The Impact of Social Types within Information Communities: Findings from Technical Newsgroups

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Abstract

We explored whether Fisher and Durrance's [11] framework of information communities applies to online technical newsgroups and the impact of particular social types on information flow within digital economy. Data collection methods included content analysis of discussion threads from six technical newsgroups over an eighteen month period, along with focus groups, participant observation and interviews with key informants, and analysis of quantitative data obtained from Microsoft Research's Netscan project. Findings support and expand the information communities framework. Four social types were identified: (1) members, (2) mentors, (3) managers and (4) moguls. Newsgroups facilitated social and information exchanges among individuals from diverse backgrounds, cultures, and geographic locations as they posted and replied to messages publicly available for viewing. The interaction of the social types within the communities thus fostered information flow as people solicited, disseminated and exchanged information on varied topics.

1. Introduction

Imagine navigating an unfamiliar technical environment or a powerful new software package with many features that you cannot tap into. You have a problem and you are searching for somebody—anybody— to help you solve it. You're not quite sure what the problem is, but you know how the problem is being manifested. You post a message to Usenet and someone whom you've never met is there to help.

People navigate unfamiliar online environments each day on various topics looking for help and looking to help others. The above scenario occurs daily in online technical communities or newsgroups—Usenet discussion forums for publicly exchanging threaded messages. Lee, Vogel and Limayem [24] define an online community as, "a technology-supported cyberspace, centered upon communication and interaction of participants, resulting in a relationship being built up." While "community" has been defined in many different ways [8, 19, 20, 27, 28], the study of online communities—and specifically the flow of information within them are relatively new.

Broadly encompassing newsgroups, forums, conferences, and bulletin boards, [33] online communities occur "when users are given tools to use their voice in a public and immediate way, forming intimate relationships over time" such that users associate themselves with those communities [32]. While participants commonly refer to one another by name even though they have never met in-person, they assist each another in varied ways, most particularly through sharing information. Notwithstanding early literature that focused more on technical aspects of online communities, recent work is addressing myriad social aspects that are emerging where information is free-flowing and for the most part free of censorship [3, 4, 23, 38, 40]. For the digital economy and hi tech companies in particular, the fostering of online communities is a vital way of creating and sustaining a strong customer base; delivering products and services in ways that can alleviate barriers of time, distance and cost; obtaining customer feedback for product modifications and new product design; saving personnel cost by having customers provide help to each other via support groups; keeping in touch with customers in a high tech and high (and low) touch way; and promoting company and brand loyalty.

The purpose of our study was to examine the role of information, i.e., how its need is expressed, how it is sought and shared in technical newsgroups and to learn whether these informal, technical support-based, peer-to-peer newsgroups are consistent with Fisher and Durrance's [11] framework of information communities from the field of information science. According to Fisher, et al,

Author	Roles
Brush, Wang, Turner & Smith (2005)	Key contributor, Love volume replier, Questioner, Reader, Disengaged observer
Golder (2003)	Newbie, Celebrity, Elder, Lurker, Flamer, Troll, Ranter
Kim (2000)	Visitors, Novices, Regulars, Leaders, Elders
Turner, Smith, Fisher & Welser (2005)	Answer person, Questioner, Troll, Spammer, Binary poster, Flame warrior, Conversationalist
Waters & Gasson (2005)	Initiator, Contributor, Facilitator, Knowledge-elicitor, Vicarious-acknowledger, Complicator, Closer, Passive-learner

Table 1: Social Roles suggested by various authors.

information communities form primarily around people's needs to get and use information. The framework arose from their study of how people use online community networks for situations of everyday life.

In its tightest sense, an information community is a "constituenc[y] united by a common interest in building and increasing/ access to a set of dynamic, linked, and varying information resources" [12, p. 299]. Information communities may differ in their primary subject of information focus (e.g., healthcare, automotive repair, music, etc.) and they are not bound by geography. As Fisher, et al. explain, information communities comprise five characteristics. They are:

(1) Anticipate and form around people's needs to get and use information;
(2) Effectively exploit the information sharing qualities of available technology and yield multiplier effects for stakeholders;
(3) Transcend barriers to information-sharing;
(4) Connect people and foster social connectedness; and,
(5) Emphasize collaboration among diverse information providers

We will study these characteristics as it relates to the use, social structure and motivation of communities of practice where people with similar interests and needs exchange information about technology.

