is to provide multiple identity signals that help facilitate future interactions.

Offline gatherings may also provide online community members with an opportunity to extend the process of socialization that they have adopted in their online sites. Oldenburg [13] described three places in which we spend our time. He referred to a home as a first place, where people feel most comfortable but hold significant power over those who visit. Workspace is considered a second place, where people might feel comfortable, but often face behavioral and occupational expectations. Third places refer to social settings where people meet others and discuss topics in neutral settings free of hierarchy often imposed by external identities. Oldenburg describes English pubs, Japanese tea gardens and German Biergartens as examples of third places. Putnam [19] argues that third places, like bowling leagues and service organizations, are in decline, which has an effect on civil society. Steinkueler and Williams [24] offered a response to the perception that third places (social settings) were in decline by describing the virtual worlds created in online games as matching requirements laid out by Oldenburg, making them a new form of “third place” that allows people to receive the benefits of the social interactions described by Oldenburg. Computer-mediated communication may remove signals that confer status and stigma connected to visual cues or traditional roles [20, 28]. In some cases, removing these cues may be favorable, like when individuals are less comfortable in social situations. However, limiting these cues also limits the amount of information that can be transferred. Therefore, eventually it becomes difficult to maintain these relationships solely in online space because the limited channel requires more time to transfer the same amount of information [26]. This discrepancy could lead to a desire to develop relationships in offline space where cues can be transferred more efficiently.

Figure 1: Screenshot of the Node for “wiki” on Everything2.



Offline meetings could also help socialize new members of an online community. Lave and Wenger [9] describe the process by which new members of a Community of Practice move from the periphery to the core of the group, and in that process learn group norms, pick up shared repertoire, and incorporate boundary objects (which could be articles, as an example) into their practice. Bryant et al. [1] previously used this perspective to show how Wikipedia editors became full-fledged Wikipedians. It could be that offline meetings help to facilitate the socialization of those users in adopting those hallmarks of central participation by allowing them to see physical cues attached to conversation about site norms, and consequently be able to more readily sort out which norms matter most.

Although offline gatherings may be an important element for online communities, little research has evaluated the effects of attendance on participation. One study found offline interaction to be an important variable, when combined with ease of use and usefulness, in predicting online community success as measured by an online survey of online community members in Taiwan [10]. Another study evaluated the use of offline gatherings from the online community Metafilter [23]. Results from this study found that offline gatherings had a positive effect on close ties with those in attendance, but created sub-groups within the community that had a negative effect on the individuals not in attendance. In other words, gathering offline created a stronger sense of connection with those that met face-to-face, but

distanced people from those in the community who only met using computer-mediated communication.

Relational connections may be important for the continued health of an online community that focuses on peer production. Stronger relationships between site members may provide additional common ground and trust that facilitates future contribution to the activity of the site. It could also be that a stronger connection between users increases the longevity of those users as members of the site. Given that collaboration on complicated work tasks has been shown to be facilitated by the existence of multiple channels of information about others present in the offline environment, these physical gatherings help reduce the cost of users learning about each other to gain that benefit. To further assess these possibilities, we studied an online community oriented toward peer production, Everything2, and investigate the motivations of users to attend such a meeting, and the subsequent effects on the behavior of those users when their interactions return to the site.

2.1 Everything2 and Nodermeets

Everything2 is an online peer production community started in 1999 as an offshoot of the popular news and discussion site, Slashdot. Originally described as an open source encyclopedia, Everything2 shifted focus since its inception to include more personal journaling and creative writing. While not based on a Wiki platform, the Everything2 system is built on technologies that share many similar core elements as Wikis, such as

collaborative content creation, direct user communication, and a focus on internal links to other content in the system.

Contributions to the site are made in the form of topic entries, referred to as Nodes. Content within these Nodes can range from well-researched, factual information, to creative writing, or to diary-style narrative. Because Nodes are central to the development of the site, users refer to themselves as “Noders.” A Node is comprised of several Write-ups, which are articles contributed by individual authors on the site. Unlike most Wiki systems, Everything2 Write-ups are not collaboratively created, but the Node is collaboratively constructed through iterative Write-ups. Also, unlike most Wiki systems, Everything2 Noders maintain authorship for their contributions.

Through tools embedded in Everything2, users can send asynchronous messages to each other, participate in synchronous online chat, and vote on the quality of other users’ contributions. There are two types of user-provided ratings on Everything2. “Votes” are thumbs up/thumbs down evaluations of a Write-up. “Cools” are tags that users can apply to either a Write-up or a Node. Some members use the community communication tools provided by the site to organize offline gatherings.

Everything2 is valuable to study in this context for several reasons. First, the longevity of Everything2 has created a vast, heterogeneous user base. Second, there were several events over the history of the site that incorporated offline meetings of users. Third, researchers were granted access to server-level data, permitting analysis of user behavior resulting from Nodermeets.

