Information Flows and Social Capital in Weblogs:
A Case Study in the Brazilian Blogosphere

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ABSTRACT

Blogs are tools for publishing information that have become very popular due to the way they facilitate the process of publishing on the Internet. Due to their popularity, blogs influence how information flows in cyberspace. This paper deals with the relations between bloggers' perceived social capital and motivations with the information they choose to publish. Based on a case study of a network of 48 weblogs, 32 interviews and 988 analyzed memes, we show how, for the studied case, information flow is influenced by bloggers' motivations and perceptions.

Categories and Subject Descriptors

J.4 [Social and Behavioral Sciences]

K.4.0 [General]

General Terms

Human Factors.

Keywords

Information flows. Memes. Weblogs. Social Capital. Social Networks.

1. INTRODUCTION

The advent of weblogs (or blogs, as they are commonly referred to) has dramatically changed the Web. Because they facilitate the process of publishing a website (and are often regarded as the evolution of personal publishing [41]), weblogs allowed for much more content to be aggregated to the Web.

In December of 2007, for example, the search engine Technorati indexed over 100 million blogs[1], which represent a growth of 60% over April of the same year [39]. Even if the growth is slowing down (as Sifry [39] argues) , blogs are still a huge influence on how information spreads through the Web [3] [16]. Even though many previous studies address the matter of how information spread through blogosphere, there is a paucity of work on the

bloggers' decision-making process – i.e. which types of information they choose to publish and which types they do not publish.

In this paper, we propose an hypothesis on how Brazilian bloggers choose what to publish and how these decisions can influence the flow of the given information within the network. Hence, we study information flow within the Brazilian blogosphere and its relations to the social capital perceived by bloggers. Our work is driven by the following research questions: How can social capital influence how information spreads within the blogosphere? Does the perception of different values within the published information affect how they spread?

To accomplish our tasks, we present a qualitative study, where we discuss empirical evidence of the above mentioned hypothesis, based on a case study of a network in the Brazilian blogosphere, During this study, we observed 988 pieces of information we called memes (and will be further explained in section 2.3) in 48 weblogs belonging to the same ego-centered network and interviewed 32 bloggers.

1.1 Weblogs

Although blogs were born as link-driven sites [5], the emergence of publishing services, such as Blogger.com in 1997, gave users a whole set of new appropriations for the technology. Blogs became publishing tools and, because of that, they are often described based on their structure [37]. Weblogs consist of web-based sites, with reverse chronologically organized texts, also often with comment space and trackbacks [5,36,37].

As publishing tools, weblogs can also be used for several purposes. For example, many authors have studied the uses of blogs in political contexts [1], blogs as personal diaries [38] [23] [29], blogs as conversation media [11] [33] and as communities [36] [7]. In fact, blogs have so many appropriations that classifying them is a hard task.

Blogs have two very important characteristics: First, they are personalized, in the sense they show someone's point of view about something [4] [37]. Second, apart from the A-list (list of very popular blog hubs), blogs often have a regular small audience [22], usually linked through the blogroll [36]. In this paper, we focus on these small groups of bloggers. Even though they are not the most popular, they still play an important role on how information propagates within the blogosphere.

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[1]http://technorati.com/weblog/2007/12/405.html (Retrieved January, 4 2007)

1.2 Brazilian Blogosphere

Although the exact number of weblogs in Brazil is unknown, estimates from September 2007 show that over 9 million users had accessed and read blogs in the country, which represent 46% of Internet active users in Brazil[2]. Half of those users are less than 24 years-old. Data from ComScore report from December 2007, shows that Blogger.com alone was accessed by more than 6 million unique Brazilian visitors.

1.3 General Terms Used

In this paper we will use the following terms with the following meanings:

Blogger: User who has (and uses) a blog.

Blogrolls: List of links for blogger's friends or blogs he/she reads.

Blogosphere: General community of bloggers and their readers.

Blogspace: Blogs analyzed. Authors have used the term *blogspace* to refer to the content of weblogs and *blogosphere* to refer to the content plus the community of users and readers [10,29].

Comments: Comments are usually texts published by users other than the blogger in the "comment space". They often have a link for the user's own weblog.

Citation: A citation is a link to the original source of some information.

Meme: Information published in a weblog that has a reference (in the form of a citation) to the source.

Meme path: A group of blogs where the same meme is published and that have a traceable chain of links between them.

Permalinks: Permanent links for one blog post which are present on the post.

Post: Each text published in a weblog is considered a post.

2. RELATED WORK

2.1 Weblogs and Social Networks

Research on the blogosphere is often focused on the social networks underlying the system. Since the Internet can help users to develop and sustain relationships [43], weblogs are often perceived as social spaces. They allow for social networks to emerge through the exchange of interactions. Most of the interaction that takes place in blogs happen in the form of visitor's comments that generate blog conversations [33]. Recent research has shown that bloggers value very much the comments they receive and such comments are a key motivational factor for users to keep posting new content [29,30]. Citations are also very important and often seen as a form of evaluating someone's popularity [4]. Citations are also a way to perceive blog conversations and the exchange of information within several weblogs.

Weblogs allow personalization, in the sense they allow users to express self-disclosure in a higher or lesser way. Some authors argue that weblogs are the heirs of personal homepages in the sense they are composed of self-representational writing [22] and most of them are personal journal [19,35,37]. This means that, even though many weblogs are not personal diaries, bloggers

express themselves in some personal way. The choice of facts to comment in a journalistic weblog, or the support to some idea in a political weblog, for example, can be forms of showing other people who the blogger is or what he stands for (similarly to what Goffman [14] argues).

For Goffman [14], self-presentation is strategic to create impressions in others. These impressions are carefully conveyed by interactions that are consonant with the interests of an actor. Weblogs allow interaction performances and users want to create in their audience impressions and these impressions are made through personalization [37].

Since weblogs are social tools, they can also help users create and share social ties. Ties are the connection between actors in a social network, composed of social interaction. Granovetter [15] showed that ties can be weak or strong based on the amount of intimacy they have. Strong ties are often the connections with a high level of intimacy and social support while weak ties, on the other hand, usually don't have intimacy. Social ties can be expressed in weblogs through many ways. Ali-Hasan and Adamic (2007), for example, consider blogrolls, citations and comments to be expression of ties, in a very similar way as Marlow [25] does, although he adds permalinks to the list.

2.2 Weblogs and Social Capital

Social capital is often perceived as the value that circulates within a social network. Bourdieu [6] defines social capital as an aggregate of resources which are *"linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition"*(p.248-249). These resources are perceived by actors, who can use them for their own purposes, transforming social capital in other forms of capital. Social capital is, then, a collective value [32] associated to a social network that can be appropriated and used by its actors [6].

Since social capital is such a broad concept [24], many authors discuss how it can be perceived. Putnam [32] argues there are two forms of social capital, the bridging and the bonding. The latter is linked to closeness, and intimacy usually shared by homogeneous groups while the former is related to loose relations distant ties, usually shared by more heterogeneous groups. Ellison, Steinfield and Lampe [13] connects Putnam's definitions to Granovetter's [15] weak and strong ties. While bonding social capital is found in tightly-knit relationships with emotional support and intimacy; bridging social capital is associated with weak ties. These connections that can provide some value, like new information to the network, but not emotional support. The authors also introduce an additional dimension for the concept, "maintained social capital", which is related to *"the ability to keep in touch with a social network after physically disconnecting from it"*. We will further use, in this paper, those three categories.

While some authors have discussed how Internet may increase social capital [34,42] by allowing social interaction through different forms of communication, other have discussed the opposite [31]. Weblogs, as computer-mediated communication tools, allow users to create and gather social capital. Trammell and Keshelashvili [41], for example, recognize some bloggers to be able to gain popularity through performance in weblogs.

Marlow [26] quantifies social capital indicators in weblogs and shows that there are two types of bloggers: professional bloggers, which are more focused on the audience size and feedback

quantity, and social bloggers, which are more focused on relationships between smaller audiences. The latter type, according to the author, is more able to create social capital. Both types can, however, gather and use different aspects of social capital. Professional bloggers, for example, may be more interested in creating bridging social capital while social bloggers would be more interested in creating bonding social capital. Either way, Marlow [26] shows that the more a user invests in his/her weblog, the higher the payoff as audience size and feedback he gets.

2.3 Weblogs and Information Flow

We are also interested in understanding information flow through the blogspace. Although many authors have addressed this matter in several papers, the focus has often been on a quantitative view. For example, [3] and [16] have studied how linking patterns can predict information flow through the blogosphere; others [27] have identified patterns on link propagation.

Due to the social nature of blogs, it is common for bloggers to link each other and post "conversational" texts [11,33]. Herring et al. [20] argue that blogs that link to each other have a tendency to mention one another in posts and to exchange comments. In fact, previous work has shown that bloggers are often involved in small communities of frequent readers and commenters that share similar interests [4, 22]. Thus, information flow within small blog networks can help understand how users decide what to publish and why.

Halavais [18] pointed out that media content, such as mainstream news , is often the a common discussion topic between bloggers. This is evidence that bloggers value posting new content for their audience (networks). Krishnamurthy [21], while analyzing blog conversations, found out that controversial or insightful posts get the most comments. So commenting may also play a part on information flow in blogspace.

Blogging motivations are also important to understand information flow. Users post based on personal motivations and audience perceptions. Nardi, Schiano, Gumbretch, and Swartz [30] have identified five major reasons why people blog: documenting one's life, providing commentary and opinions, expressing deeply felt emotions, articulating ideas through writing and maintaining community forums.

The study of information flow in the blogosphere is often connected to the study of *memes*. The concept of meme was first created by Richard Dawkins [8], who claimed that culture change through the replication of ideas or memes. Although controversial, the term is commonly used to define recognizable pieces of information that spread through blogosphere [2,17]. Memes travel through paths between blogs. Efimova and Hendrick [12] call *meme path* the study of *"ways ideas or references to interesting sources 'travel' around weblogs are influences by social structures behind them"*. We will refer as meme path size the number of nodes (blogs) that publish the same meme within the same network.

Based on the work discussed previously and because bloggers are conscious about the impressions they want to make and about the audience they have, we hypothesize in this paper that the information they publish is based on the impressions they want to make and the perceptions of social value it will create. In other words, bloggers publish information based on **the perception of social capital** they believe they will gather.

More than publishing information based on value perception, we argue bloggers have in social capital their key motivation for blogging. Because social capital is so important, information that generates different types of social capital may be associated different flow patterns through the blogosphere.

3. METHODOLOGY

The paper is based on a two phase qualitative study conducted from March to January of 2008. The first phase happened from March to August of 2007. During this first phase we selected arbitrarily 150 weblogs and observed the information they published. This phase was conducted through ethnography, with field notes and participant observation. Those weblogs were observed until July of 2007, when, confronting observations with previous work, we elaborated two hypotheses about how bloggers decide to publish information.

Hypothesis 1 (H1): Information is replicated by the studied bloggers based on the perception of social capital gain.

This hypothesis was created based on the observation that some bloggers considered comments and links to be a very important form of social status. They publish information they perceive as having the potential to attract comments. This hypothesis is also based on the observations of the conversational nature of blogosphere [33,36,41]. and Marlow's [26] view of different types of bloggers and their role.

Hypothesis 2 (H2): Different types of perceived social capital by the studied bloggers create different diffusion patterns within the network.

This hypothesis was created based on the observation of what users in the same network publish. It is based on the work of Halavais [18] and Krishnamurthy [21].

The second phase took place from August 2007 to January 2008 and focused on testing the proposed hypothesis. In order to observe information flow, we decided to focus on one weblog network and track the memes published in it. We chose one ego blog arbitrarily (not the same of the first phase) and added to the observation list the 47 connections in the blogroll. Through this process, we directly observed 48 weblogs during 4 months, collecting all memes published (September to December, 2007). Every time a meme was published we followed the link path until reaching the original source, or for as long as possible. We only considered memes that had in them a way to trace the original source, which was usually done by a hyperlink. A meme, as we considered in this study, always had, thus, a citation.

It is important to note that, according to Dawkins definition [8], every published information on a blog could be considered a meme. However, since we need to be able to track a meme path, we decided to only trace memes that had a way to construct a meme path. During this period, we observed 988 memes and how they spread. Memes were collected, read and classified according to the social capital they would create by the researcher. Every piece of published information with a citation was considered a meme.

We further conducted 32 semi-structured interviews with bloggers. They were invited to answer the interview through weblogs, e-mails and comments on their weblogs. The questions

were proposed so as to understand: a) motivations for blogging; b) types of information published; c) social capital perceived in information; d) perceived information impact on the social network. Interviews were done in Portuguese and quotes appear translated in this paper. The users' names and URLs were suppressed due to privacy issues, even though they all agreed to have their information shared through this research.

4. RESULTS

We will start by exploring the results about bloggers perceptions on the information they publish and further, will explore the observed memes through blogosphere. The following table (Table 1) summarizes the characteristics of the users interviewed.

Table 1 - Interviewees Data

	18-25	26-35	36-45	46-55
Age	6	18	6	2
Number of blogs maintained[3]	6	36	15	5
	Average – 1	Average – 2	Average – 2,5	Average – 2,5
Gender	Female – 5	Female– 11	Female– 3	Female– 2
	Male – 1	Male – 7	Male – 3	Male - 0

The interviewees were composed of 11 males and 21 females, the majority between 26-35 years-old. We can see a growing average of blogs maintained by older bloggers. Bloggers from 36-55 years-old reported it is common to have more than one blog. They reported that happens because they usually have one personal weblog, where they publish more general things they like and everyday life thoughts and other (s) more focused on their work or particular interests. Some of them (N=6) participate on collective blogs as well.

14 participants explained they had personal journal weblogs while 11 had blogs were mainly informational. 20 interviewees defined their blog as a mixture of personal and informational content (mostly between the 26-45 years-old)[4]. Informational blogs were defined only by the three older categories while the youngest (18-25) only defined their weblogs as "personal journals".