2. Related Work

Behavior in Usenet has been studied since the days of The Well [18, 34], online since 1985. Researchers and users alike have wondered how a group of strangers find their way to a common place where community eventually evolves. Constant, Sproull and Kiesler [6] found that strangers (i.e. weak ties [17] were willing to share

information to technical questions online although they did not know the person they were helping and that information seekers thought the advice was useful.

We were further interested in discerning whether particular social types [26] exist within information communities and how these roles affect information flow. According to Fisher, et. al. [12], two crucial roles are present in any information community: information users and information providers. We anticipated that our focus on social types might build on earlier work conducted by Berger and Luckman [1], Davis and Schmidt [7], Goffman [15], Klapp [22], Lofland and Lofland [26], and Nardi and O'Day [30]. Golder [16], for example, reported such social roles as newbie, celebrity, elder, lurker, flamer, troll, and ranter. Kim [21] hypothesized differences between eight official and unofficial roles in online communities based on anecdotal evidence, and suggested that for online or offline community to be successful and thrive it must have the right mix of people. Her five sequential stages of community participation were: visitors, novices, regulars, leaders and elders. Roles have also been studied in the virtual learning environment. Using asynchronous learning situations, Waters and Gasson [40] studied the progression of student roles, including initiator, contributor, facilitator, knowledge-elicitor, vicarious-acknowledger, complicator, closer and passive-learner in asynchronous learning situations. Although these roles were explored for the purpose of a graduate course, they can be generalized to other online environments.

Rather than using content to assign social roles, Turner, Smith, Fisher and Welser [39] provide descriptions to seven types of authors in Usenet based on their visual and quantitative patterns of posting behavior. They first used a treemap visualization technique to classify newsgroup hierarchies; next they used "newsgroup crowds" visualization to classify different types of newsgroups and finally "author lines" visualization as well as social network diagrams to classify author roles. These roles were answer person, questioner, troll, spammer, binary poster, flame warrior and conversationalist. Brush, Wang, Turner and Smith [2] used a different approach by assigning social roles to contributors in Usenet based on participants' self-report on a survey that was then tested and verified with their behavioral metrics in Microsoft Research's Netscan. They classified 127 participants into five role types: key contributors (26%), low volume repliers (43%), questioner (2%), reader (28%) and disengaged observer (2%).

Both in the case of Turner et al [39] and Brush et al [2] their study subjects were customers and employees of the product and the technology newsgroups in which they participated. The majority of customers primarily participate in technical newsgroups to have problems solved. This model of peer-to-peer support, although not monetarily quantified, potentially saves a company

millions of dollars in support costs. In addition, customers are able to gain quick, archived solutions that other real users have tried. In ideal situations key community leaders are integrated into the product development cycle by serving as beta testers or advisors. Franz and Wolkinger [13] found that in their research lead users (i.e. "super users" who are very active and have special rights) are ahead of others in their needs and concerns. They claim that a leader's strong needs now are evidence of what will be needed in the future for general users. Therefore their presence in online communities can help developers by introducing new features, bugs and usability issues.

This paper builds on previous research in four ways. First, we use a novel framework to explore an online community from an information science perspective within the broader context of the digital economy. Second we employ triangulated qualitative [10] and quantitative methods to study an online community from the perspectives of varied stakeholders. Third, we offer detailed descriptions of social types that exist in technical newsgroups, wh

ere an extrinsic reinforcement [38] model exists. Fourth, we introduce a general model of the flow of information and authority in online technical communities.

3. Methodology

Given the information communities' framework and our interest in online technical newsgroups, in particular, the following primary research questions guided our study:

1. Do technical newsgroups exhibit characteristics of information communities?
2. Do particular social types exist within technical newsgroups?
3. What are the roles of these social types regarding information flow?

Data were collected April 2003 – October 2004 using triangulated qualitative and quantitative methods, including: online participant observation, online focus groups, and in-person interviews with key informants. Additionally, we performed content analysis of newsgroup postings, and analyzed social accounting meta-data from Microsoft Research's, Netscan project. Each method is described in-depth as follows.