In the Everything2 community, Noders often set up offline meetings. These meetings, referred to as Nodermeets, typically occur over a weekend and are independently organized by individual users. The user hosting the event makes an announcement through the site by creating a Node inviting other users and covering logistical details. While some meetings are meticulously planned, including detailed activities like a scavenger hunt, paint ball, and local festival trips, other meetings are house parties with few rules or expectations. Typically, a Nodermeet is announced in the public areas of the site, and all users of the site are welcome to attend.

The Everything2 community maintains a record of all Nodermeets that have been announced on the site. This record lists offline meetings that took place between 2000 and the present, usually providing a link to the article that acts as a public invitation to the gathering. Over the past decade there have been 259 gatherings, a number proudly displayed at the top of the Node. The annual Nodermeet counts ranged from a high of 46 in 2002 to a low of 4 in 2010, with an average of about 26 each year.

While Nodermeets have occurred all over the world, most of them have been clustered in 5 or 6 geographic areas, including London, New York, and Boston. Smaller clusters have included California’s Bay Area, Portland, Oregon, and the Midwest. Nodermeets have also been held in places like Australia, Norway, and Germany. Some Nodermeets were annually recurring events, though most were one-time only occasions.

2.2 Data Collection

Since online communities are complex, it is helpful to approach these organizations from multiple perspectives [22]. We used three methods to collect data about Everything2 Nodermeets. First, people who used the site during its peak between 2001 and 2005 were contacted and interviewed. Next, two of the most

well attended Nodermeets were identified and selected based on the number of attendees and access to attendance records. Server log data from the time of the events were extracted for each user. Finally, content provided in the aftermath Nodes was analyzed for qualitative themes. By utilizing these three methods, it was possible to discuss perceptions, track actual behavior, and analyze the community’s public record of the event.

2.2.1 Telephone Interviews

We interviewed 30 users who were active on the site between 2000 and 2005. Participants in these interviews were selected because of their record of heavy participation in the site. We used a referral system, or chain sampling, to contact additional participants, as many of the people active during this time period had stopped using the site, and were difficult to contact.

Because chain sampling is highly susceptible to homophily problems [7], subject selection was augmented by cross-referencing suggested user names with various user data collected at the server level to attempt to find a diverse set of participants within this subset of users. Once a list of potential subjects was developed, each individual was given a screening questionnaire. Participants were interviewed by phone, and a digital audio recording was made of each interview.

Interviews were conducted over approximately one hour and were semi-structured, focusing on contribution practices, interaction with users both online and offline, and perceptions of the community itself. Digital recordings were later transcribed for further analysis. These transcripts were examined through the use of iterative, objective, and systematic analyses [15]. Using qualitative analysis software, Atlas.ti, relevant codes and sub-codes were created and assigned, connecting common themes arising through the interviews. Utilizing these codes, data were reduced by reading through pertinent quotations in each transcript [11]. Thematic patterns were identified using data related to users’ experiences at offline gatherings, including, but not limited to, Nodermeets. Finally, quotations representing emergent themes given by users were identified. All user names reported in the Results section are pseudonyms of the user names of site members.

2.2.2 Server Logs

Server log data were collected from two distinct time spans in order to provide an empirical understanding of usage patterns in relation to Nodermeet participation. Each time span corresponded with a separate Nodermeet, chosen from a list maintained by the Everything2 community. Specific Nodermeets were selected based on the large number of site users who attended the meeting. Although each Nodermeet has an identifying name, for the purpose of analysis we refer to the two events selected as Nodermeet1 and Nodermeet2 in order to preserve the confidentiality of participants. Server log data were collected for each username on the attendance list. Server-level data included total number of Write-ups, Messages, Votes, and Cools. Data sets included 64 registered members from Nodermeet1 and 78 registered members from Nodermeet2. Data were collected from the date each Nodermeet invitation Node was first created. Nodermeet1 was announced 97 days prior to the gathering while Nodermeet2 was announced 43 days before the meeting began.

As described above, the primary contribution of authors on Everything2 is a Write-up, or an article they’ve created on a discrete topic. Write-ups provide the primary form of

contribution to the site, and are the contribution that can be read by non-registered users of Everything2 (as opposed to Messages). The total number of user Write-ups, as collected from server logs, after the two sampled Nodermeets were used to measure the impact of offline interaction on Everything2 contribution. In order to mitigate the effect of time on the production of Write-ups, the number of Write-ups both two weeks and six weeks after the event were also tested. Write-ups require significant user effort to contribute, and analysis of typical time frames of Write-up creation times indicated that a two - week lag would help mitigate delays in effects from the time required in writing contributions.

To isolate the effects of Nodermeets on those in attendance, contribution patterns of attendees were compared to similar users who had attended the meetings. Server logs were used to select individuals with similar aggregated distributions of Write-ups, Messages, Votes and Cools to those who had attended each Nodermeet. Using this method, samples of 80 non-attendees for Nodermeet1 and 97 users for Nodermeet2 were drawn and their participation was matched with those users who did attend. This process allowed for comparisons of usage patterns (in terms of Write-ups) between Nodermeet attendees and a similar set of non-attendees.

2.2.3 Content Analysis

A third method, content analysis, was utilized to provide further context based upon content contributed to the site sharing stories of offline experiences. It is common practice in the Everything2

community for Nodermeet attendees to contribute Write-ups recounting their experiences at the event. These Write-ups are referred to as “Aftermath Nodes.” In providing multiple accounts of the event, Everything2 members offered multiple perspectives on activities that transpired. Most Nodes were posted on the page originally announcing the event, though for some Nodermeets specific and separate Aftermath Nodes were created.

A standardized protocol was created to guide qualitative analysis of all Nodes posted after both Nodermeets. The protocol was designed to aid coders in identifying the presence of four specific themes: Commitment, Emotional Attachment, Community Expectations or Requests, and Giving to the Community. The protocol was developed through an iterative process of independent content coding of Write-ups by two researchers, comparison of coding between researchers, and protocol adjustment until satisfactory agreement was achieved. Two researchers then applied the protocol to Write-ups of Aftermath Nodes independently, identifying themes defined in the protocol, thus maintaining internal validity of the study.

Commitment was operationally defined as actions or promises given by the host of the offline gathering and the individual Noder attending the Nodermeet, such as offering a ride from the airport or bringing beer. We also recorded commitments offered before the meet (intentions), commitment during the meet (actions) and commitment after the meet (future behavior/individual intention to perform an action). Emotional attachment was defined as specific comments in reference to an individual’s affect toward the site. This code was further classified into emotional attachments towards specific Noders, or those in attendance, and emotional attachment to the Everything2 community. Attachment towards individuals was recorded by the manner in which they were recalled by the individual Noder, measured by counting the number of usernames mentioned in each Node. We defined Community Expectations or Requests as requests made to the community members; mainly by or to the host of the Nodermeet before and during the actual offline gathering. For example, the host asked people to bring specific items to the party. Giving to the Community was defined as specific instances of an individual providing something, like bringing food or drinks, providing a ride, or contributing content to the site, either to Nodermeet attendees or the community in general.

3. RESULTS

3.1 Interviews

Results from interviews allowed responses to be grouped into four categories. Specifically, these categories refer to how participants believe Nodermeets affected their subsequent contribution behavior to the site, their relationships with other users, their general usage patterns of the site, and their sense of belonging to the online community.

3.1.1 Contributing New Write-ups

Users perceive that attending Nodermeets affected their contributing behavior in two ways. Some users considered that Nodermeets affected the amount of Write-ups they contributed to the site after the event. Other users described a more significant change in the quality, rather than the quantity, of their posts.

Some users suggested that after attending a Nodermeet, they tended to post more Write-ups. According to these users, an increase in the amount of Write-ups was due in part to the

	Variable	Explanation
I.V.	Write-ups before	The count of Write-ups submitted between the Nodermeet invitation first posted in the forum and the first day of the Nodermeet.
	Messages before	The count of messages sent between the date the Nodermeet invitation was posted and the first day of the Nodermeet.
	Votes before	The count of votes submitted between the date the Nodermeet invitation was posted and the first day of the Nodermeet.
	Cools before	The count of cools submitted between the date the Nodermeet invitation was posted and the first day of the Nodermeet.
	Attended Nodermeet	It is a dichotomous variable to differentiate between individuals in our sample who had attended a meet coded as 1 and those who had not coded as 0.
D.V.	<i>Write-ups after</i>	Total number of Write-ups submitted by members in 2 and 6 week time slices, accordingly presented as wuafter2, and wuafter6.

Table 1: Independent and dependent variables in Write-up production associated with Nodermeet attendance.

quality of the interaction they had with other users during the Nodermeet. The encouragement that they received from others during the gathering made them gain more confidence in their writing abilities, while at the same time they started feeling that others cared about what they wrote: *"...I remember there was one particular user who was very encouraging, I was very...being self-deprecating, but she said 'what you were doing was great so please continue doing it'"* (Jim).

Additionally, other respondents expressed that they posted more Write-ups after the Nodermeets because they felt they had established more personal connections with other users, so now they could share "stuff" they would not share otherwise. One Noder, Kim, described the effect of Nodermeets on her contribution, commenting: *"Meeting people, starting to understand what they're like..."*. She added: *"It takes me a while to feel comfortable, so by meeting people on the site and getting to know them separately, um, I was more willing to speak for myself when I wrote to um, to share things that I wouldn't normally have shared"*. In this sense, some users reported that, after the Nodermeets, they could share and write about more intimate topics because they felt closer to their readers. Therefore, Nodermeets helped users broaden their audience, and at the same time allowed them to establish closer ties. These feelings of closeness and the confidence that someone appreciated their work motivated some users to contribute more.

