

# Reflexive practices in science blogs written by scientists

## *Práticas reflexivas em blogs de ciência escritos por cientistas*

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### ABSTRACT

We investigate the discursive configuration of science communication blogs written by scientists. From the theoretical perspective of Foucault and Maingueneau, we analyze the enunciations of 1,329 posts from 43 science blogs, identifying their discursive formations. We identified enunciations of the discursive formation of reflexivity. They constitute modalities of enunciation to talk about themselves, science institution and science and subject roles of scientist blogger protagonist, positioning the enunciator as a character of the enunciation, and as Scientist blogger commentator that enables him to give his opinion on scientific practice. Blogs become spaces of reflexivity for scientists and reiterate his social position of guardian of science discourse.

**Keywords:** Science communication, reflexivity, discourse, science blogs

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### RESUMO

Investigamos a configuração discursiva de blogs de divulgação científica escritos por cientistas. Partindo do aporte de Foucault e Maingueneau, analisamos os enunciados de 1.329 posts de 43 blogs, identificando suas formações discursivas (FD). Identificamos enunciados que se inscrevem na FD da reflexividade constituindo: modalidades de enunciação de falar de si, falar da instituição científica e falar da ciência e funções-sujeito de Cientista-blogueiro-protagonista, que posiciona o enunciador como personagem do enunciado, e de Cientista-blogueiro-comentador, que o legitima a opinar sobre a prática científica. Os blogs moldam-se como espaços de reflexividade para o cientista e reiteram sua posição de guardião do discurso sobre a ciência.

**Palavras-chave:** Divulgação científica, reflexividade, discurso, blogs de ciência

## INTRODUCTION

**B**LOGGING PRACTICE HAS already been consolidated as an academic social practice, being used by researchers and postgraduate students for educational, professional, scientific and many other purposes. Over the past years within this universe, there has been a growth in the use of science communication blogs, created and maintained independently by scientists. Grouped in network like *ScienceBlogs Brazil*, these webpages become interesting devices to communicate science to non-experts. An environment of science communication is created on the Internet, along with other digital social media such as Twitter, Facebook and YouTube.

Besides its science communication function, those blogs have also become a place where scientists can practice self-construction and exhibition, whose outlines differ from formal discursive spaces destined to these individuals. Vanessa Fagundes (2013) points out in her study that the emergence of researchers' blogs is linked to the context of transformations in the scientific community, in which the entrepreneurial discourse makes a great headway in the academic environment due to the closer connections between market, science and technology. In an environment shaped by the values of competitiveness, performance and success, scientists assume the strategic role of science communicators to promote themselves. Understanding how these processes of self-promotion are textualized is the new challenge.

Based on this perspective, we analyze in this article the discursive configuration of scientific communication blogs written by scientists. The paper presents some results from my doctoral research, focusing on the investigation of the discursive formations that form the materiality of these discourses. We focus specifically on Foucault's notion of discursive formation (1969, 1971), organized by Dominique Maingueneau (2011) in the context of Discourse Analysis. Our analysis focuses on a previously categorized corpus of 1,329 posts from 43 Brazilian blogs written by scientists, selected from January 2012 to December 2013 (Gomes; Flores, 2016). Our interpretation is also based on Anthony Giddens' studies (1990, 1991) on reflexivity in modernity, Baudouin Jurdant's (2006a, 2006b) on reflexivity in the sciences, and Laurence Allard's (2009) on reflexive individualism in social media.

## THEORETICAL-METHODOLOGICAL PERSPECTIVE: THE CONCEPT OF DISCURSIVE FORMATION

Discursive formation has gradually become a key concept in the Discourse Analysis studies practiced in Brazil and France since 1960. It is widely agreed

among discourse scholars that the concept has a dual paternity, as it was elaborated by Foucault and reworked later by Michel Pêcheux (1997) in the light of the ideology concept, in the framework of Discourse Analysis<sup>1</sup>. The approaches given to the concept by the two researchers have substantial differences related to the theoretical basis used by them and to the empirical objects analyzed. Due to theoretical affinity, observed both in our conception of discourse and in the object of research analyzed, we chose to use the idea of discursive formation developed by Foucault.

Discursive formation is conceptualized by Foucault in *L'archéologie du savoir* in an attempt to explain and describe its archaeological method, used in previous studies on the constitution of knowledge and sciences in a given historical context. In this first moment, we have the following elaboration of the concept:

In the case where we can describe a certain number of enunciations, a certain system of dispersion, and in the case that between the objects, types of enunciation, concepts, thematic choices, if one can define a regularity (an order, correlations, positions and functions, transformations), we will say, by convention, that it is a discursive formation – thus avoiding too many words filled with conditions and consequences, inadequate to designate such a dispersion as “science,” or “ideology,” or “theory” or “domain of objectivity”. (Foucault, 1969: 53)<sup>2</sup>

Foucault is interested in understanding the conditions that lead certain objects to arise and be legitimized at a specific time. His idea of discursive formation refers to a system of regularities and dispersions that rule historically dispersed discourses. This approach enables the theoretician to escape from totalitarian and unitarian conceptualizations as ideology and theory to try and understand the constitution of discursive objects from heterogeneities and the dispersion of their system. Thus, prior to being a linear progress of events, history is constructed from discontinuities, in a unique temporal dynamic in the formation of its discursive objects.

We must point out here that the fragments that constitute a discursive formation do not refer to the level of sentences and their grammatical traits, nor to the levels of propositions and their logical and psychological traits or formulations. Before having a syntactic/semantic, formal or conscious coherence, the discursive formation is related to what Foucault (1969) names as *a set of verbal performances linked together at the level of enunciations*. These elements constituted themselves in the relationship between discursive object, subject and discursive field, gaining existence in physical materialities. The process gives a

<sup>1</sup> Pêcheux's notion of discursive formation is directly influenced by the historical materialism and by the class struggle. Through the Althusserian lens, the theorist links the notion to ideology, defining it as an element that determines “what can be said (articulated in the form of a harangue, a sermon, a pamphlet, an exhibition, a program, etc.) from a given position in a given conjuncture” (Pêcheux; Haroche; Henry, 2011: 27).

<sup>2</sup> From the original: “Dans le cas où on pourrait décrire, entre un certain nombre d'énoncés, un pareil système de dispersion, dans le cas où entre les objets, les types d'énonciation, les concepts, les choix thématiques, on pourrait définir une régularité (un ordre, des corrélations, des positions et fonctionnements, des transformations), on dira, par convention, qu'on a affaire à une formation discursive – évitant ainsi des mots trop lourds de conditions et de conséquences, inadéquats d'ailleurs pour désigner une pareille dispersion, comme 'science', ou 'idéologie', ou 'théorie', ou 'domaine d'objectivité'”. Every quotation in this article was translated by the author.



reproducibility character to the enunciation, as it survives temporarily from its reuse in different historical circumstances.

Foucault (1969) emphasizes the analyst's effort to investigate the rules of discourse formation, which are not set in a given unit a priori. The analyst needs to undertake an archaeological analysis that could enable him to see in the regimes of dispersion in time the forms of regularity and order that rule the discourses. These regularities – named by him as “rules of formation”, which refer to objects, modes of enunciation, concepts and thematic choices – form the conditions for the existence of an object of enunciation and are responsible for giving unity to a discursive formation. This archaeological process can establish the positivity of a discourse.

From the Foucaultian perspective, we can summarize the notion of discursive formation as a *system of rules that conform the enunciations, the subject-functions that must be occupied and the discursive objects in a given context*. This system would be marked by contradiction, heterogeneity and historical dispersion, which puts it in contact with the interdiscourse, other-discourses that are precedent. It is thus based on the principle that discourse is historically constructed through a movement of reiteration/transformation and erasure of sayings. The discourse would then inevitably be related to power and to knowledge, since it constitutes its objects through procedures of selection and exclusion of some objects of enunciations.

Foucault's theoretical method inspired the constitutions of Discourse Analysis's French studies in the 1960s, whose object of study is the discursive exteriority of linguistic objects. The main idea is to approach objects as formed by discursive rules of formation that define what belongs to the discourse and what does not. The mode of apprehension of this discursive functioning implies understanding that the study of discursive formations starts from the analysis of language and its textual-discursive marks, extending to its exteriority.

Maingueneau (2011) reflects on the operational nature of the units worked by discourse analysts categorizing them into *topical units and non-topical units*. While topical units refer to elements that have already been formatted by verbal practices (such as types and genres of discourse), the non-topical units, which have the discursive formations as representatives, would be constructed by the researchers from the interpretation of the *corpus* of the research. For Maingueneau, the existence of Discourse Analysis studies is based on topical units, but also on the movements that exceed its borders:

Understanding Discourse Analysis exclusively on the territorial units is to deny (in the psychoanalytical sense) the reality of discourse, which is put in permanent relation by the discourse and interdiscourse: interdiscourse “works” the discourse,

which in return perpetually redistributes this interdiscourse that dominates him. From this impossible enclosure, the persistence of the idea of discursive formation seems to make sense: if there were no groupings of enunciations circumscribed by boundaries, there would be no Discourse Analysis, which would not know, however, how to satisfy itself with these units. (Ibid.: 73)

The non-topical units would be constituted through a movement of interpretation of the analyst, who locates the courses and discursive formations in the discourse analyzed. These formations shape what can be said in a given historical context and link the discourses to their historical thread of enunciations. From this point of view, we will observe in the next section the discursive formations in which the discourses of the blogs written by researchers are inscribed.

### **CORPUS ANALYSIS: THE DISCURSIVE FORMATION OF REFLEXIVITY**

We analyzed the discursive formations in a *corpus* of 1,329 posts from 43 science blogs written by scientists whose content had already been categorized in a previous study (see Gomes; Flores, 2016). Our interpretative gesture was based precisely on the results of this categorization, which found two enunciative categories assumed by scientist bloggers: one of the scientist blogger as a Science Communicator (A), in which the enunciator occupies a secondary place in the narrative, using strategies of detachment (present in 25% of the *corpus*), and the other one as a Protagonist (B), present in 75% of the *corpus*, where the enunciator occupies a central place in the discourse, using strategies of involvement (Ibid.).

The role of protagonism played by the blogger in most of the analyzed texts represent the very enunciative nature of generalized self-talk in blogging discourse. It allowed us to identify enunciations in blogs that are part of what we named the discursive formation of reflexivity. In our view, this formation conforms specific sayings of the blogs that distinguish them from enunciations assumed by scientists in scientific discourses, where the exclusion of marks of authorship predominates (Foucault, 1971). For this reason, we have chosen to explore it in our interpretive gesture.

For the Foucaultian studies, one of the main characteristics of a discursive formation consists in the logic of the repetition of its enunciations, which causes the discourse to rescue fragments that are historically previous to it, dispersed in the temporal logic of a certain discursive formation. In this sense, circumscribing the discursive formation of reflexivity means understanding that it has a logic



that allows us to explain its emergence and dispersion in the discursive objects of contemporary culture. We relate its logic to a will of self-reflection built up gradually by discursive practices of our society. We construct our argument based on the writings of Giddens (1990, 1991), Jurdant (2006a, 2006b) and Allard (2009), whose focus on reflexivity interest us substantially to develop a perspective about the reflective practices of the scientist on the internet. We briefly outline these theoretical axes below.

In modern times, the practice of reflexivity is established as a social element of reference. According to Giddens (1990), reflexivity in this period appears as a practice of evaluating actions in the light of other knowledge, a practice that is also used by all social sectors. The reflective form of modern social institutions has also affected daily practices of individuals. The exercise of reflecting on oneself, defining *who we are* and projecting *who we want to be* shows us how the construction of contemporary subjectivities occurs through the modern paradigm of reflexivity. This process, known by Giddens as reflexive individualization, transforms the self into a reflexive project of individual responsibility (Giddens, 1991).

The contemporary individual's identity production is made according to his capacity to construct coherent narratives of himself (Giddens, 1990). Baudouin Jurdant (2006a) has a similar perspective when he associates the notion of reflexivity with the subject's use of language in expressing himself. Instead of being a simple mode of self-awareness or appropriation by reflection, this practice refers to the *use of speech*, and constitutes a cleavage effect of the speaking subject. The researcher explains this process:

This division refers to the fact that the “subject of enunciation,” the “talking” subject, and the “subject of the enunciation,” the subject “spoken by the speech” designate, at the same time – here and now – in the taking of the floor and, despite the non-coincidence of these two inseparable faces of the subject, a single linguistic entity: the subject precisely. At the same time, in the name of the intentions that inspire me, I am the speaker of speech expressing myself, this speech constitutes me as spoken by it and, of course, different from what I believe to be when I take the floor. In other words, speech causes something to escape me from what I am as a speaker. It confronts me with an alterity present in the consciousness that I have of myself and the speech that constitutes me as subject. (Jurdant, 2006a: 132)<sup>3</sup>

Jurdant's perspective gets closer to linguistic studies by approaching the enunciation situation as the exact moment in which the reflexive process occurs,

<sup>3</sup> From the original: “Ce clivage renvoie au fait que le ‘sujet de l'énonciation’, le sujet ‘parlant la parole’, et le ‘sujet de l'énoncé’, le sujet ‘parlé par la parole’, désignent, à l'instant même – hic et nunc – de la prise de parole et malgré la non-coïncidence de ces deux ‘faces’ indissociables du sujet, une même entité langagière: le sujet précisément. Au moment même où, au nom des intentions qui m'animent, je me constitue comme porteur de la parole en la parlant, cette parole me constitue comme parlé par elle et différent, bien entendu, de ce que je crois être quand je prends la parole. Autrement dit, la parole fait que quelque chose m'échappe de ce que je suis en tant que parlant. Elle me confronte à une alterité qui habite la conscience que j'ai de moi-même et de la parole qui me constitue comme sujet”.



when there is a coincidence between the subject of the enunciation act and the subject of the enunciation object. There is a dialectical process in the constitution of this talking subject, which becomes the object of its enunciation in speaking about itself. The second point we highlight is the emphasis given by the researcher to the relationship between reflexivity and otherness, separating the reflective process from a simple awareness of the self. In this sense, the reflective process brings elements linked to a *non-identity of the subject*, which escape from his control over the image he has of himself. The operation of reflexivity would then take place through the relationship with the other, which causes the subject to reflect on his identity, separating the elements that define him from those that do not belong to him.

Shaped in relation to the other, the reflection and writing about the self conforms in varied modalities of enunciation in the contemporaneity, ranging from the intimate writing in personal journals and diaries to profiles in social media. Due to the social and cultural context in which the blogs studied are immersed, we are interested in highlighting how digital technologies conform these modes of enunciation and subjectivation. Laurence Allard (2009) studies this scenario from a sociological perspective, analyzing the generation of French digital natives and the performance of their identities in the network. In her opinion, by providing to the user an ability to act, the technologies of Internet communication respond to the desire of this subject to express himself and to construct his subjectivity. They would be, then, a privileged place to observe the sociological concept of reflexive individualism in action.

If you express yourself on the Internet via discussion forums, blogs, social media by creating small multimedia expressive objects like videos, photos, playlists, individuals have the possibility to stylize what he thinks or what he would like to be, to expose and, in return, to wait forms of intersubjective validation and recognition by others of the authentic character of this “aesthetic-identity” bricolage that represents a profile of Facebook, a blog post etc. (Ibid.: 68)<sup>4</sup>

Allard’s choice to use the concept of reflexive individualism to think about how the expressions of self on the web are shown is fundamental to articulate the production of subjectivities in the network to a possible reflexivity by its users. In this context, the social practices performed by young people in these technological devices would be ways for the “contemporary individual to experiment and explore the plural answers to the question ‘Who am I?’ at a time when former answers are no longer available” (Ibid.: 68)<sup>5</sup>. In this sense, the constitution of the self in the network acquires the character of reflexive

<sup>4</sup> From the original: “Ce clivage renvoie au fait que le ‘sujet de l’énonciation’, le sujet ‘parlant la parole’, et le ‘sujet de l’énoncé’, le sujet ‘parlé par la parole’, désignent, à l’instant même – hic et nunc – de la prise de parole et malgré la non-coïncidence de ces deux ‘faces’ indissociables du sujet, une même entité langagière: le sujet précisément. Au moment même où, au nom des intentions qui m’animent, je me constitue comme porteur de la parole en la parlant, cette parole me constitue comme parlé par elle et différent, bien entendu, de ce que je crois être quand je prends la parole. Autrement dit, la parole fait que quelque chose m’échappe de ce que je suis en tant que parlant. Elle me confronte à une altérité qui habite la conscience que j’ai de moi-même et de la parole qui me constitue comme sujet”.

<sup>5</sup> From the original: “l’individu contemporain peut expérimenter et explorer les réponses plurielles à la question ‘Qui suis-je?’ à un moment où les réponses ne sont plus disponibles”.

practice by allowing the subject to reflect on their own identity constitution. This identity is constituted on the web from the relationship with the otherness, since social media make emerge expressivist practices.

Our interpretative effort allows us to construct some links between the contemporary reflexive individualism and the discursive logics of the science communication blogs written by researchers. For us, the enunciations of these spaces are governed by the same set of rules as the discursive practices of web exposure of other blogs and digital social media. As we will see later, this same set of rules, which we named the discursive formation of reflexivity, also governs the science communication discourses. The enunciations of the science communication blogs written by scientists occupy a space between blogging and science communication discourses (Figure 1).

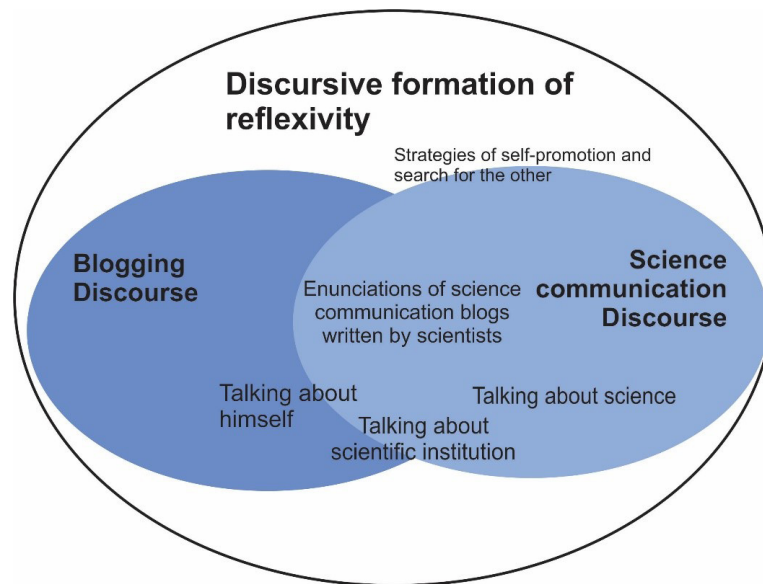


FIGURE 1 – Discursive formation of reflexivity

Source: Author's elaboration, 2017.

The discursive formation of reflexivity is a system that defines the enunciations of blogs written by scientists, as well as the other enunciations of blogging and science communication discourses. Its rules *establish reflection as a central element of these enunciations, positioning the enunciator/scientific practice, scientific institution and science as the objects of its saying*. As we will see throughout our text, this discursivization gains diverse outlines, formatting subject-functions and specific discursive strategies. However, its regularities –



which refer to a subject reflexive turn – are the ones that allow us to refer to it as a particular discursive formation.

As we observe the connections from the discourses of the blogs written by researchers, we realize that its organizing system conforms from strategies and enunciative modalities that are proper to this discursive formation. The constitution of the subject enunciator as an object of his saying occurs through an imbrication between the strategies of self-promotion and the search for the other and the enunciative modalities of: a) *talking about himself*; b) *talking about the scientific institution* and c) *talking about science*. Each of these modalities groups similar enunciations, discursive objects and subject-functions that the enunciator must occupy to become the owner of his saying. These discursive constructions allow us to see, for example, the transformation zones and the displacements of this specific discursive formation (Figure 2).

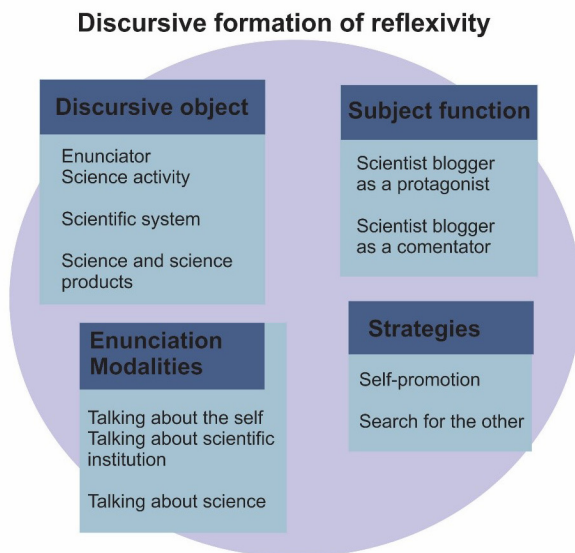


FIGURE 2 – Enunciative system of the discursive formation of reflexivity in blogs

Source: Author's elaboration, 2017.

As we can see in Figure 2, the themes and sayings that belong to the order of the discourse of blogs are determined by different discursive levels, which maintain, by its turn, interdependence connections among them. Thus, the functions-subjects of *scientist blogger as a Protagonist* and *scientist blogger as a Science Commentator* are determined and determine the modalities of enunciation of *talking about the self*, *talking about scientific institution* and

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*talking about science and the discursive objects of enunciator, scientific system and science.* This network of relations also determines the strategies of self-promotion discourse and the search for the other, which directly affects the conformation of the discursive themes.

The recurrence and relationship between the modalization forms on science blogs enunciations and the content of blog posts can be seen in Table 1. The talking about the self unfolds in the subcategories Showcase, Diary and Personal; the talking about the scientific institution appears in the subcategories of Bulletin board and Criticism, while the talking about science appears in the subcategory of Science communication themes.

Enunciation modalities	Subcategories	Discursive object	Subject function
Talking about the self	<b>Showcase</b> [To give visibility to the scientist blogger and his research group]	Enunciator Scientific practice	Scientist blogger as a Protagonist
	<b>Diary</b> [To reflect about life in Science labs and other themes related to the scientific practice and science]		
	<b>Personal</b> [To reflect about personal life and other non-scientific subjects]		
Talking about scientific institution	<b>Bulletin board</b> [To announce scientific events and news. To give tips to researchers]	Science institution and Science system	Scientist blogger as a Science communicator
	<b>Criticism</b> [To criticize the scientific and educational systems or scientific researches]		Scientist blogger as a Protagonist
Talking about Science	<b>Science communication themes</b> [To promote scientific research and information about science]	Science and its products	Scientist blogger as a Science communicator

Table 1 – Enunciation modalities on science blogs enunciations

Source: Elaborated by us from Gomes and Flores (2016)

In Figure 3, we present a graphic with the amount of occurrences of each category in the 1,329 analyzed posts. We observed the predominance of talking about the self over the other two categories, representing 57% of the analyzed *corpus* compared to 18% of the talking about science and 25% of the talking about the scientific institution. In the subcategories of self-talk, the Personal subcategory stands out with 34% of the posts, followed by the subcategories of Diary (15%) and Showcase (8%). The subcategories Criticism (18%) and Science communication themes (15%) appear as the second and third most frequent, representing, however, a lower percentage if compared to the first subcategory. This occurrence shows us that blogs are used, primarily, for sharing and reflecting on non-scientific content, for reflecting on daily research, for disseminating scientific subjects and for criticizing scientific system and its praxis. The use of blogs as document repositories and for promotion of scientific events (represented by the subcategory of Bulletin board) appears in the corpus in a secondary form (Figura 3).

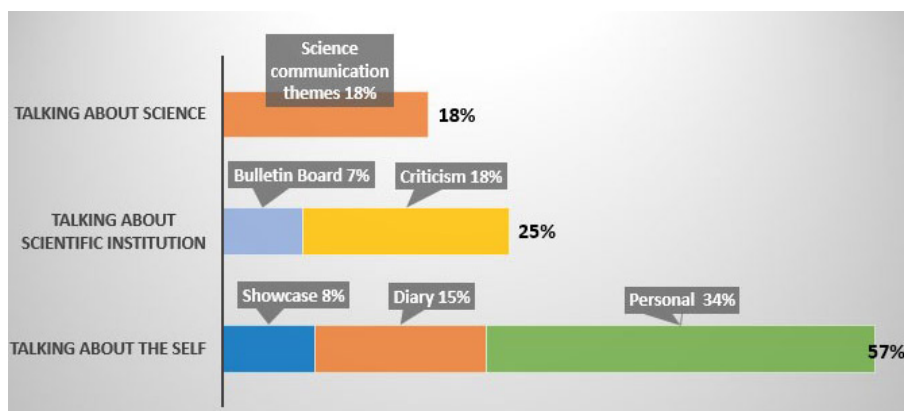


FIGURE 3 – Percentage of the *corpus* subcategories and categories

Source: Author's elaboration, 2017.

The enunciative mode of *talking about the self* is characterized by positioning the enunciator as the center of his enunciation. The difference between this one from other enunciations of the discursive formation of reflexivity lies in the fact that the scientist blogger is the discursive object, becoming a character of his own narrative. This configuration rescues elements of *blogging discourse*, such as the textualization of self in personal blogs, marked essentially by the personification of that space and a narrative that privileges elements of the enunciator's everyday life and personal records of writing. For this reason, the enunciations refer to the Internet's power effect based on the individual's

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freedom of expression (Komesu, 2005) and in the more frequent exhibition of elements of the private sphere of blogs.

The talking about the self constitutes the subject-function of scientist blogger as a Protagonist, marked by enunciative strategies of involvement with the enunciation. We can see that the talk about the self appears on the Diary subcategory posts, which take the enunciator as an object of narration (Gomes; Flores, 2016). The exercise of writing about his routine would imply a reflection of the scientist blogger on the situations and circumstances narrated, producing a reflective discursivity. Let us see, in Example 1, how this process occurs:

[**Example 1**]: I took care of other people's experiment as if it were *mine*. But ***I never got*** a chance to *see an experiment die*. So far. *My new son* has a date to die. The tenth of February. A week from now. A. Week. It may sound crazy, but today ***I'm sad***. Because it's like living with someone who has a date to die. A day and an hour. Sentenced to death. And ***I will be*** the one to whom the experiment will say its last words, offer its last results, give its last breath. And this is so damn sad. ***I never thought*** it was like this. ***I always thought***: turn it off, come on, it's over, let's do something else. But now that this is concrete... ***it's distressing***. Next week, after ***I run*** the last experimental sequence, get the last data, and finally turn off the equipment for the last time, ***I'm going to have*** a minute of silence in respect to my experiment<sup>6</sup>.

<sup>6</sup> HENN, E. Vida e morte de um experimento. Notes of Laboratory. 2 Feb. 2012. Available from: <<https://googl/EdYLuP>>. Access on: 11 Nov. 2015.

In the text, the enunciator places himself as the object of his enunciation as he narrates his relationship to his experiments, subjectively implicating himself in his discourse. This implication, constituted by the use of the first-person singular (highlighted in bold in the passage) and by the enunciator's states of humor expression ("today I am sad", "it's distressing") produces meaning effects that mix the instances of the scientist and his scientific object. The relationship is reiterated by the enunciator's treatment of his scientific experiment, turning it into a person ("seeing an experiment die", "my new child", "is like living with someone who has a date to die").

The recurrence to an emotive sphere, indicated in Example 1, as well as the writing about the self, interconnect the enunciations of the self-talk in the blogs to their discursive memory, the discourses of personal diary and personal blogs. In both cases, the enunciations are shaped by the expression of self that gain, at times, reflection or complaint looks. In Example 2, the hashtag used by the blogger on his post (#DivãDaPós<sup>7</sup>) already guides the saying of the blog as a place of reflection about the academic life:

<sup>7</sup> Translator's note: "Divã da Pós" means literally "Analyst's couch of the Post-Graduation" and refers to posts that use a confession discourse.

**[Example 2]:** The blog has been in a hiatus for a little over a month, and this is due to a gigantic experiment from *my master's* and another colleague's lab, which was held on the 5th and 6th of last week (15th and March 16th). And when I say it's a gigantic experiment, believe me. It's so big that when we do it, we practically *interdict* the lab – not only because we need a lot of manpower but also material and equipment. On Thursday, the experiment started at 7:30 a.m. and finished at 8 p.m. – I stayed there until 10 p.m. to complete two spin cycles – and on Friday *we were able to finish at 6 p.m. Best of all was having the boss asking me to tabulate all the data, assemble the charts and do statistical analysis of everything for the following Monday*<sup>8</sup>!

Examples 1 and 2 belong to the subcategory of Diary and constitute a self-talk because they imply a look at the subject-scientist and his daily practice. There is an imbrication between the positioning of the enunciator and the textualization of his professional activities. The discursive constructions of these enunciations relate daily practice and the enunciator's way of thinking to the position of scientist, in excerpts of texts in which he assumes or questions his professional practice.

The talk about the scientific institution appears as the second enunciative modality of the discursive formation of reflexivity in blogs. It is formed by a displacement of this discursive formation, which produces discursive objects and subject functions that are distinct from the enunciative modality of self-talk. Here, instead of showing itself as a character of the narrative, the enunciator positions the institution and the scientific system as the object of his discourse, starting to define his opinion and his reflections on this theme. This configuration appears in texts of the subcategories Bulletin Board and Criticism. In this last one, the enunciator assumes the role of institutional subject that criticizes the functioning of the scientific system (Gomes; Flores, 2016). Let's look at Example 3:

**[Example 3]:** Everyone imagines - correctly – that research labs are filled with expensive, complex, and almost magical equipment. In almost 100% of the cases, this is true and implies another characteristic: they are imported. Hence, in addition to all the complication to obtain the money to the purchase, the importation and the receipt of the said one, we have the mother of all the Evil: the Bureaucracy [...] Dona Burocra<sup>9</sup> (affectionate nickname given by a great friend and adopted by many with whom I work) does everything to catch you. Whether it is lack of space in the laboratory, quarrel between departments to decide who will “host”

<sup>8</sup> ELIAN, S. Em busca da estatística perfeita #DivãDaPós. *Culture medium*. 20 Mar. 2012. Available from: <<https://goo.gl/sGL347>>. Access on: 9 Nov. 2015.

<sup>9</sup> Translator's note: “Dona Burocra” literally means “Mrs./Lady Bureaucra”.



<sup>10</sup> CUNHA, G. Burocracia eterna das trevas. *Rna-m*. 10 Feb. 2012. Available from: <<https://goo.gl/ZS2w5J>>. Access on: 12 Nov. 2015.

the novelty, institutional patrimonial (sic), etc. obstacles. You can choose at will because the menu is extensive<sup>10</sup>.

In Example 3, we observe that the subject of the enunciations focuses on a scientific subject that places the scientific structure as the center of the enunciation, criticizing the bureaucratic practices present in the universities and research centers. This is marked in the text by the absence of personal particles (the enunciator is not explicitly present in his enunciation). Nevertheless, this enunciative modality implies the enunciator in his discourse, placing it in the position of subject that only criticizes the scientific system because it knows its faults, dynamics, etc. This implication allows us to refer to these enunciations as inscribed in the discursive formation of reflexivity. It is in the act of textualizing his opinions that the scientist reflects on his professional world.

At first, describing where the sayings that update these enunciations come from seem to be a difficult task, since these sayings constitute an everyday informal space difficult to be identified, intersected by discursive practices and diverse discourses. We have noticed, above all, that talking about the scientific system is the topic of informal conversations among scientists, where they share the dissatisfactions and expectations of these individuals in relation to the scientific system. The textualization of opinions, however, also refers to the discourse of blogging and to the figure of the enunciator blogger as a commentator on a certain theme. Otherwise, this enunciative modality rescues other discourses, such as the pamphleteer discourse, in its most polemical and opinionated configuration.

In these enunciations, we have the constitution of a subject-function of a commentator scientist blogger, who marks his protagonism in the text through the insertion of his opinions. These take various configurations depending on the tone and the records of the texts. In every case, whatever is done is textualizing the blogger's perceptions about scientific activities and their professional environment. Here's another example:

**[Example 4]:** *Unfortunately*, this comic shows a reality in psychology courses. We see some authors who write a lot about nothing and end up being worshipped, as if being more complex would make it truer. *I believe* that what is missing is knowledge of science in general: one of the goals of science is to explain how things work (or why people do the things they do) by seeking regularities. [...] the science of behavior simplifies these phenomena by explaining them in laws that make it easier for us to understand and act upon people<sup>11</sup>.

<sup>11</sup> EPAMINONDAS, F. Teorias na psicologia: quanto mais complexas melhor. *Psychological*. 16 May 2012. Available from: <<https://goo.gl/wwEqpw>>. Access on: 12 Nov. 2015.



As we can see, the central characteristic of the enunciations of this enunciative modality is to construct a place of enunciation of the subject that knows scientific practices, science and the reality of psychology courses (Example 4) and, for this reason, give some opinions about the subject (using expressions of the sphere of opinion, such as “unfortunately” and “I believe”). The simple textualization of these comments on academic life is the scientist blogger’s process of self-knowledge, who defines, explains and justifies more clearly – for himself and for his readers – his opinions and positions in relation to the proposed themes.

The third enunciative modality of the discursive formation of reflexivity refers to the speaking about science. The enunciator establishes science and its products as a discursive object in this one. Here, the discursive formation suffers another displacement, moving from daily narration and opinion records of self talk and talk about the scientific institution to informational records. This configuration gives these enunciations a connection to Science communication discourse enunciations, also inscribed in the discursive formation of reflexivity.

Before we give examples of this specific discursive configuration, we must make some observations about the fact that science communication is involved in the discursive formation of reflexivity. According to Jurdant (2006b), before being based on the current discourse of knowledge sharing for laypeople, science communication practices would come from the reflexive need of the scientist and scientific societies. The researcher points out that this demand would be due to a historical absence of reflexivity in scientific activities, which do not instigate the scientist to reflect on his way of seeing reality. This process is complemented by the use of scientific language, which operates a systematic pilfering of enunciation (Jurdant, 2006a; 2006b). It revolves around the use of a writing that imposes a distance between enunciator and enunciation, producing a writing without subject and without reflective traces.

The Science communication discourse would work the reflexivity of the sciences from its submission to the reflexive demands of speech, dynamics explained by Jurdant (2006b: 55) in the following passage:

If it is true to say that language provides the experience of reflexivity only in its oral dimension, and if it is true to say that scientific communities resent this demand in the name of its social-cultural integrity’s need, then we can understand that popularization arose as Science’s “oral appropriation” mechanism, which is, first and foremost – we must not forget – written. Then, popularization would have as an essential goal “make science talk”, which implies, at the same time, its integration



in common language and the privilege that it grants to the relationship between science and reality, between words and things.

From the construction of narratives that often resemble the oral dynamics of dialogues and the explicitation of the enunciate's situations of enunciation, science communication activities would have the textualization of science as one of its fundamental roles, integrating it to reality through mediation with the language of common sense, from everyday discourse.

Although they are part of the science communication universe – from the establishment of science and its products as an object of their discourse – the enunciations of blogs written by researchers have particularities in relation to other enunciations and discourses of science communication. These appear mainly when we realize that the institutional differences between the blogging discourse and the science communication discourse constrain their enunciations differently, individualizing them. The enunciations of blogs written by researchers would be, for example, constituted by a mixture of discourses besides the discourse of science communication, like discourses of the self, humoristic, publicity, among others (Cortes, 2015). These particularities appear in the way the enunciator is shown in the text, moving to a relation of proximity between what is enunciated (Example 5):

**[Example 5]:** And when *I talk* about the immune system, *you already think* about antibodies, lymphocytes, immunoglobulins... but no, these animals are much older than the mammalian adaptive immune system. They have an innate immune system. And that comes down to, and that was one of our discoveries, *only one kind of cell! But these little animals are sinister!* They phagocytose bacteria, bombard them with reactive species of oxidation and, to ensure that they do not appear anymore, they trigger antimicrobial peptides from their granules in the hemolymph of the beast<sup>12</sup>.

In the excerpt, the use of the first person and exclamations and personal comments (“only one kind of cell!”, “But these little animals are sinister!”) produce effects of sense of involvement of the scientist blogger with his enunciations and research scientific narrative. These enunciations slip into other spheres beyond the discourses of science communication and science, such as everyday discourse, resembling, for example, an informal conversation among friends about the research reported.

The modality of enunciation of science talk takes on two distinct configurations in blogs: the talk of its own scientific research – practiced by

<sup>12</sup> REBELO, M. O “mainframe” da vida. *You, