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WHY LURKERS LURK

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Abstract

The goal of this paper is to address the question: ‘why do lurkers lurk?’ Lurkers reportedly make up the majority of members in online groups, yet little is known about them. Without insight into lurkers, our understanding of online groups is incomplete. Ignoring, dismissing, or misunderstanding lurking distorts knowledge of life online and may lead to inappropriate design of online environments.

To investigate lurking, the authors carried out a study of lurking using in-depth, semi-structured interviews with ten members of online groups. 79 reasons for lurking and seven lurkers’ needs are identified from the interview transcripts. The analysis reveals that lurking is a strategic activity involving more than just reading posts. Reasons for lurking are categorized and a gratification model is proposed to explain lurker behavior.

Introduction

Lurkers reportedly make up the majority of members in online groups and discussion lists (DLs) in particular (Katz 1998; Mason 1999; and Nonnecke 2000). In a logging study of 109 support DLs, we found that lurking varies for different DLs, ranging from as much as 99% to a low of 1% (Nonnecke and Preece 2000a). The study showed that topic, traffic volume, and other factors are related to lurking levels. From these earlier studies we claim lurking is normal and that everyone lurks at some time. Yet little is known about why lurkers lurk. Without a deeper understanding of lurkers and lurking, our understanding of online groups is incomplete. Ignoring, dismissing, or misunderstanding lurking distorts our knowledge of life online and may lead to inappropriate design of online environments.

The goal of this paper is to address the question: ‘why do lurkers lurk?’ In the next section we review literature that informs this question. Then we discuss findings from in-depth, semi-structured interviews with ten members of online groups. The conclusions from this study are presented in a model that describes how the need for gratification motivates lurking. Although gratification is not the sole motivation, for example, concern about persistence of messages and personality characteristics also influence lurking behavior (Nonnecke 2000; Nonnecke and Preece 2000b), gratification plays a key role. This model helps to inform design that supports this large, silent majority of users – the lurkers.

Background

Defining Lurkers and Lurking

The online definition for the term, *lurker*, provides insight into how lurking is viewed. The online Jargon Dictionary (2001) defines *lurker* as: “One of the ‘silent majority’ in a electronic forum; one who posts occasionally or not at all but is known to read the group's postings regularly. This term is not pejorative and indeed is casually used reflexively: ‘Oh, I’m just lurking.’” When a lurker speaks up for the first time, this is called ‘delurking’.”

In their review of the Internet as a form of mass media, Morris and Ogan (1996) point out the paucity of information on lurkers. They ask the following questions about lurkers, their number, and their nature: “To what extent do lurkers resemble the more passive audience of television sitcoms? And why do they remain lurkers and not also become information providers? Is there something about the nature of the medium that prevents their participation?”

In their extensive log-based study of mass interaction in newsgroups, Whittaker et al. (1998), indicate that lurkers need to be studied. They would like to know the rationale for lurking, whether lurking is transitory, and whether group dynamics come into play: “Why do people contribute to certain discussions but not to others? How long do people lurk before they first post?” For the purpose of this paper, a lurker is defined as anyone who posts infrequently or not at all.

Characterizations of Lurkers

Researchers have characterized lurkers in various ways. For example, lurkers have been described as communicationally incompetent, i.e., “people who lurk do so because they do not feel competent to post” (Mason, 1999). This observation comes out of Mason’s ethnographic study of British football fans belonging to a DL. It represents his perception of lurkers in a specific community and may or may not apply to different types of groups. Part of the problem he found in coming to understand lurking in this DL was that most lurkers are by nature less open to being studied. Furthermore, he employed what he calls “virtual ethnography”, i.e., his ethnographic study took place through the Internet. This in itself may impose a different set of barriers to ethnography than face-to-face ethnography. One such barrier might be an increased difficulty in luring the lurker into participating in the ethnography.