Some users felt that Nodermeets led them to write higher-quality content for the site. After meeting other users in person and establishing stronger ties with them, some users wanted to provide their friends and the online community with the best possible content. *"...As I started to get to know people I wanted to make sure that the quality of the stuff I was contributing was really, really good because these were my friends now and I didn't want to write something bad in their database that we were all trying hard to create together."* (Rachel).

3.1.2 Relationship Building

For some users, the perception of a closer relationship becomes an incentive to post more Write-ups, for others the value of Nodermeets resides in the relationships developed from attending. Nodermeets offered the opportunity to meet new people or the chance of finally meeting in person the authors of Write-ups they had read. As explained by Patrick: *"I would actually meet the people there and these people would become some of my closest lifelong friends. So if I wasn't messaging people about their writing as an editor, I was messaging them to catch up or ask questions or hey I know you're an expert on subject X, can you answer a question about Y?"*

While some see the interpersonal relationships developed on the site as a way of getting to know their audience and broadening it, others see a way of developing new friendships. Tim, a participant who valued the connection and closeness allowed by the Nodermeets in relation to the friendships that would result from it, demonstrates this consequence when he stated: *"I think once you started to develop actual relationships with people they kind of transcended the site a little bit. You wouldn't get the same out of interacting with someone in that limited format once you had exposure to them in person."* In this sense, Nodermeets potentially devalue the site for some users to the point of making it almost unnecessary. Specifically, as individuals form relationships through multiple channels in contexts outside of the site, those who were motivated to contribute for purely social reasons possibly begin to view the site as an irrelevant communication format.

Users that exhibited greater interest in forging new interpersonal relationships also perceived changes in site usage patterns. Some stated they started sending more private messages to keep up with people they had met at the gathering. Rachel, when asked about how her participation in Nodermeets might have affected her behavior on the site, replied, *"I definitely saw a significant increase in the amount of time I spent um keeping up with people who I've met in person by private messages."* (Rachel).

3.1.3 Community Belonging

Besides developing individual social relationships on the site, some participants perceived another consequence of attending Nodermeets was an increase in their sense of belonging to the community. They stated that, despite heterogeneity among Nodermeet attendees, there was a shared sense of belonging; a sense of shared purpose or identity. *"It was one gathering where you do not know lot of people but you know something is very common"* (Jack). Another user added: *"It was really amazing how much like mindedness there was because even if we had different interests we had a common way of talking about those interests."* (Zoe).

These findings suggest people perceive the effects of their participation in Nodermeets through the lens of their overall motivation to participate on the site. Some perceive that Nodermeets motivated them to contribute to the community, either by posting more Write-ups or by spending more time crafting higher quality contributions. For others, Nodermeets have a different meaning; face-to-face interaction aided the development of social relationships that were largely expressed on the site. For these users, offline gatherings represent the opportunity to build interpersonal relationships that might develop beyond the online community. Behind this difference might reside an important distinction regarding the motivations users have of participating on these types of sites.

Part of the interview asked users their initial and ongoing motivations for using Everything2 in the first place. There was a connection for users who expressed social motivations, i.e. make friends or find new people to talk to, to their attendance and positive impressions of Nodermeets. In other words, it could be that only users who adopt a site for social reasons are engaged in these offline meetings.

3.2 Behavioral Data

Olson and Olson [14] argue that face-to-face meetings can improve collaboration by allowing more shared understanding because we have access to multiple channels of information about others. Given that this access to many signals could facilitate the process of building common ground that helps collaborative processes, we might expect to see the number of submissions of those users who had attended a Nodermeet to increase after the event. We used behavioral data, compiled from the databases of user activity stored by the site servers, to compare the pre and post behavior of Nodermeet attendees. Consequently, we might expect to see that subsequent Write-ups increase after a Nodermeet.

Ordinary Least Square (OLS) regressions were used to compare the predicted values of attendees' Write-up contributions after attending the two Nodermeets described above. We include a variable for "Attended Nodermeet" to be able to compare differences between those users who were present at the two Nodermeets described, and another set of users that are matched based on Table 1 describes the variables used to assess participation changes associated with Nodermeet attendance.

Because some users considered for the test attended both Nodermeets, a Durbin-Watson (DW) test for autocorrelation was conducted between *Write-Ups before* and *Write-ups after* to ensure internal validity. The DW test returned a value of 1.12 for Nodermeet1 and 1.16 for Nodermeet2.

3.2.1 Write-up Submissions After 2 and 6 Weeks

After two weeks, server data showed no significant difference between attendees and non-attendees ($p < .05$). As expected, *Write-ups before* was the highest predictor of *Write-ups after* in both the models. In other words, the amount of contribution prior to the Nodermeet, regardless of attendance, was the strongest predictor of Write-up contribution two weeks after the gathering. Other measures of site activity before the Nodermeet, (Messages, Votes, and Cools) were not significantly related to the post-Nodermeet production of Write-ups in either model.