These observations show that, in the observed group, rather than having professional or social bloggers as Marlow [26] observed, users have professional and social blogs focused on different types of information. Also, older users of the group would use blogs in a more informational and professional way than younger users.

4.1 Motivations for Blogging

Regarding motivations, the interviewed bloggers seem to focus on five main reasons: a) Creating a Personal Space; b) Creating

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[3] The number of blogs maintained was given by users during the interviews. Since some of those (4) were "secret blogs", not present in any blogroll, they were not taken into account in this study.

Social Interaction; c) Sharing Knowledge; d) Creating Authority; e) Creating Popularity.

4.1.1 Creating a Personal Space

Weblogs are an easy way to share ideas. Users realize they can use the blog tool to publish "themselves", to create a personal "presence" in the Internet. They seem to think their weblog is a channel to express themselves and to share the knowledge they have. A weblog is, thus, a way to be present in the Internet and to show to their friends that. Even though a part of the interviewed bloggers (N=14) assumed their weblogs were personal diaries, all bloggers (N=32) regarded their weblog to be personal in some way.

> *"A space to write about what is going on in my head and my heart, in my life... it is my space"*, female, 23 years-old, when asked to define her blog.

Younger users (25 or less) would maintain only one blog, usually a very personal one, with strong characteristics of blog journals [37]. Users between 26-35 would maintain more than one blog, usually, one personal and one professional. Some exceptions would also be a part of collective blogs of interest. Older users (36 or up) would talk about their weblogs in a more professional way, discussing not only hobbies, but also information they believe is important to their work.

> *"I try to publish information that I believe can be important for my readers"*, male, 45 years-old, about his business blog.

Many of those users base their posts in their personal experiences and thoughts, in order to send people something they believe will help them. Six users contributed to collective weblogs, where many authors are allowed to post; even there they affirm that they always try to add their personal contribution to the posts. Users believe personalization is very important in order to receive more comments.

These observations are consistent to Goffman's [14] ideas on making impressions. Bloggers want to create values associated to their blogging activity that will show users who they are.

> *"I think a blog is a way to know its author"*, female, 21 years-old.

This value is also similar to the motivations observed by Nardi, Schiano, Gumbretch, and Swartz [30]: documentation of one's life; expressing emotions; and articulating ideas are particularly connected to the creation of a personal space. It also shows that personalization is a very important characteristic of blogs for the interviewed sample. As Kumar, Novak, Raghavan, and Tomkins [22] argue, most bloggers feel their blogs are personalized writing, although not personal journals.

4.1.2 Creating Social Interaction

Creating interaction was pointed out by 31 of the 32 interviewees as important for bloggers. Users explained that receiving comments is crucial to keep on blogging and that the lack of comments can be a motivation for shutting down a blog.

> *"Comments are the blog's soul"*, female, 24 years-old.

In fact, all interviewed bloggers perceive their own blogs as conversational spaces, where they can "talk" to their friends and reader. Because of this perception, comments are extremely important for them to keep on blogging since they can bring "reassurance" that someone is reading.

"Comments are the feedback one has in order to know how the blog is doing. They are also a confirmation that someone is reading." , male, 28 years-old.

Others explained that comments contribute to the discussion and make them feel that their thoughts are relevant. Comments are so important that two users argued that if a blog doesn't have comments, they would not visit it.

Comments were also regarded as a way to keep in touch with far away friends. Users with personal weblogs frequently include the need to be in contact with their friends among their reasons to have a blog.

"I was reticent, but my friends convinced me a blog was a good way to stay in touch (...). So most of my [received] comments come from them and I usually comment in their weblogs as well", female 21 years-old.

Staying in touch with friends and s interacting with other users was a major motivation for 15 interviewees to keep blogging.

Users also feel comments are a way to show their presence. When asked when they would post a comment to a weblog, users agreed they would comment to show their presence and to contribute to the discussion. Presence is connected to showing others that they are treading the weblog. Comments are also a currency and often exchanged or used as a way to stimulate others to keep blogging.

"When I realize someone is starting to blog, I comment to motivate him/her to keep on blogging. To me this motivation was and is very important", female, 33 years-old.

Comments are also important to "measure" someone's popularity within the blogosphere and within a social network. Personal journal bloggers would also point that comments can help them through difficult times by showing their friend's support or simply by interacting. Mishne and Glance [28] have observed both patterns in a quantitative study about comments in weblogs, showing evidence that this behavior may be present in many blog networks.

These results are consistent to what Marlow [26] observed. For "social bloggers" of the sample, comments were a form of sharing support and knowing more about friends. For "professional" bloggers, comments are a way to show they are being read, and a motivation to keep writing. Social bloggers would be also more interested in comments from people they know (creating personal circles, as argued by [4,22]), while professional bloggers would be more interested in comments from new people, seeking for comments as thermometer for popularity or authority

4.1.3 Sharing Knowledge
Another common motivation mentioned by interviewees was to share knowledge with their friends interested in some common subject. We found this was a motivation for 20 bloggers. Users want to contribute by sharing information with their audience. They believe the things they write in their weblogs are important to their readers and they believe they are contributing to improve someone else's knowledge.