In addition to a lack of confidence in their competence, lurkers may exhibit the kind of passivity commonly associated with TV viewers (Morris and Ogan 1996; T. Postmes, personal communication 1998). They have also been characterized as abusers of the common good, i.e., “[lurkers and the like do] not contribute to the joint effort, but free-ride on the efforts of others” (Kollock and Smith 1996). Wellman and Guila (1999) in their discussion on whether virtual communities are communities, make reference to free-riders. They propose that “free-riders” lurking in support groups are less detrimental than in face-to-face situations because their lurking is not as easily observed. In their discussion of bulletin board systems (BBSs), Morris and Ogan (1996) talk about a “critical mass” of users required to carry the “free riders”. They go on to talk about “members, participants, or free riders” in a way that suggests that participation is strictly defined as posting in public spaces. No mention is made of participation in other ways, such as direct email between members or other forms of communication or relationships.

In an online column titled ‘Luring the Lurkers’, Katz (1998) describes his understanding of lurkers based on both the email he receives after each column - between 100 and 500 personal emails, much of it from lurkers - and his observations of online forums. Katz describes lurkers from three perspectives: who they are; their reasons for lurking; and their value.

After publishing a column describing his difficulties with learning Linux, personal email from lurkers was overwhelmingly supportive. At the same time he was receiving this support, messages in a related public BBS were highly critical. He indicates that the email he receives from lurkers can be challenging, but is not hostile in the same way it is in BBSs.

Why Lurkers Lurk

Uncomfortable in Public

Katz has come to understand why his lurkers lurk: they are uncomfortable with the tone and hostility of public forums, and they believe that the values espoused in the public forum are widely held and they are alone in their opinions. Lurkers who would like to post desired moderated discussion lists that ban anonymous posting and personal insults. As well, non-native English writers lurked out of a lack of confidence in their English skills. This multitude of reasons for lurking is in contrast to the single reason (feelings of incompetence) stated by Mason (1999)

About one-third of Katz’s lurkers prefer lurking, “...bypassing the worst, personal insults, and abuse...” Of those who did not prefer lurking and were interested in posting, reasons of a social nature were cited for their lurking, e.g., to become familiar with the terminology and rituals used in the public forums. While Katz talks about their technological sophistication, this may also provide a clue to explain why they lurk. Perhaps they are afraid of being tracked through their trail of persistent conversations. Less technically savvy participants might not be aware of this issue.

The overall message of Katz’s article is that lurkers are to be valued and not shunned. Katz’s lurkers are rational, less bellicose participants who lurk for a variety of reasons. The underlying belief is that lurkers are valuable to the community and that online groups could be a better place by making these communities more inclusive. Katz’s work may be limited by the narrow focus of his particular community – a group interested in things technical, e.g., learning about installing a UNIX operating system - and as such, may not reflect the dynamics of groups with a different focus, such as health support or online education.

Learning about the Group

In their study of mass interaction in newsgroups, Whittaker et al. (1998) suggest that the activities of lurkers are a legitimate form of participation, i.e., a background involvement that can be beneficial. They support this position by citing Kraut and others, who see this as an important transition mechanism for novices to learn about a novel topic (or social milieu). In describing members of social groups, Gunnarsson (1997, p. 148) indicates that the members “are shaped or socialized with respect to knowledge, norms, attitude, and identity”. It is likely that at least some portion of lurking behaviour is attributable to the process of coming up to speed on the workings of a group. This process may require more observation and listening and less public participation. Donath (1996) suggests that readers of newsgroups seek the identity of those giving advice, and that this is done in several ways, e.g., through reputation, signatures, and archives. The literature does not address DLs specifically, but there is nothing to suggest that DLs operate any differently.

Building an Identity

Beaudouin and Vekovska (1999) describe the building of identity and the taking on of roles and status within a newsgroup-based community. They studied the Cyberian newsgroup and provided an ethnographic account of how relationships were built. They found that regulars in the group had a sense of belonging when talking about newcomers who did not catch their jokes. This exclusiveness and bonding was undoubtedly recognized by those new to the group. Although their study is not directed at lurkers per se, it would not be surprising to find that lurkers recognized that they were outside of the core group. In this situation, lurking would be an obvious way of learning about the group without putting oneself at risk. The authors found that community members value one-to-one relationships and they used many other channels outside of the newsgroup for communication, e.g., email and ICQ (an online communication tool that combines both asynchronous and synchronous communication capabilities).