3.1. Participant observation

We spent more than 300 hours over sixteen months observing and participating in six clusters of technical newsgroups ranging from 15–30 newsgroups each. Newsgroup topics were SQL, SDK, Webservices, ASP, Visual C++ and Visual Basic. These newsgroups were chosen based upon the following criteria:

1. A Community Manager was assigned to superintend the group and to serve the leaders in the community. Newsgroup participants could contact this person if they had a problem or suggestion.
2. Microsoft Research's Netscan project contained social accounting metadata which showed significant activity in the newsgroups at the time of study.
3. The representative type of thread in the newsgroup was question-answer, indicating that a form of technical support was taking place in these online public spaces.

One researcher spent 30 minutes each morning (excluding holidays, weekends, and vacation) in the busiest newsgroups of each cluster reading threads that occurred since the next morning analyzing the content of messages, any social cues that alluded to a person's status in the community and text that signaled that the author of the message was involved in a social interaction (i.e. a response to "Is anyone else out there experiencing a problem with…" or "I asked <person's name> with help on…"). She also participated in private newsgroup sessions and email exchanges where she answered questions for leaders and invited them to online and offline community events.

The same researcher also sat in a cubicle arrangement with the Community Program Managers of the selected newsgroup clusters to observe their interactions in the public and private newsgroups as well as any other forms of communication they had with the leaders and influencers of their assigned newsgroups. She asked specific questions of the Community Managers when she saw particular interactions and received recommendations on which leaders to email for participation in the online chat-based focus groups.

In the observations of technical newsgroups we primarily saw instances of problem-solving (i.e. question-asking, question-answering, clarification of both questions and answers), bug reports (trying to get the message to developers) discussions (on and off topic), announcements (spam, useful information, bragging) and miscellaneous posts (i.e. showing gratitude, trolls, etc). Somewhat to our surprise we also observed appeals for consultants (some were requested by name) who were skilled in an area to help small companies in exchange for payment. This gave us insight into how Usenet participants were receiving financial incentives just for being part of these communities, providing evidence that everyone in technical support newsgroups is not there for the sake of altruism. We further probed on this fact during focus groups with key community leaders.
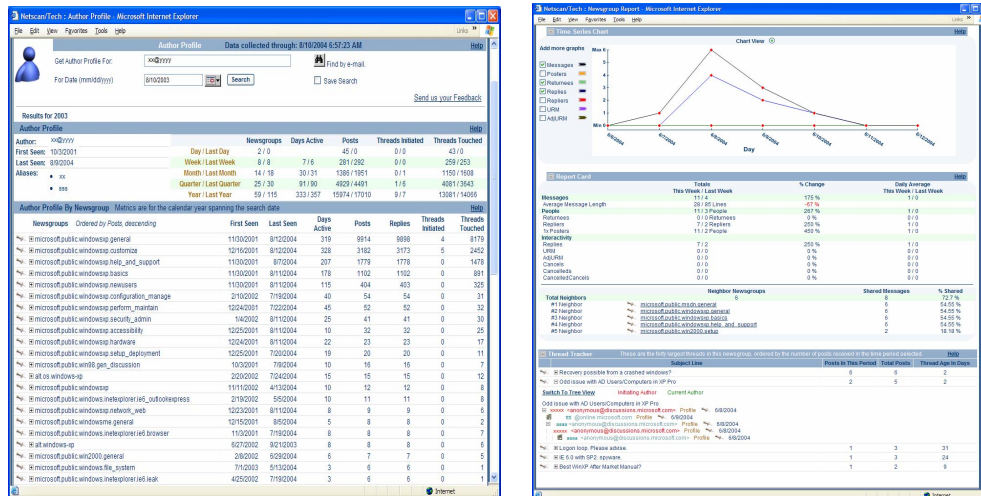
Figure 1: Author Profile (left) allows users to select an author and receive summary and detailed information about the author's activity in Usenet. The Newsgroups Report Card (right) shows activity in a newsgroup for a selected time period.

3.2. Social accounting metadata

We used Netscan [36], a tool designed and developed at Microsoft Research that quantitatively computes and collects social accounting metadata on authors, newsgroups and threads. With Netscan (Figure 1) we viewed data about community leaders (using the Author Profile via Author Tracker, which lists the top 40 posters computed by days active and number of replies to determine what type of information is shared by top contributors), the newsgroups they participated in (using the Newsgroup Report Card) and the threads they contributed to (using the Thread Tracker). All of the social accounting metadata used in this paper is publicly available at http://netscan.research.microsoft.com.

Netscan helped us focus our efforts by choosing different types of newsgroups. We chose a couple that were very active and had lots of postings, newsgroups that had high percentages of replies (low unreplied to message ratio) and some less active but more socially tight-nit newsgroups. For calendar year 2004, Netscan tracked 189,144 newsgroups (25% growth over 2003), 257,442,374 messages (7% growth over 2003), 172,340,394 threads (16% growth over 2003), 85,101,980 replies (9% decline from 2003) and 9,208,370 unique authors (5.2% growth from 2003). From a methodological perspective we found that Netscan was useful for understanding the general pulse of the particular newsgroups in which we were interested.

We also used Netscan to verify the self-reported information that community leaders gave us regarding how long they had been active in newsgroups (first seen date), when they first started to reply (as opposed to asking questions), and how often they post. In addition we were

able to look up message identification numbers to search for content they contributed in different newsgroups helping us to understand what types of posts they contribute to.

3.3. Focus groups and interviews

We conducted two online chat- and phone-based focus groups at times that were convenient for participants in different time zones. Six community managers were asked to recommend two or three highest volume community leaders, i.e., community leaders who post the most number of days per month (see Figure 2 for an example). A "call for participation" was emailed to these nominees as well as those in the private newsgroups with whom we communicated often and who fit the criteria for this phase of the study. Participants received a $20 gift certificate to Amazon.com.

Community leaders shared how they felt about technical online peer-to-peer newsgroups. They talked about first experiences with technical newsgroups, the types of duties personally performed as they sought to build community, and their observations on dynamics and accountability in the newsgroups.

The focus groups comprised an online chat in a chat room designated specifically for data collection of this study and a recorded conference call that participants were able to dial into toll-free. This two-step approach enabled participants to expound and to clarify statements based on what another participant may have typed or said during the chat.

To gain a deeper understanding of the communication exchanges in the high volume Microsoft public
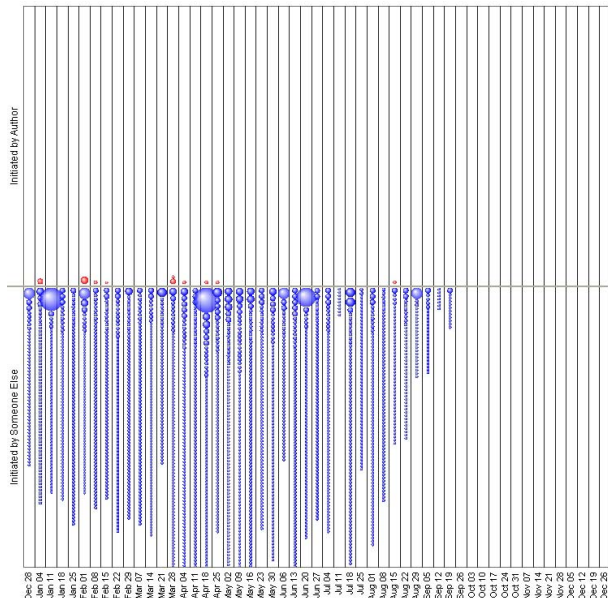
Figure 2: Example of the posting pattern of a community leader. Red "bubble" in top half of double histogram show messages initiated by author while blue "bubbles" in lower half show messages replied to by the author, indicating that this person answers a lot of questions. Size of the bubbles correlates to number of messages per thread. Selecting a bubble exposes the conversation thread. See Turner, et al 2005 [39].

newsgroups, we interviewed individuals who were established, long-term leaders in their communities. These key informant developers used Usenet newsgroups for many years and tended to post in the same places for a long period of time. They were further characterized by being recognized and knowing others in the newsgroups as well as having social ties to the group.

3.4. Trustworthiness

The notion of "trustworthiness" is used by Lincoln and Guba [25] and also Effrat [9] to refer to the quality or rigor of qualitative research and recommend several techniques for ensuring it. In this study we ensured credibility (similar to internal validity) through prolonged engagement, persistent observation, triangulation of sources, methods and investigators, peer debriefing, negative case analysis, referential adequacy checks and member checking. Transferability or external validity, was achieved by providing "thick description" in our methodology notes and writings. Dependability (comparable to reliability) was ensured by examining the data for factors of instability and factors of phenomenal and design induced change. Confirmability (or objectivity) was enacted by tracing data to their sources and as researchers asking ourselves whether our findings

"made sense" based on the sources and findings reported by cognate studies.