Six weeks following the Nodermeet changes in Write-up production were more pronounced. Six weeks after Nodermeet1 attendees have posted 2.79 fewer Write-ups than non-attendees, controlling for all other variables ($p < .05$). Results for Nodermeet2 were similar with a difference of 4.32 Write-ups ($p < .05$). In other words, users that did not participate in the Nodermeet posted 4.32 more Write-ups than users that

participated in the Nodermeet.

There are two findings here that require attention. First, the data suggest a difference in Write-up production before and after Nodermeets between attendees and non-attendees. The second finding is that users who attended a Nodermeet actually contributed fewer Write-ups than a matched sample of similar users who did not attend. This result contradicts what might be expected from the literature on the role of face-to-face meetings for collaborative processes.

3.2.2 Write-Up Differences

The primary finding resulting from the regression is a significant difference in contribution between those who attended Nodermeets and those who did not. This finding suggests that users who attend Nodermeets have different characteristics from those who do not attend. These differences support conclusions drawn from previous work about changes in user motivations [8].

It should also be noted that differences only appear after a protracted period. After two weeks, there is no significant change in contribution patterns. After six weeks, however, the difference becomes clear.

3.2.3 Decrease in Contribution

The second finding is counterintuitive to previous findings. Instead of Nodermeets working to increase participation and contribution, data analysis suggest attendance is related to a decrease in write-up contributions. The counterintuitive nature of this finding suggests not only different motivations for users, but a change in their motivations as new variables are introduced into the community.

As individuals begin interacting on the site, they are limited to computer mediation in developed relationships. Subsequent site interaction might seem limited to many users. Therefore, as people move into offline space, the flood of cues creates new variables that significantly alter online relationships.

3.3 Content Analysis

As described above, Nodermeets are often associated with user-generated descriptions of the events labeled as “Aftermath Nodes.” Analysis of Aftermath Nodes posted following the two Nodermeets selected for this study provided an in-depth perspective on how these events are recalled and shared with others in the community. Throughout these narratives, two distinct themes emerge. First, Aftermath Nodes revealed a sense of emotional connection with individual Noders that superseded connection to the community in general. Second, Nodermeets represented an opportunity to show commitment both to the site and its individual participants.

3.3.1 Structure of Aftermath Nodes

In general, Aftermath Nodes followed a relatively formulaic structure. Each Node would begin with a generic statement about how special the community is and how much the writer appreciates attending, followed by a statement extolling the experience. For example, one Noder posted, “*The gathering was nothing short of amazing.*” Nodes then tend to transition into a narrative format, often beginning by recounting the journey to the meet. Some Nodes seemed to read like a work of prose while others provided a list of events and the roles played by other Noders. Recollection of each Nodermeet seemed to center on a shared activity, like a scavenger hunt. Although each Noder would present numerous individual experiences, the primary

Nodermeet1	Two weeks after meeting		Six weeks after meeting	
	Coefficient	p-value	Coefficient	p-value
Constant	0.977	0.059	2.505	0.026
Attended Nodermeet	-0.875	0.135	-2.786	0.029
WU before	0.054	0.005	0.325	0.001
Messages before	0.001	0.265	0.003	0.175
Votes before	0.001	0.022	0.001	0.453
Cools before	-0.005	-0.015	0.006	0.553
	$R^2=0.19$	df=147	$R^2=0.43$	df=147

Nodermeet2	Two weeks after meeting		Six weeks after meeting	
	Coefficient	p-value	Coefficient	p-value
Constant	3.456	0.006	3.851	0.016
Attended Nodermeet	-2.556	0.149	-4.328	0.049
WU before	0.234	0.001	1.031	0.001
Messages before	-0.001	0.0972	-0.001	0.980
Votes before	-0.001	0.634	0.001	0.989
Cools before	-0.015	0.811	0.055	0.474
	$R^2=0.42$	df=175	$R^2=0.87$	df=175

Table 2: Ordinary least squares regression predicting attendees’ Write-ups after 2 and 6 weeks from Nodermeet1 and Nodermeet2 (D.V.=WU after). Nodermeet attendants are the reference group.

event becomes the centerpiece around which each narrative is crafted; often appearing as the high-point of the gathering.

Aftermath Nodes tended to conclude with an expression of sadness in having to say goodbye. One user ended their Node commenting, *"I can still feel some of your arms around me, and if it was up to me, I would never have to let go."* These final expressions often provided recognition of the significant emotional connections made throughout the process of these gatherings.

3.3.2 Reflection on Personal Connection

A common theme in Aftermath nodes was the sentiment that those users who attended the Nodermeet felt a stronger sense of emotional connection to attendees than they did to the site in general. Emotional comments made in each node were separated into two categories: Emotional connection to the site, and emotional connection to individual Noders. Most of the comments posted in Aftermath Nodes fell into the second category, showing a propensity to identify with individuals more than with the site in general. For instance, one Noder, referring to her experiences in the offline gathering said, "E2 is people," offering a perspective that the community is not a singular entity, but a collection of many unique individuals. Another Noder said *"I met some incredible people. I have some rather vivid memories of the weekend. They include smiles, hugs, tears, snuggling, reassurance, searching and freedom."* A third added, *"I know I will never forget the gathering but it isn't because of the drinking or the fireworks. It is the people."* These messages posted by the attendees at the meeting showed attachment exhibited towards other members in the offline gathering. Moreover, in each Node, it seemed common practice to name each Noder in attendance, which could be seen as a type of social grooming to help reify the personal connections made at the gathering. These small reflections on what the writer remembers about others, and the expressions of appreciation for the experience, could help solidify emotional bonds made during the Nodermeet by inviting the names people to remember their own experience.

Nodermeets were also used as a tool to guide and develop impressions of their fellow contributors, by confirming or disconfirming impressions formed from interacting online. In the text-only environment provided by Everything2, Noders formed impressions of other users through content in their posts, interactions in synchronous and asynchronous messaging on the site, or through observing their interactions with others. Write-ups often contain personal information, so it is possible that users were forming strong impressions based on that content. Offline gatherings were useful in confirming or disconfirming those impressions made through the site. One Noder wrote, *"[He] was neither old nor bony, not at all the old lecher I had pictured, but rather solid. I was not able to pass my hand through his torso as with ghosts."* Another Noder, recalling the sense of security felt next to someone else in attendance, contributed, *"I continually grabbed [his] hand and when I went from one place to another in the club. I wanted to be viewed as taken. If anyone there hit on me, as they did [the other Noder], I would have been very intimidated."* A third user posted, *"Prior to this meet, I hadn't met that many Noders in person, and it was nice to up that count. As I came across person after person I was meeting in person for the first time, I realized something. I already knew most of you."* Knowledge of others was likely one reason individuals felt a sense of commitment to the site, and to those they met.

3.3.3 Commitment to Community

The content of Aftermath Nodes also showed high levels of commitment to both the overall online community, and the Nodermeet itself. For example, one post suggested, *"after much going over the bank account and budget and much crying after finding every time that I just didn't have the money for the plane fare, I've decided I'm just going to have to borrow the money. There's no way around it, it just has to be done."* This sense of commitment to attending the event seemed to not solely reside in those who were central to the production of the online community. *"I know I haven't made much of an appearance on E2, nor have I done any Write-ups that have lasted, but I've made my plans and I'm on my way."* In both cases, the sense of committing to participate came loaded with a connection to a greater community even at great expense.

Noders also attempted to show commitment by engaging in reciprocal exchanges with each other before and during the event. The invitation Node became a central hub for coordinating carpools and rides from the airport. Hosts often asked for small gifts from attendees, like shot glasses or other tokens. Users often used the invitation node to coordinate cooking for the large group and shared activities during the meeting. These acts were often mentioned in the Aftermath Nodes, where attendees would frequently mention someone who had provided them a favor, or compliment the participants who brought food to, or made food at, the event. Again, this can be seen as a type of social grooming, but the Aftermath Node creates a very public place to do this. Given that all members of Everything2 could view the Aftermath Node, whether they attended the meeting or not, this type of grooming behavior could be performative. In other words, the specific mention of reciprocal exchanges could be subconsciously intended to show what good people Noders are, and create the impression that the people who use Everything2 are people one should be committed to.

While these types of posts may have the unintended consequence of showing community norms, the content of the Aftermath Nodes shows similarity to the interviews in that attendees were consciously more focused on the individual personal relationships they had formed or strengthened at the Nodermeet.

4. DISCUSSION

There's a seeming disconnect between the qualitative results, where Nodermeet attendees claimed to feel increased commitment to each other and the site, and the behavioral data which shows a decrease in the main activity of the site, writing content. There are many possible explanations for this finding, which we can't differentiate with our data. It could be that Nodermeet attendees are writing fewer pieces of content of higher quality to impress their new friends. It could be that users who attended Nodermeets were socially motivated to use the site in the first place, and forming relationships moved their site activity from writing to messaging with other users. We explore some of the possible interactions between site activity and Nodermeet participation below.

There are several possible interpretations for the decrease in contribution following attendance at a Nodermeet. The first explanation revolves around the creation of sub-groups and a disconnection from the broader community. The second explanation assumes personalization changes the perceptions with which an individual approaches a community.

Many Nodermeet respondents mentioned that they formed a closer attachment to other users through the event, and that they anticipated that affecting their writing. As a result of these closer connections or more specific identifications, individuals returning from offline gatherings disengaged from subsequent community activity. They identified more with specific individuals than with a larger social group.