Parks and Floyd (1996) examined the development of friendship in newsgroups. They polled a large number of regular newsgroup participants to determine whether participants developed friendships. They found that friendship is possible and a frequent feature of public membership in newsgroups. This study was based on examining those who post, so it is unclear whether their findings would extend to lurkers. For example, is a lack of public participation a barrier to lurkers finding friendship online. Parks and Floyd found that when friendships developed, they involved contact outside of the newsgroups in the form of email (98%), telephone calls (35%), face-to-face meetings (33%) and correspondence sent via the postal service (28%). These results and those described in the previous study of Cyberians (Beaudouin and Vekovska, 1999) suggest that observable public participation is the proverbial tip of the iceberg and that non-public behaviours may account for a large portion of the group’s interaction.

Fear of Persistence of Messages

Based on Erickson’s definition and description of persistent conversation (Erickson 1999) email is persistent. The following description is from his call for participation in the Persistent Conversation mini-track at the Thirty-Third Hawaii International Conference on System Science: “[persistent conversations] include conversations carried out using email, mailing lists, news groups, bulletin board systems, textual and graphic MUDs, chat clients, structured conversation systems, document annotation systems, etc. The persistence of such conversations as computerized records, although variable in duration and ease of user access, gives them the potential to be searched, browsed, replayed, annotated, visualized, restructured, and recontextualized, thus opening the door to a variety of new uses and practices.” Lurkers that are aware of persistence as an issue may be deterred from posting and may therefore lurk instead (Nonnecke 2000).

Communication Overload

There are a number of constraints on group members that may affect their participation and thus their lurking. For example, the amount of time available for participating in online groups will vary from member to member. The following was noted in Parks and Floyd’s work on developing online friendships: “Walther and his colleagues found that the proportion of socioemotional content was higher when interaction time was not restricted.” (attributed to Walther, Burgoon, and Park, 1994). If the result of lurking is thought of as a lowering of the visible socioemotional content of a group, then it may be because lurkers have less time available to publicly participate.

Communication overload in email clients has been studied extensively by Whittaker and Sidner (1996). Whittaker et al. (1998) suggest that that long messages cause communication overload, and that short messages promote interactivity. It is possible that given a large number of postings, short postings are read and replied to more frequently than long ones. Communication overload can also take place at the user-interface level of an email client (Whittaker and Sidner 1996). Possible areas of breakdown in email clients include not showing threading, cluttered inboxes, inboxes containing hundreds of messages, and the diversity of

information and cueing being shown within the UI. Coping strategies for dealing with communication overload are discussed by Whittaker and Sidner (1996). They describe how users develop workarounds for managing their email inbox, filing and finding information, and in general, handling email overload. Given that DLs use email clients for receiving, storing, and sending email, and that DLs are capable of delivering large volumes of emails, the functionality and usability of email clients is an important aspect of understanding how DLs are used, and potentially for understanding aspects of lurking.

Not Necessary to Post

DL membership can vary in number from two to hundreds of thousands (or more). If there is a relationship between size of group, posting levels, and number of lurkers, it has not been researched. Also, it is not known whether DL members know how many fellow members there are in a DL, or whether this is an important issue for them. One could certainly hypothesize that if members know there are many other members, then they may put less effort into posting, i.e., they would recognize that if all members posted there would be chaos (Nonnecke 2000). On the other hand, there may be more pressure in smaller lists for members to post.

In Roberts' study of the development of community newsgroups (Roberts 1998), it was found that over two-thirds of the respondents had a sense of belonging and over half felt closeness within the group. For women, those with higher posting rates also had a greater sense of community. Roberts' results suggest that female lurkers should have a lower sense of community. Similarly, duration and frequency of posting have been found to be the best predictor for making friendships (Parks and Floyd 1996). However, it is not clear whether lurkers who participate silently over longer periods of time, develop friendships through other means. Lurkers were not included in either of these studies.