To analyze the data, as initial observations and interviews were completed, we iteratively developed a coding scheme using Strauss' [37] technique for analyzing the data. Tests of inter-coder reliability were conducted with two independent coders, who coded the raw data for incidents that reflected the themes in the codebook (i.e. activities and roles). They were instructed to assign as many codes as necessary to accurately represent each segment of the transcripts. The coders were also instructed to indicate their degree of certainty (based on a three-point scale) for each decision. To calculate reliability scores, we used a formula recommended by Miles and Huberman [29, p. 64] in which the number of coding agreements is divided by the total number of agreements plus the number of disagreement. Final agreement rates reached 100.0%.

4. Findings

After data collection was complete and all the transcripts had been analyzed, we grouped evidence for each of the five characteristics of information communities as well as interactions that showed information exchanges. We used AuthorLine profiles (as shown in Figure 2) [39] to follow information exchanges and threads in which selected authors had participated. The transcripts and observations also exposed some social types that we discuss further in this section.

4.1. Newsgroups as Information Communities

Our analysis revealed strong support that online technical newsgroups function primarily as information communities. Using the five characteristics of information communities described by Fisher and Durance [11, 12], we share our preliminary findings as follows.

(1) Information communities anticipate and form around people's needs to get and use information. The founding purpose of technical newsgroups mirrors this first characteristic of information communities: they were formed as venues for people with similar interests to share problems and solutions as well as news and developments in the field. Beyond instructing each other in how to use resources, participants reveal selectivity in sharing information sources such that their information-giving is tailored to the needs of the requesters. As one participant explained, "I was really impressed to see a bunch of people—who had no financial incentive—participate and give up their time to help others. I wanted to be a part of it." A different participant member was amazed that he could "send questions and get answers quickly." These users had positive experiences after they finally decided to post questions after silently observing how other people behaved in the newsgroups.

(2) Information communities effectively exploit the information sharing qualities of available technology and yield multiplier effects for stakeholders. By virtue of their professional skill set, newsgroup members were savvy users of technology, which they exploited for sharing information in several ways, including posting queries and responses in the newsgroup space, sending files to one another, hosting websites, writing FAQs (responses to frequently asked questions), providing recommender services to other resources, providing introductions to experts outside the group, etc. Benefits accrued at the individual member's level as well as his/her employer. In addition to technical expertise, members received helped with clarifying problems, emotional support, employment leads (consulting and long-term), and information about topics unrelated to the newsgroup. Members also enhanced their reputation—both within and outside—the newsgroups. One interviewee, calling himself a "wizard" in a specialized technology, said he encountered a thread with three prior posts that referred the initial poster to him, which, he added, "got [him] a consulting gig and seminars." Members and their respective organizations also reported saving considerable time and money due to newsgroup access. In short, the newsgroups provided information, social benefits, and visibility for the participants that went beyond their members' local networks.

(3) Information communities transcend barriers to information-sharing. The primary barrier to information sharing among technologists is access. The newsgroups alleviated this barrier in several ways. Collectively, the participants in the six newsgroups were from 42 countries, including the U.S., Japan, Germany, Italy, Spain, UK, Korea, France, and China. However, despite cultural boundaries, the newsgroups enabled participants to share information about more than 60 products or technologies. Ordinarily in an organization or even in other face-to-face interactions, individuals with similar titles or job responsibilities would interact with one another. However, because information in technical newsgroups is free-flowing, IT executives and managers of one company are able to ask question or share best practices with a staff person who works in the IT department of another company without disclosing proprietary information or even disclosing the company for which they are employed. The many consultants within technical newsgroups ask for help with setting the price of a service or getting a project finished for a client. This type of synergy is more difficult to accomplish when people are face-to-face and are more prone to embarrassment.

(4) Information communities connect people and foster social connectedness. How newsgroups fostered social relations were evident in many ways. Relationships were formed and strengthened, for example, when peers worked together, especially on solving a problem plaguing one of
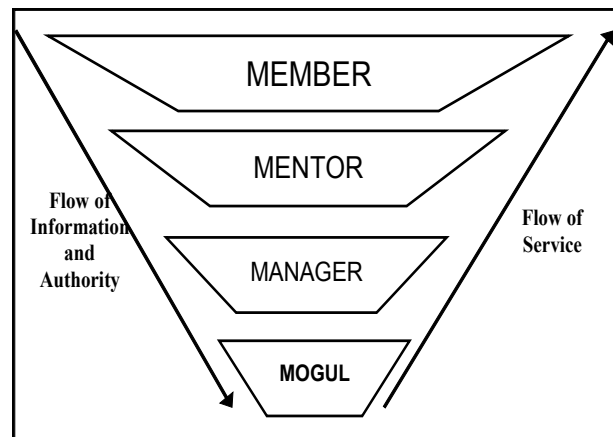

Figure 3: Flow of Authority and Information in Technical Newsgroups

the members. Such concentrated problem-solving moved quickly to private email or private newsgroups in a courteous effort to keep off-topic posts out of the public newsgroup spaces and resulted in closer ties among those involved. But the act of meeting someone in-person was considered particularly exciting, as one participant explained recounting his own emotions over his first face-to-face encounter with someone he knew well online. One newsgroup discussed a couple who married after meeting face-to-face. All of the informants in our study had at least one offline encounter with someone they met in a technical newsgroup. Some described their pre-existing impressions of people and said their offline encounters usually confirmed the former. As one participant explained, "You know what sorts people are based on their responses. You tend to make up some impression of them, which helps especially when you meet in-person. That's when you solidify your opinion of them."

(5) Information communities emphasize collaboration among diverse information providers. The newsgroups in our study were undoubtedly richer for encouraging participation from developers worldwide and from different corporate backgrounds with different motivations. This diversity created a broader range of expertise and experience for members to draw upon. For example, while some members posted a query as a point of first level escalation (i.e., before calling to pay for support) for their company, others were there simply because they code for fun and other members did not program at all. The congregating of people with diverse backgrounds and interests yielded a richness to the information sources that might not otherwise have existed.

4.2. Social Types in Technical Newsgroups

According to Klapp [22, p.674] "between knowing a person's formal status only and knowing him intimately,

there is a kind of knowledge that 'fills in'" to give a more complete picture of the individual. In this sense, Lofland and Lofland [26, p.106] explain that social types are "constructs that fall, conceptually, somewhere between an individual, idiosyncratic behavior on the one side and formal or informal role behavior on the other side." Bearing in mind that a member's role may change over time and across settings, our analysis of the six newsgroup clusters revealed four distinct social types that play significant roles in the flow of information: members, mentors, managers, and moguls.

A *member* is any one who participates in a newsgroup information community, either actively or passively, by "showing up" in the past twelve months to post at least one message. There are two types of members: posters, who have sent queries and comments on a regular basis (at least monthly), and lurkers, who tend to observe or read others' postings and seldom respond to or create their own threads. Although lurkers [31] do not contribute content or information to the newsgroups they read, they are a vital part of the community since they are the consumers of the content. Lurkers are purported to make up 80-90% of an online community's participants [31, 38]. Membership is the first or entry stage to joining a newsgroup information community. People engaged at this level may or may not yet understand the benefits of the community's collective action. Members often participate when they are in need of information and not necessarily because they have information to share. Members, as with other social types, are also faced with the dilemma of deciphering the roles of content contributors within the community often with no clear indicators of the role of the author of a message. Because members are not very active in community-building activities, they may not be able to identify the major information providers. Even if they understand which social types distribute most information, they may not be savvy in knowing which sources they should trust.

If a member hopes to be recognized as a leader [13] in the newsgroup information community, he/she must distribute information of noticeable quality over a period of time. One type of leader is the *mentor*, a highly active participant who holds influence with the community at-large and can advocate a topic/solution or help another member. Contributions by mentors are noticed by those managing the newsgroups and they are awarded for consistently answering questions and providing useful information to people in the community, (notably, only half of focus group participants were aware of the awards or knew how to identify someone had received one). Simultaneously, mentors operate as informants or direct links to managers (a third social type), escalating issues that managers need to be made aware of while asking for (and sometimes demanding) changes to the community. Mentors emerge as leaders within their communities; depended on for problem-solving, discussions, help and support. They comprise the core group and serve as liaisons between members and managers. Moreover, they constantly add to the dynamics of community because have larger spheres of influence than any of other actor: many mentors host their own websites, write FAQs, white papers and books. While mentors may appear overly altruistic, always giving away information with little in return, they do aim to enhance their subject expertise and social standing. They enjoy answering challenging questions and nurture newcomers. In the focus group, one mentor said he answers simple questions posed by newbies because "they seem to be largely ignored by a collection of people." He gives other members 24 hours to respond to the newbie's question before formally welcoming the newbie and answering the person's question as a means of "straightening them out."

Although the newsgroups we observed were established for peer-to-peer interactions, there is a need for roles dedicated to the administrative duties of community *managers*. Managers are responsible for facilitating the governing of community, by enforcing rules or evoking social norms—when they perceive that they are called upon to do so. They serve their communities by holding everyone responsible for particular rules of conduct, which may make them unpopular at times with a few individuals. Managers desire not to be seen as policing the community, but as facilitating the community instead. As explained by Hafner [18, p.104], managers are viewed as hosts, helping to guide, shape, and monitor discussion. The primary distinction between mentors and managers is that managers do more "behind the scenes" work. They are the official, paid community leaders who are responsible for bringing together the right mix of people, at the right time to the right place for the purpose of building community. They sometimes have to take on roles that they would rather not, like having to police the community, asking people to abide by a code of conduct, deleting spam, redirecting traffic (posts that do not belong in a newsgroup), rewarding good behavior and monitoring deviant behavior. They balance all of these sometimes conflicting duties while maintaining relationships with many of the other social types. In this sense, they may be able to mitigate anything that might negatively affect the community's health and may seize opportunities that may even help it thrive. Managers facilitate information flow for everyone primarily between mentors and moguls and to foster working relationships with them in order to put a human face on the product or technology that the mogul develops. At their best, managers enable and encourage participants to share resources, knowledge and information.

Like managers, *moguls* are designated gurus that may have to be engaged, especially when a problem escalates that no one else can solve. They are internal to the organization and are privy to the inner workings of the

technology that is being discussed in the newsgroups. Highly esteemed, technical experts they tend not to enter threads until the discussion has been filtered through the mentors and managers. In this sense, the mogul takes on the tough situations or questions and may add insights that other social types could not provide. Moguls answer the very complex questions that sometimes deal with the inner-workings of a product or technology. They write code snippets, send private email to newsgroup users, engage in newsgroups exchanges, engage and coach authors who wish to write books on the technology, host online chats, moderate webcasts, and many other activities. Moguls mostly participate where they will receive maximum return on the investment of their time. They provide content to content providers. Mentors highly value their relationships with moguls: knowing that the mogul's time is pressed, mentors carefully and reverently craft their questions. The manager, in many cases, makes the mentor-mogul relationship possible by inviting both types to engage with one another, and by providing the forum.

Figure 3 shows a delineation of order among the four social types regarding information flow, authority, and service. While any one of the four social types could potentially interact with another, information typically flows from members to mentors (i.e., questions are posted in a newsgroup); from mentor to manager (i.e., if the answer to the question requires some type of internal information to which the mentor is not privy); and from manager to mogul (i.e., if there is a need to understand the internal workings of a product or if a bug or feature needs verification).

With respect to information flow of answers, for moguls and managers time is a major reason for not responding to posted questions. Moguls are very busy developing software that is being discussed in the newsgroups while managers are overseeing operations in and surrounding the newsgroups for which they are responsible. What about mentors? In our research, some mentors said they would not enter a discussion unless it was challenging in a technical respect. Others respond to clarity, as the following participant explained, "I definitely prefer the questions where the title is clear or they give you a sentence that explains the problem. I tend not to go into detail unless I know the person or unless there has been a discussion in which I was already participating… but if they're already long drawn, I tend to ignore them. Unless it happens to be in an area which I know very well."

The roles of member, mentor, manager and mogul are all highly subjective and may call into question proper or improper behavior–especially when rules have not been formally established or circulated in the community. Social norms are sometimes established by punishing those who commit deviant acts and by rewarding those who do good deeds. Moreover, such restrictions and sanctions are sometimes the bases or impetus for establishing new rules. Members and mentors tend to pass along the code of conduct through constant interactions and orient new participants, who must observe current behavior and govern themselves accordingly.

5. Conclusions and Implications

People helping people they do not know through peer-to-peer support with no clear financial incentive is a hallmark of Usenet newsgroups where far more than the provision of technical support is occurring. Developers and information technology professionals have organized themselves in such a way that there is a definite social order in effect. From the question-posing members, to the nurturing mentors, to the rule enforcing managers, to the content expert moguls, most everyone's contribution is valued as it relates to the functioning of the online information community. There were numerous examples of how participants became associated with a particular technical newsgroup. While the majority of developers began their newsgroup usage through the course of information seeking, along that line they began engaging at a deeper level and helping others. As Burnett [3, p.539] says, "it is through the flow of information taking place via these messages that the small worlds of virtual communities come into existence and are sustained in the online environment."

For the digital economy and such hi tech firms as Microsoft, online communities hold strong importance in several ways. For example, while suggestions and bug reports from the community are valued by product development teams, it is the pool of key contributors [13], like the mentors in this study, who provide consistent, reliable feedback whether solicited or not.

In our interviews and focus groups we learned that mentors, themselves, feel like an invaluable extension of the company's development process. They said it was their responsibility to be early adopters of the company's new technology as well as to give feedback before that technology released to the general public [35].

We further observed that mentors, who were rewarded for their contributions in newsgroups, want to be further involved in the development process and are thus key contributors in the product feedback cycle (i.e. bug reports, break/fix, etc.). We therefore recommend that professionals who wish to leverage the power of community in their own business practices consider ways of incorporating mentors' feedback, suggestions and content into the company-sponsored technical support database. When mentors feel their contributions are welcomed and utilized, they tend to seed more contributions into the community.

Although all suggestions and bug reports that the community gives are valued by product development teams, it is useful to have a pool of key contributors [13], like mentors who give consistent, reliable feedback whether solicited or not.

In our interviews and focus groups with mentors they told us they felt like an invaluable extension of the company's development process. They felt it was their responsibility to be early adopters of new technology the company developed as well as give feedback before having that technology released to the general public.

It has been our observation that mentors who have been rewarded for their contributions in newsgroups and want to be further involved in the process are key contributors in the product feedback cycle (i.e. bug reports, break/fix, etc.). It is our recommendation that practitioners who are thinking of leveraging the power of community in their own business practices thing about how to incorporate mentors' feedback, suggestions and content into the company-sponsored technical support database. When mentors feel their contributions are welcomed and utilized they tend to seed more contributions into the community.

While our data show strong support that technical newsgroups exhibit characteristics of information communities and that social types affect the types and quality of interactions that take place therein, several areas were revealed for future. Beyond exploring the notion of information communities and the role of social types in other online settings, research is needed on the types of information seeking activities in which participants engage before posting their questions on newsgroups. Several of our informants stated they consulted peers, looked through books, and searched the web and through various knowledge bases before posting a question in the newsgroups. The effects of source reputation and seeker anonymity also warrant further investigation as does the effects of tie multiplicity on information exchange. Our study suggests that some users feel a stronger sense of community and therefore a deeper commitment to share, use and generate information than others. What are the factors that primarily cause feelings of community and hence promote information exchange? How can these factors, such as social interaction both on- and off-line, be promoted? Moreover, what factors prompt a participant to respond (or not respond) to a question? And, what factors affect an information seeker's likelihood of accepting a posted response as accurate? Wilson's [41] work on cognitive authority might assist in this line of investigation. He proposes that particular types of authority influence one's thoughts regarding what one would consciously recognize as proper, i.e., people who are known for producing high quality work hold cognitive authority in that area.

During our exploration of social types in information communities several sociological theories came to mind that might shed further light in the phenomenon and thus warrant further consideration. Durkiem [8], for instance, discusses social norms and deviance in society, which is of particular interest since all of the social types that emerged from our data engaged in some form of disciplining or governing of community. This is an indicator that something occurred to offend or violate some set of rules. Are codes of conduct a direct response to the actions that are viewed as deviant by certain social types? How do people respond and adjust when there are social or structural changes introduced and how does this affect information flow? Elfreda Chatman's information science theories of life in the round and of normative behavior [5] would also be relevant to understanding information flow and social conventions in such online settings.

Lastly, human values appeared prevalent in some of the newsgroup information communities. Those values included: trust, intellectual property, safety, autonomy, accountability, privacy, anonymity, and a sense of community. Future research could apply Friedman's [14] Value-Sensitive Design to information communities to assess the four social types: member, mentor, manager, mogul. Which values are most important in sustaining communities where information flows freely? What happens if specific values are violated or if certain social types do not feel their values have been considered in the structure or organization of technical communities? For information system designers and others, answer to such questions can assist in the creation of more useful and efficient systems.

6. References

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