A number of interview respondents expressed initial concern about meeting people in offline contexts. This fear, however, was assuaged by a sense that other community members were familiar based on content of contributions made to the site. Textual interaction has been shown as an effective tool for trust formation in experimental settings [27], when that interaction is persistent. On Everything2, members were forming impressions based on cues from writing and social messages, which could lead to more trust of the people about whom the impressions are formed.

By creating a sense of trust, individuals were more open to the prospect of meeting community members in offline contexts. Online community members used open and public Nodes to announce these parties, risking divulging personal information like addresses and phone numbers. During the meets, site content was an original catalyst for conversation and interaction, but for many users eventually faded into the background as interpersonal relationships were developed based on other shared identities beyond the scope of Everything2.

Nodermeets offered sub-groups from the site an opportunity to reinforce and strengthen extant relationships. Some sub-groups were also created at the Nodermeets, as Aftermath nodes would also use inside jokes, or vague references to events, to establish an in-group barrier. Sessions [23] highlighted this issue in her research, showing the creation of sub-groups based upon offline interaction. Future research should compare the role of offline gatherings in relationship formation to their role in the reification of extant ties. Offline gatherings may allow people to deepen relationships with only a specific group of people, to the detriment of the connection felt to the overall community.

Instead of creating strong sub-groups within the community, it is also possible that gathering attendees developed a stronger bond with other individuals than to the site in general. As individuals interacted solely online, the individuals with whom they were developing relationships were recognized only through a textual interface. In this way, users may have had a stronger sense of creating a community focused on content. By interacting offline, online textual contributions carried with them nuances and context specific to the relationship [4]. By developing this interpersonal relationship, individuals may have changed their perspective of the site, replacing community identity with individual relationships through an individuation process. In other words, the site became more personal, users might have started to identify with specific individuals rather than with the community.

In most Aftermath Nodes, users would begin with a generic statement about how much they enjoyed and identified with the Everything2 community. As the Node developed into a narrative of gathering activities, the focus would change to identify specific Noders with whom the writer had connected. The final statement would often be another generic statement, but focused more specifically on the emotional ties created with those in attendance. This suggests that Nodermeet attendees had higher satisfaction with the specific members of the community, increasing the salience of Everything2 membership, but had

alternative methods of keeping in touch with interpersonal contacts (such as private messages or other communicative channels outside the site) reducing the need or desire to contribute content to the Everything2 community in general.

Another possible explanation for this finding is that is that users who established more social relationships during the Nodermeet changed their behavior to emphasize social activity, rather than writing contribution, when they returned to the site. Many interview respondents felt a clear sense of connection with the community prior to the meet. Attending the gathering, however, offered people new information with which to approach others on the site, changing fundamental behavior patterns. In measuring only contributions, other forms of participation were neglected, like logins or time spent on the site, which may have been unchanged following Nodermeets. Some subjects reported a perceived increase in the amount of personal messages they received from others. Although our quantitative data did not show a strong overall increase in messages, it could be the content of messages changed to be more social.

There are some interesting implications from these results when considering other the activities of other peer-production online communities, like Wikipedia. What are the effects of participation in Wikimaina? While sites that foster offline meetings between users may meet the needs of social motivated users, they may also undermine site goals related to content creation. It could be that the unstructured, unsponsored nature of Everything2 Nodermeets had an effect, which would indicate sites should maintain an active role in offline gatherings.

As mentioned above, there was a connection between motivations to initially joining the site for social interaction, and the Nodermeet activities of users. Previous work [8] has shown that contributors to user-generated content sites have multiple motivations for participation. On Everything2, some users wanted to share information, some wanted to be entertained, and some wanted to socialize. Before meeting others, contribution of Write-ups was a signal of group membership, but once other channels had been employed to create common ground, that necessary condition for socializing had been removed.

There are several possible explanations for this disconnect that the data don't address. For example, the fewer Write-ups could be of higher quality in order to impress new friends. People who had a negative experience at the Nodermeet would likely not have submitted an Aftermath node to be analyzed, or been available for an interview. These unknowns are associated with the limitations of the study. Although we tried to mitigate limitations by using multiple methods, we are still dependent on a small sample of very active users to report their activities. In addition, for our quantitative analysis we were only able to examine two Nodermeets, so it could be that smaller offline meetings had very different effects.

Although a significant drop in content production seems like an initially bad outcome for the site, it's impossible to be sure that the Nodermeets didn't end up having a positive effect on Everything2 overall. For example, many of the Nodermeet attendees who reduced their Write-up contributions may have taken on more serious governance and administration roles that are also essential to the health of the overall site. Even if the meetings are bad for the production of content on the site, many Nodermeet attendees reported finding long-term friends and sometimes mates at the events, which could be considered as an even more positive outcome of the site than the content on it.

5. CONCLUSIONS

The present research provides two conclusions and offers questions for further investigation. First, interactions enabled by the technical features of Everything2 enabled users to trust each other well enough to engage in face-to-face meetings. The process of sharing the collaborative process of writing, and using embedded communication tools for social information exchange, enabled users to build common ground and interact offline. Second, the effects of that interaction were to increase expressions of social bonds between users, but seemed to decrease the amount of Write-up contribution. We interpret this to mean that motivation for participation is a key factor in how and when users interact with one another, and that users come to wiki-like contribution sites with heterogeneous motivations that may affect their later use.

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7. REFERENCES

- [1] Bryant, S., Forte, A. and Bruckman, A. Becoming Wikipedian: Transformation of participation in a collaborative online encyclopedia ACM-GROUP, Sanibel, FL, 2005.
- [2] Burke, M., Marlow, C. and Lento, T. Feed me: Motivating newcomer contribution in social network sites. CHI. 945-954.
- [3] Carter, D. Living in virtual communities: An ethnography of human relationships in cyberspace. *Information, Communication & Society*, 8 (2). 148-167.
- [4] Clark, H.H. and Brennan, S.E. Grounding in communication. in Resnick, L.B., Levine, J.M. and Teasley, S.D. eds. *Perspectives on Social Shared Cognition*, American Psychological Association, Washington, DC, 1991.
- [5] Cramton, C.D. The mutual knowledge problem and its consequences for dispersed collaboration. *Organization Science*, 12 (3). 346-371.
- [6] Donath, J. Signals in social supernets. *Journal of Computer-Mediated Communication*, 13 (1). article 12.
- [7] Heckathorn, D. Respondent-driven sampling: a new approach to the study of hidden populations. *Social problems*, 44 (2). 174-199.
- [8] Lampe, C., Wash, R., Velasquez, A. and Ozkaya, E. Motivations to participate in online communities. *Proceedings from the conference on Computer Human Interaction*. 1927-1936.
- [9] Lave, J. and Wenger, E. *Situated Learning: Legitimate Peripheral Participation*. Cambridge University Press, New York, 1993.
- [10] Lin, H. The role of online and offline features in sustaining virtual communities: An empirical study. *Internet Research*, 17 (2). 119-138.
- [11] Lindlof, T.R. and Taylor, B.C. *Qualitative Communication Research Methods*.
- [12] Matzat, U. Reducing problems of sociability in online communities: Integrating online communication with offline interaction. *American Behavioral Scientist*, 53 (8). 1170-1193.
- [13] Oldenburg, R. *The Great Good Place: Cafes, Coffee Shops, Community Centers, Beauty Parlors, General Stores, Bars, Hangouts, and How They Get You Through the Day*.
- [14] Olson, G.M. and Olson, J.S. Distance matters. *Human-Computer Interaction*, 15 (2&3). 138-179.
- [15] Onwuegbuzie, A. and Leech, N. A call for qualitative power analyses. *Quality and Quantity*, 41 (1). 105-121.
- [16] Panciera, K., Priedhorsky, R., Erickson, T. and Terveen, L. Lurking? Cyclopaths? A quantitative lifecycle analysis of user behavior in a geowiki. CHI. 1917-1926.
- [17] Parks, M.R. and Floyd, K. Making friends in cyberspace. *Journal of Communication*, 46. 80-97.
- [18] Ploderer, B., Howard, S. and Thomas, P. Being online, living offline: The influence of social ties over the appropriation of social network sites. CSCW '08.
- [19] Putnam, R.D. *Bowling Alone*.
- [20] Rains, S.A. Leveling the organizational playing field - Virtually: A meta-analysis of experimental research assessing the impact of group support system use on member influence behaviors. *Communication Research*, 32. 193-234.
- [21] Rheingold, H. *The Virtual Community: Homesteading on the Electronic Frontier*.
- [22] Sade-Beck, L. Internet ethnography: Online and offline. *International Journal of Qualitative Methods*, 3 (2). 45-51.
- [23] Sessions, L.F. How offline gatherings affect online communities: When virtual community members "meetup". *Information, Communication & Society*, 13 (3). 375-395.
- [24] Steinkuehler, C.A. and Williams, D. Where everybody knows your (screen) name: Online games as "Third Places". *Journal of Computer-Mediated Communication*, 11 (4). 885-909.
- [25] Straus, S.G. and McGrath, J.E. Does the medium matter? The interaction of task type and technology on group performance and member reactions. *Journal of Applied Psychology*, 79. 87-97.
- [26] Walther, J.B. Computer-mediated communication: Impersonal, interpersonal and hyperpersonal interaction. *Communication Research*, 23 (1). 3-43.
- [27] Walther, J.B. Interpersonal effects in computer-mediated interaction: A relational perspective. *Communication Research*, 19. 52-90.
- [28] Walther, J.B. Language and communication technology. *Journal of Language and Social Psychology*, 23 (4). 384-396.
- [29] Walther, J.B. and Bazarova, N.N. Misattribution in Virtual Groups: The Effects of Member Distribution on Self-Serving Bias and Partner Blame. *Human Communication Research*, 33. 1-26.