Possible Influence of Group Characteristics

Similar to the volume of messages, the topic of the DL and the number of topics/threads may have an effect on lurking. Whittaker et al. (1998) have used thread length as a measure of interactivity and mean thread length of DLs has been shown to be correlated to lowered lurking levels (Nonnecke 2000). A very focused topic for a DL may also have an effect, as may the general type of the topic, e.g., would there be any lurking difference between health self-help groups and software self-help groups?

Personal Characteristics

Along with group characteristics, member's characteristics will play a role in lurking behaviours. These characteristics may impact desire to participate publicly and in some cases give cause to lurk. For example, extroverts may be more willing to post than people who are shy. Lack of time or nearing the end of a relationship with the group will reduce or eliminate the desire to post or even to read messages.

Study Method

The goal of this study was to develop a preliminary understanding of why lurkers lurk and to reveal as much as possible about lurking in as rich a way as possible. To this end, a small number of in-depth interviews with online group members were used in preference to questionnaires, or more structured interviews. Observing online behavior, and ethnography, is obviously not feasible for studying lurkers.

Interviewees

Because lurkers were initially assumed to be shy and not eager to communicate, lurking behavior of people who also post was investigated. Given the relatively high incidence of lurkers reported by Mason (1999), it was assumed that the majority of study interviewees would more than likely be lurkers. Pilot interviews supported this decision because it became clear that lurkers in some groups, were often posters in others.

Participants were selected at random from two physical communities in which members were known to be Internet users. Ten interviewees were drawn from two locales, five men and five women, ranging in age from early 20s to early 50s. The intention was to balance for age and gender, rather than examine age or gender issues. All participants were members of at least one online group, and were not pre-selected for lurking or for their level of experience with online communities.

Interviewing Process

Face-to-face or phone-based, in-depth interviews lasted between 45 minutes and two hours, and focused on the interviewee's participation in online groups. The interviewees were not told that we were interested in their lurking behavior because we wanted to understand lurking in the context of all of their online participation. Prompting was minimal, and the interviewer did not validate whether a group or topic was worth discussing.

Interviewing a relatively small number of online group participants under the assumption that many would be lurkers turned out to be a fruitful approach. The in-depth interviews provided rich information about how and why the interviewees lurked. To do this, the interviewer developed a technique intended to encourage the interviewees to reveal as much about their lurking behavior as possible. While generally following a script, the interviewer allowed the interviewee to direct the discussion to reveal what he or she felt was important about their lurking experience. Points raised in previous interviews were used to probe subsequent interviewees' group experiences. As a result, the interviews were less like a scripted questionnaire and had a much more fluid quality. This provided a deep understanding of why people lurk rather than a between subjects comparison. Although such comparisons are important and will be done in follow-up studies, more fundamental knowledge was sought about lurking at this time. We wanted the broadest possible picture of lurking. In essence we were attempting to map the landscape of 'lurking' as so little is known about it. Having done this others will be able to fill in details using more structured approaches.

Several things became obvious after doing the first couple of pilot interviews. For one, the semi-structured interviews worked very well. By emphasizing the online groups and then having the interviewee describe their participation in the group, it was possible to understand lurking, not just in terms of lurking behaviour, but also in terms of participation in general. Understanding the types of groups people joined, the reasons they joined, their activities and duration of their membership painted a very rich picture of their lurking and participation. For many interviewees, talking about a particular group experience proved to be a good anchor for their discussion.

A number of interviewees had a very good understanding of why and how they participated. For these interviewees, it was often easier for them to describe their strategies and then give examples using a specific group. These interviewees appeared to be more reflective and less reactive. Their approach to explaining their knowledge and experience while different from the anticipated interview structure, in no way lessened the value of their input. This leads to a discussion of a bias that was unintentionally introduced into this work.

The semi-structured interview provided a large amount of information. Making sense of that information proved to be one of the most valuable parts of the process. The interviewees' stories of their group participation hold potential for describing lurking in a way that could make the lurking experience more accessible to community developers and tool designers. Given the dearth of lurker information for grounding group and community design, these stories could provide a means of establishing and fostering environments suited for lurking.

Analyzing the Interviews

After the interviews were completed, reasons for lurking were collected and like reasons placed under common headings. These headings were then used to develop major categories for why lurkers lurk. In a similar manner, counts were taken on what interviewees wanted from their lurking experience.

It is important to note that our intention was to map out the terrain of lurking behavior so these counts are included only to indicate the how often the concepts were mentioned. They do not speak of the relative importance of the reasons or categories. The 'ethnographic' style of interviewing used in this study does not lend itself to this type of analysis. Consequently, there is no need to examine the inter-researcher reliability of the categories.

Study Results

The initial assumption that lurkers could be found by polling a physical community proved to be a good one. All interviewees were experienced lurkers, but not necessarily all of the time, nor in all communities. Of the groups described by participants, 30 out of 41 were ones in which the participants lurked. These findings support suggestions that lurking is a common activity in online groups.

The participants described 25 DLs, seven BBSs, five newsgroups, three chat rooms, and one MOO. All participants belonged to or had belonged to groups in which they never posted, or posted rarely, e.g., once or twice, or so infrequently that they considered themselves to be lurkers. Two interviewees belonged to only one group while the largest number of groups mentioned by an individual was eight. All participants posted in at least one of their online groups, even if they did consider themselves to be lurkers in those groups.

It is interesting to note that the asynchronous groups (DL, BBS, and newsgroup) have lurking rates around 75%, the synchronous environments (chat and MOO) have no lurkers. As one participant pointed out, it is much more difficult to lurk in synchronous environments as you are almost always immediately visible to other members. Being visible acts as an invitation for others to approach.

Reasons for lurking were varied, with participants citing 79 reasons. What lurkers did while lurking was equally varied. The most obvious conclusion to be drawn from the interviews is that lurking cannot be characterized by the single behaviour of not posting. Instead, lurking should be viewed as a complex set of actions, rationales and contexts, i.e., situated action (Suchman 1987). This suggests that the term, *lurker*, may be an overly broad term to describe anyone and their activities who do not publicly post.

Why Do Lurkers Lurk?

The interviewees in this first study painted a very broad picture of why they lurked. It would be convenient for designers, community builders, etc., if specific reasons for lurking could be cited as more important than others. That does not appear to be the case with this group of interviewees. Each individual appeared to be guided by his or her own reasons, needs, and stage of membership. There is no single answer to why lurkers lurk. However, by examining their stated reasons for lurking, it is possible to get a sense of the issues involved. The following are the interviewees' stated reasons for lurking. They are grouped in 26 categories and summarized in Table 1. The following *most mentioned* reasons for lurking were stated by at least half of the interviewees:

- wanted to be anonymous, and preserve privacy and safety
- had work related constraints, e.g., employer did not want work email address to be used
- had too many or too few messages to deal with, i.e., too many messages was burdensome, and it was easy to forget low traffic groups
- received poor quality messages, e.g., messages were irrelevant to topic or had little information value
- were shy about public posting
- had limited time, i.e., other things were more important

The *gratification model* described in the next section links the reasons for lurking with what lurking can provide. For all of the participants, lurking provided a means of satisfying their needs. This is not to imply that lurking satisfied all their needs, only that it was capable of supplying a variety of wants/needs. The following list indicates what lurking provided. The number in parentheses indicates how many interviewees cited each need.

- conversation/stories (8)
- entertainment (7)
- information, not interaction (6)
- access to expertise/experience (5)
- community without posting (5)
- connections with individuals (4)
- stuff in mailbox (3)

Gratification Model of Lurking

In a discussion on why communication researchers should study the Internet (Newhagen and Rafaeli 1996), Rafaeli suggests that gratification is an important element in understanding why people put considerable time and effort to connect over the Internet. He questions why people expend so much effort presenting themselves and then suggests that interaction between members is likely to play a major role. Trying to understand lurking in this context is confounding. Lurkers do not publicly present themselves, and interaction for the lurker is unidirectional with only half of the gratification possible, that of being a recipient. The fact that online group members lurk, suggests that connecting may not be the sole source of gratification or even the most

important. If Rafaeli's suggestion is true, that gratification is a strong motivation, then lurkers will likely have sources of gratification outside of the direct connection.