"I thought that if I could help other teachers, with tips, ideas and content, I could help them improve their classes." , female, retired teacher, 53 years-old.

Although sharing knowledge was mentioned more often by users between 36 and 55 years old, for some younger users that was also a motivation, mostly when involved in collective blogging. Many users argue they had no special interest in sharing information while others argue they would give away information because they believe their audience could be interested in. Contribution was associated with reputation, since users want other to see their weblogs as "useful".

"I want readers to find in my blog as a good source of information about this subject", female, 29 years-old, talking about her blog about cyberculture.

These users seek the recognition of their weblogs as a valuable source of information and thus, to be recognized themselves as contributors. This is related to Goffman's ideas on the impressions given since users carefully choose what to publish based on the contribution they want to share. They don't publish any content but rather focus on what they believe their audience wants. It is also related to Nardi, Schiano, Gumbretch, and Swartz [30] ideas of motivation, since users want to share opinions and comments on a subject.

4.1.4 Creating Authority
Another common motivation for blogging is the desire to be recognized as an *authority* on some subject. This was a motivation for 10 interviewees, which were mostly older than 30 years-old. These users not only feel they have something to contribute but also want to be regarded as an authority on the subject. These users' blogs focus on highly specialized information that they gather in order to provide their readers with the best information. These bloggers are also very conscious of their "gatekeeper" role.

"I look for specialized information that is off mainstream on the subjects I like (...)", female, 32 years-old.

These bloggers not only want to share information, but they are also aware of the value they can gather through blogging and want to be recognized as experts. They are aware blogging can be a self-promotional activity and they admit using blogs for this purpose too.

"[blogs] also have a self-promotional side that helps promoting my work", female, 32 years-old.

Users who seek for authority explained they spend hours searching for information and carefully choosing what to publish. Some of them even spend hours creating a post because they don't want to disappoint their readers.

Authority is also related to received comments. Readers perceive someone's authority by the number and the content of comments as well as by the links from other specialized blogs they receive. Thus, authority is also a form of reputation and is strongly related to contribution (although not all bloggers that want to "contribute" want to be recognized as authorities). Credibility is another aspect of authority for the interviewed users, since bloggers with higher authority would also have higher credibility in the information they publish.

Users who seek authority also tend to add personal thoughts or comments to the text, analyzing the information published, rather than just publish the raw information.

"I always try to make some personal comments, I never just publish an information, female, 29 years-old.

Authority is very closely related to Goffman's [14] ideas of impressions. Users who seek authority spend time searching for

information and publishing it. They are also close to Marlow's [26] definition of professional bloggers, although none of them actually had any monetary profit from blogging.

4.1.5 Creating Popularity

The last motivation factor that appeared in the research was popularity. Popularity was regarded as a motivation for blogging by only three interviewees. These users are focused in gathering as many comments and exchanging as many links as they can in order to become popular. Popularity is a value associated to the amount of incoming links [40] or comments [28] received, as a measure of approval. In order to gather popularity, they use all sorts of strategies.

> *"One of my motivations to comment in a blog is to create a link to mine"*, male, 45 years-old.

Users not only use comments to create popularity, but also choose what they are going to publish based on the amount of comments received and the perception of what the audience likes or not. They also actively exchange blogroll links with other bloggers in order to become more popular and some of them regard answering comments only as a way to keep readers happy. They often use trackbacks in order to receive more links.

> *"I created a character for the blog. My blog is my publicity strategy"*, male, 28 years-old.

Although the interviewees do not believe they will be part of the A-list, for example, they still want to become as popular as they can get, by getting comments and being associated with popular blogs. Popularity is often seen as a value, associated to being famous within the network.

Although this is not a common behavior, engaging in becoming popular can be a motivation to blog and is connected to social visibility. Mishne and Glance [28] related comments to social visibility, showing that sometimes weblogs that are not the most popular can also receive a high number of comments within a smaller network. This may be due to these bloggers' efforts to become popular among his/hers network. Marlow [25] showed that popularity and authority can be related,. Although we didn't find a connection between the two motivations, it is possible that this link appear in other blog networks.

4.2 Types of Information Published

Interviewed bloggers argue there are two basic types of information they publish: *personal information*, which is information about themselves, their likes and dislikes, their personal daily activities, their thoughts and lives; and *useful information*, which they regard as general information they consider important or useful for their audience. This type of information can be, for example, a movie review or an opinion about something. The difference is that personal information is regarded to be about the blogger and useful information is about everything else.

> *"I publish things that I find interesting (such as videos, links and etc.) and personal stuff (...)"*, female, 29 years-old.

Users make this distinction based on the idea that they consider personal information as a way to show to others that there is someone behind the blog, a way to create empathy through personalization. Personal information posts are usually original,

not copied from other sites. Useful information, however, is information they take from another site (usually another blog) and share with others because they think it is important. This type of information has origin outside the blog network and is more likely to be spread than personal ones.

When we observed the information users actually publish in their weblogs, however, we found out that both personal and useful information spread through the network. Personal information can be shared, for example, through games of questions and answers such as the "what were you doing in…". This game was created by one of the observed weblogs and spread to many others. The idea was for each user to whom the game was "sent" to say what he/she was doing 5, 10, 15, 20, 25 and 30 years ago. After remembering and publishing his/her past, the blogger was then asked to send the game to another 5 bloggers by including their names and links after the answers. The idea of the game was to offer bloggers a chance to share personal information.

> *"This [games] allow you to know more about other people and eventually add them to your friend list*, male user, 28 years-old.

Personal information has a strong interaction purpose. Users regard personal information as key for creating interaction. When asked about these games bloggers would recon they are useful to allow people to know each other and to create interaction with friends.

For the following analysis purpose, we will call the information that spread from blog to blog and that can be reference by a link, a meme. The two types of perceived information within the interviewees are personal information, which aim to create interaction with users and useful information, which aim to inform users. Hence, we will call *interaction memes* the ones that create an opportunity for users to share personal information. We will call *informational memes* the ones that allow users to share general information. *Interaction memes* are related to motivations such as creating a personal space, because personalization is fundamental for social interaction; and to interaction, since they allow people to exchange information. Because they are usually about the blogger as a subject, they also allow intimacy to emerge. Interaction memes are, thus, linked to the strength of social ties within bloggers. One observed example was a game passed on from blogger to blogger where users were invited to share three most awkward moments they remembered and then, chose three other bloggers to answer the question. This sort of meme was perceived by users as valuable to know each other and to create motivation for interaction.

On the other hand, *informational memes* are related to contribution, authority and popularity. For example, the publication of Since their value is contained in the information published from external sources and not to the intimacy shared, they allow users to create more social ties, but not to strengthen them. One example was information on a YouTube video teaching how to use Twitter[5], that was published by the observed bloggers. The video was perceived by bloggers as "useful" to their readers rather than funny or social.

Table 2 summarizes this discussion.

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[5] http://www.twitter.com

Table 2: Meme Types and Motivations

Meme Type	Motivation
Interaction memes	Personal space
	Interaction
Informational memes	Authority
	Popularity
	Knowledge

4.3 Social Capital and Information Flow

So far, we examined the relations between motivations and types of information published by bloggers, based on interviews and observation of memes. We showed that, in the case examined, blogger's motivations can underline perceived values and that they are aware of this, even sometimes leveraging such values by carefully choosing what to publish. We will now discuss how published information can create values and thus, social capital for bloggers. We argued users have motivations for publishing information in their weblogs. Each motivation is related to a social value. We will analyze the values perceived as Putnam's forms of social capital [32].

The creation of a personal space is related to *visibility*. Having a blog is a way to create a performative and personal space [9,14] and to show that "you are there". When they comment on another blog, they mark their presence as an audience. Social visibility is central to bridge capital. It allows an actor to be perceived by others and to know more people, thus, enhancing weak ties [15]. The creation of a personal space is also associated to interaction. Creating a persona is fundamental in order to create an "Other" to whom someone else can relate [9,14]. All interviewees regard blogs as a "personal" way to publish information and to interact. The creation of a personal space is connected to the development of social ties and thus, to bonding social capital and maintained social capital.

Interaction is a value itself. Having many comments can be a sign of social visibility and popularity [25,28]. However, since most blog networks are small ones [4,22], interaction can be also connected to assurance, feedback and social support from friends [28]. Personal weblogs, for example, tend to receive much social support through comments [36]. Comments can contribute to the discussion and allow users to know more about others and to create bounds with them. Blogs are also used to keep in contact with friends that are not geographically close anymore, as interviewees recognize.

Interaction is related to social ties in general, because it is the material that composes them. Interaction through comments and conversations in the blogspace can be thus connected to either strong or weak ties [15] or, rather, bonding and bridging social capital [32]. Interaction can also be related to maintained social capital [13].

Sharing knowledge is a value associated to sharing information others don't have yet. It is strongly related to blogging activity as a motivation for bloggers. Users feel that, by publishing certain information in their weblogs, they are contributing to the debate on some subject, helping spread some information considered important. Sharing knowledge is also connected to reputation. By publishing information they have users want their blog to be seen as relevant by their friends and readers. To have reputation, in this

case, is becoming someone "useful" for the network. We find contribution is linked to bridging social capital rather than bonding, since bloggers regard they want to be read rather than interact or share intimacy with readers.

Authority is also a value itself. It is also strongly related to reputation, but in a different way than contribution. Users who seek authority want to build a reputation on a specialized subject rather than just be seeing as someone who is interested in something to the network. Because of that, even thought the bloggers we interviewed were not professional bloggers, authority seekers are more committed to blogging as a professional activity. Gathering and sharing specialized information is the main activity for these bloggers. Authority is also connected to bridging social capital, because bloggers focus on having an audience rather than interacting or sharing intimacy with readers.

Popularity is too a value itself and is connected to social visibility. It is related, for bloggers, to the number of comments received or the size of its audience (such as number of visitors to the blog) and to the amount of *inlinks* (links that point to the blog) [28]. Bloggers who seek popularity don't seem to care about what they publish, as long as they have readers and comments and they engage themselves in "networking activities" very often (commenting and exchanging links with other blogs, trying to get social visibility). Popularity is the result of weak ties rather than strong ones and thus, is connected to bridging social capital.

The values discussed are forms of social capital. Since interactional memes are connected to the categories where bonding and maintained social capital can be found and informational memes are connected to the categories where bridging social capital can be found (Table 3), one may argue they have different impact within the network.

Table 3: Meme Type, Values Perceived and Social Capital

Meme Type	Values Perceived	Social Capital
Interactional Memes	Visibility	Bridging
		Maintained
	Interaction	Bonding
		Bridging
		Maintained
	Social support/ Assurance	Bonding
		Maintained
Informational memes	Visibility	Bridging
	Reputation	Bridging
	Popularity	Bridging
	Authority	Bridging

Looking at the summarized results above, we may find that informational memes are rather important to bridging social capital, while interactional memes are more influential for bonding and maintained social capital. If users perceive meme spread with the creation of different values, does this perception matter to the information they publish? We will further explore how they can spread in different ways through the networks.

4.4 Impact in the Network

During this study, we observed 988 memes during 4 months in the 48 weblogs from the same ego-centered network. We can see the observed data in Table 4.

Table 4. Number of memes published x Number of blogs

Number of memes	< 10	11-20	21-30	31<
Number of blogs	22	11	6	9

The memes were classified in informational memes and interactional memes. Observed interactional memes were links to games, quizzes and gifts shared between bloggers while they wrote about themselves. Informational memes were links to other sources like newspapers and blogs discussing external information. The vast majority of memes were informational: 105 (10,62%) were interactional and 883 (89,38%) were informational. One interesting fact was that only 3 weblogs (9,3%) concentrate 373 memes (37,75%). This concentration of informational memes was strongly connected to authority. Those bloggers were extremely proficuous in publishing new and specialized information and would also publish interactional memes from time to time.

On the other hand the lack of memes was generally associated to very personal weblogs. The majority of the observed weblogs were used more as personal journals (N=22), which is consistent to previous work [19,35,37]. Although there were weblogs that merge personal and informational posts (N=17), a few focus on creating and sharing new information (N=9). These (18,75%) would, however, concentrate a large number of memes: 63,76% (N=630). The large majority of weblogs (45,83%), however, published less than 10 memes.

One may expect that since informational memes are connected to personal information, they would be more common among personal journal blogs. However, these blogs only published 10 of the observed interaction memes. This may be due to the fact these bloggers publish information about themselves on a regular basis, producing rather than reproducing information. The weblogs with the highest number of memes published also had the highest number of interactional ones (N=57).

Interviews shed light on why some types of memes are more common than others. First, privacy issues are a concern to many (N=20) bloggers. Even though many of them keep personal weblogs, they are careful about what they publish and, sometimes, they would even erase published posts because *"they were too personal"* (female blogger, 21 years-old). On the other hand, interaction memes are often seen as "gifts", or "fun". Since these memes are usually passed from one user to another, bloggers feel special because they were remembered by their friends. Some, even reported they feel they had an obligation to publish an interactional meme.

> *"I wanted to be part of the fun!"*, female, 28 years-old, explained why she decided to publish a game in her weblog.

At the same point, bloggers who searched for authority also claimed to publish interactional memes.

> *"These memes are fun and show a little bit of you to your readers, make them see there is a person behind the blog."*, male, 34 years-old.

Other bloggers seem to think interactional memes show to the audience who are your friends and who is your network because they usually are passed on by and to other bloggers.

Informational memes were also very rarely replicated between bloggers in the observed network. Only 177 informational memes contained links to other blogs. From the total amount of informational memes, 706 were published directly from an original source (average meme path of 1 blog). This means all these different memes appeared on only weblog of the same network. The other 177 were published most of the time from another weblog which was pointed as an original source (average meme path= 1,5 blogs). These memes appeared in two weblogs, but not more. Those observations suggest that bloggers usually look for information from the external network. This is similar to what Halavais [18] observed.

On the other hand, all the interactional memes (105) were linked to other blogs which also linked to further other blogs. In these memes, the average meme path was much longer (average meme path=5 blogs within the same network). This may indicate that this sort of meme, because of their social aspect, tend to spread within the same network. The data also shows that interactional memes are strongly connected other blogs.

The observed data suggested that, in the studied case, the perceptions of social capital may have a strong influence in the meme path within the network. Since users perceive interactional memes connected to values from bonding social capital, as well as bridging, these type of information tend to spread within stronger ties in blog networks. This type of meme is associated to creating interaction and personal space, and thus, creating empathy. Because they have such a strong social characteristic of helping they appear to spread within the blog networks rather than between them. On the other hand, informational memes, which are more connected to values such as social visibility, popularity, authority and reputation spread through weak ties in blog networks (Figure 1).

Interactional Memes	Informational Memes
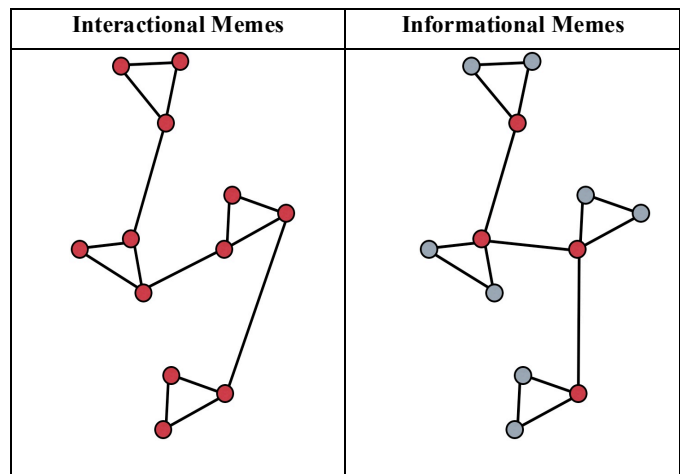
Figure 1. Types of Memes and their Spread

The image shows several small blog networks as the one we analyzed (triangles) connected to each other. The red/dark nodes are the ones that published the same meme and the grey/light ones did not. It shows information paths for informational memes and interactional memes.

As previous research [4,22] has shown, bloggers are often involved in small communities of frequent readers and

commenters that share similar interests and strong ties [36]. This study provides empirical evidence that could implicate interaction memes are more likely to spread within those networks. These bloggers seek values such as interaction, social support, sharing knowledge and building a personal space. These values are more likely to be found among strong ties and people who interact more often (as the left figure shows).

On the other hand, bloggers who seek authority and popularity, for example, rarely publish information that another blogger part of the same network has already done. So it is unlikely that informational memes would spread within those small weblog networks, as interaction ones would. These pieces of information are more likely to spread from network to network than within (right figure).

These memes have values more associated to bridging social capital. Interactional memes, such as games, however, are only fun if everybody in the same network publish them. This type of information only makes sense as a bonding tool to bloggers who are already interacting with each other. Thus, this memes tend to have a higher path within the same network and a higher value as bonding social capital or maintained social capital.

5. CONCLUSION

The study focused on understanding bloggers' motivations when deciding which information they will publish in their blogs and how these motivations relate to the perceived social capital in the case of Brazilian blogosphere. We explored how the different types of information published (regarded as meme) would spread within networks of blogs. In order to address those questions, we analyzed a small blog network (N=48 blogs), including the information they published (memes, N=988) and their motivations (through interviews N=32).

As results, we found out that bloggers perceive information they publish by a twofold prism: personal information (about themselves) or useful information (general information from other sources). As far as H1, we found out five key motivations for blogging: a) creating a personal space; b) sharing interaction; c) sharing knowledge; d) authority; e) popularity. These motivations were then connected to Putnam's concept of social capital [32] and classified as bonding, bridging and maintained values. Because bloggers realize information they publish have different values within their network, they choose to publish information based on the values that motivate them. These choices create different meme paths within the same network, as suggested by H2. While interactional memes tend to spread inside small blog networks, through strong ties and bonding and maintained social capital, it is likely informational ones tend to spread between these networks, only reaching one or two nodes at a time, connected to weak ties and bridging social capital.

This study was a qualitative one, bounded by its small group of interviewees and blogs analyzed. Thus, our results may not be found in other blog networks. Also, this study reflects results found in a Brazilian blog network, which may also be culturally different from other networks. However, the results show that users' motivations and social capital perceptions may play a part in the information flows within blog networks. Further research may focus, for example, in finding if those results are applicable to larger networks and in what way; or explore meme paths through the classification offered in this paper.

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