The underlying assumption of the *gratification model* is that needs can be met through lurking and that lurking may be the preferred public method of interacting with the group. In Figure 1, the needs are shown above the arrows and the *most mentioned* reasons for lurking are below. (To simplify the visual representation of the model, only the most mentioned reasons for lurking are included. Bold numbers in parenthesis in Table 1 show which reasons were the *most mentioned*.) The interaction between these is the essence of the *gratification model*. For example, a group of members looking for information may wish to remain anonymous. In this situation, lurking offers the means of meeting their needs.

Table 1. Summary of Categories Used to Collect and Describe Reasons for Lurking

Category of reasons for lurking	Reasons for lurking
<p>1. Member's character</p> <ul style="list-style-type: none"> • Personal. Reasons for lurking which were personal in nature. The reasons generally reflect a desire to reduce public exposure. • Relationship to group. Describes how individuals see themselves in relation to the group, either socially or from an informational perspective. The relationship to group either inhibits their public participation or reduces the need to participate. • Intention from outset. These are reasons why participants lurked from the outset. Seven of the ten participants intended to lurk from the outset and gave a variety of reason for doing so. 	<ul style="list-style-type: none"> • want to remain anonymous, and/or preserve privacy and safety (8)* • were shy about posting publicly (5) • can't offend while lurking, i.e., safe from retaliation (2) • have difficulties with English language (1) • are not part of the group, i.e., new to group and thus learning about the group (4) • have nothing to offer, i.e., group is very knowledgeable (4) • lack expertise to respond, but able to ask questions (2) • know others' queries will be answered so don't need to ask (2) • never intended to post from the outset (4) • no specific need to post (3) • not motivated to post (2) • reduce involvement/commitment, i.e., posting is a form of commitment to the group (2)
<p>2. Group characteristics Describes reasons for lurking related to group characteristics. These characteristics cover a wide range of attributes that affect whether an individual lurks.</p>	<ul style="list-style-type: none"> • either a low or high volume of messages (5) • poor quality of messages, e.g., off topic (5) • type of group, e.g., cannot post to distribution lists (3) • no posting requirement in the rules (3) • poor UI for interaction, e.g., poor BBS UI (2) • intrusiveness and style of moderation (2) • quiet periods between spikes of intense activity (2) • response of group to delurking process (2) • lack of response to questions (2) • delay in response, e.g., 24 hours was unacceptable (1)
<p>3. Stage of membership Interviewees articulated two specific periods in the life of their membership in which lurking was likely to take place. The first is when they are getting to know the group and the second is during the time when they are leaving the group</p>	<ul style="list-style-type: none"> • while leaving the group, e.g., waning of interest and involvement with group (6) • while getting to know the group (5)
<p>4. External constraints These are the external constraints mentioned as reasons for lurking. These constraints relate to time and work issues.</p>	<ul style="list-style-type: none"> • work related conditions (8) • not enough time (5)

*reasons with bold numbers in parenthesis are used to illustrate the *gratification model* (Figure 1)

Interviewees described specific needs and joined groups in order to satisfy their personal and information needs. These needs varied between interviewees and depended on the context, e.g., type of group. How they satisfied their needs was also context dependent. In many instances it was possible to satisfy their needs without posting, i.e., through lurking. For the interviewees, lurking was seen as an effective means of getting what they needed from a group. Gratification through lurking was not a simple process of reading every posting, but a complex, idiosyncratic process influenced by the individual's goals, experience, and the specific group in which they were involved.

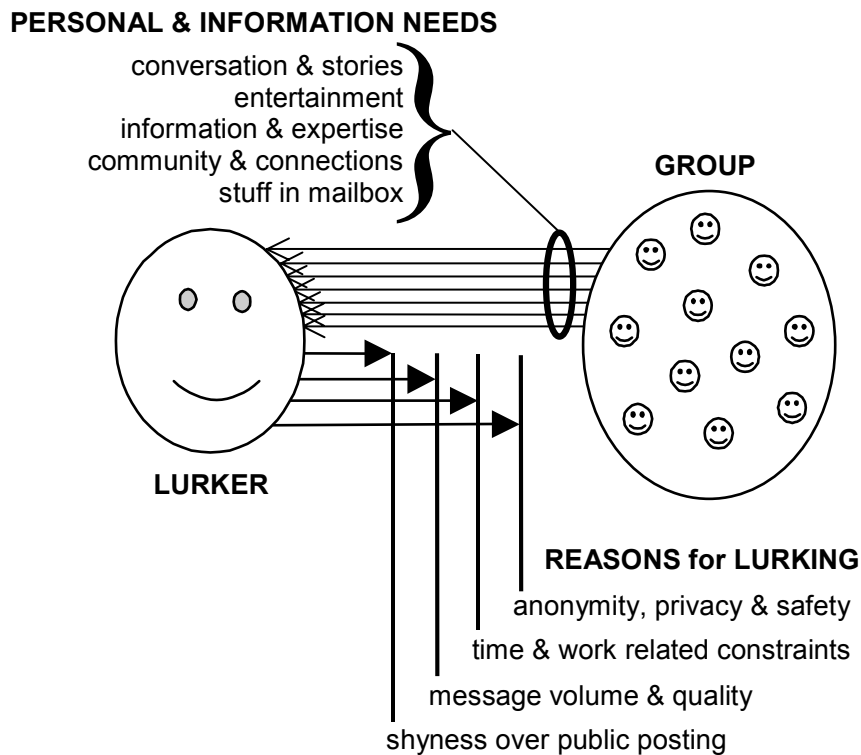


Figure 1. The Gratification Model Showing Lurkers Needs and the Most Mentioned Reasons for Lurking

For example, one interviewee belonged to a broad range of DLs, having joined them for both personal and business reasons. While the motivations for joining each list was different (e.g., want to know vs. need to know), participation in the DLs was for the most part limited to lurking. Lurking was comfortable and enabled him to attain his goals given the nature of the DLs, each DL having high volumes of quality postings representing both depth and breadth of knowledge. In neither group was the interviewee motivated to post for information. Instead, he took a more general wait-and-see approach. He indicated that DLs tend to recycle subject material on a regular basis and that if something was missed at any given point in time, it was sure to turn up later. One way of understanding the needs in the *gratification model* is by grouping them according to whether they are personal and information needs.

Satisfy personal needs: When DLs were joined for personal reasons there was a correspondingly strong motivation to get as much out of the DL as possible. Entertainment was a common theme and took a variety of forms. Just as some people enjoy receiving snail mail, several participants enjoyed receiving email, indicating they liked having new email in their inbox. This gave them a sense of connection and also something to do in their free time. Others mentioned being attracted to controversy and debate, including watching flaming from the sidelines. Curiosity and learning were high on many peoples' list of reasons for joining and lurking in a DL. Humour was also appreciated.

Others joined DLs with many of the same members as their non-electronic based organizations. In their opinion, this complemented and strengthened relationships. DLs also provided a convenient way to track events and announcements. One participant, who belonged to such a DL, read all messages and deleted all but the announcements for physical meetings.

Some participants are attracted to health-support DLs as a source of empathy (Preece 1998). For at least one participant, empathy was strongly felt while lurking. DLs can also act as a mechanism for putting people in contact with one another through more private channels. For example, peers, people with expertise, and finding people beyond a local geographic community were described as reasons for joining a DL. Topics of specific interest to participants also drew them into joining DLs. Participants often described members of DLs as interested and focused. Relationships developed out of belonging to the DL, although no long-lasting friendships were reported, as found elsewhere (Parks and Floyd 1996). Several participants indicated they developed a sense of community through lurking.

Members of DLs have a variety of personal needs to satisfy. These are far ranging and a number of different approaches could be taken to improve and ensure they are satisfied. These include:

- providing profiles of members (to enable contact between individuals)
- suggesting related DLs and organizations, indicating attributes and differences
- providing sets of personal stories in health-support communities

Obtaining the above types of information and keeping it current may be more of a challenge than making it available in a usable fashion. Profile information may not be necessary for all DLs, and unless there is a proven need, may require more effort than it is worth, i.e., to collect, maintain and ensure against its misuse.

At the operational level, a means of identifying specific types of messages, e.g., announcements, moderator comments, obvious flames, would aid the lurker in sorting and using the messages more effectively. A number of DLs already employ subject header prefixes for identifying message types. For this to work, members must comply with the conventions or have a moderator determine each message's type. Knowing the conventions requires an educated poster.

Satisfy information needs: Satisfying information needs was important to the participants. In some cases, information was more important than interaction. In addition to messages, having information in the form of archives was useful to several users, especially if it was readily searchable. In a more passive way, the turnover of information through members' dialogue was also informative. In this way, participants were able to identify experts and if need be, seek expertise directly from these individuals.

Participants sought three types of information: factual information (e.g., job postings, and solutions to technical problems); different viewpoints arising from different levels of expertise; and access to personal experiences of others. Participants also mentioned breadth and depth of expertise as being important, as was finding "authentic" information based on an individual or group experience. Timely information was also considered quite important both in the sense of it being current, and that it meet the participants' immediate needs. Getting information from people living in the Middle East during the Gulf War was given as an example of timely information.

Professional needs, such as keeping abreast of conferences and work being done by peers and colleagues, were cited. Understanding who is doing what and where appears to be an important part of staying abreast of a professional community, particularly an academic one.

Artifacts and mechanisms for satisfying information needs must be better understood and their UIs improved. DL archives should be considered as information resources and their UIs should be designed to exploit this. Individuals within a DL act as living information sources; identifying expertise within a DL and making this identification known to members would aid information seeking. Message typing would be valuable for some types of information seeking, e.g., to identify profession-related announcements.

Summary

Two important findings come out of this work. The first is that the reasons for lurking are varied and fall into a number of categories ranging from personal to work related reasons (see Table 1). The second finding is that lurking is capable of meeting members personal and information needs (see Fig. 1). While this is the basis of the *gratification model*, other models help explain other aspects of lurking. For example, the effect of persistence on online communication (Nonnecke and Preece, 2000b), and viewing lurkers' context as filters to public participation (Nonnecke 2000). Lurking can also be viewed from a social dynamics perspective, e.g., the "fat" model in which the lurkers can be thought of as a renewable and available resource for the community (paraphrased from personal correspondence with M. A. Smith 2000). Each of these models provides a different perspective for shedding light on lurkers.

One general conclusion drawn from the study is that lurking is a strategic and idiosyncratic activity. This conclusion may be a result of the interviewees being well educated and comfortable in talking about their use of the technology and how it affects them. The interviewees were in all likelihood more comfortable with the technology than the average online group member. If a less technically literate set of interviewees had been used, then the results would likely be biased in some other way. For example, learning how to use the technology might be an important reason for lurking to a less technically literate set of interviewees. Also, studying the habits of other classes of group participants, e.g., teenagers, could likely lead to some very different results. They may be much more adventurous in their use of technology and would probably seek different kinds of interaction that include less lurking.

There is another caveat and that has to do with the sample size. A larger sample may or may not provide a broader picture of lurking, but could provide evidence of the strength of the observations and conclusions. This suggests that these results could and should form the basis of larger study, one that could be based on either a very broad survey or a series of surveys to illuminate specific questions.

While this paper has focused on lurkers, non-lurkers are likely to have similar personal and information needs, and perhaps some of the same concerns over public posting. Any improvements made on behalf of lurkers will improve the lot of all members. Some of the improvements needed include better ways of following and finding conversations, aids for learning about the group and its members, better user interfaces to archives and other resources such as stories and technical information.

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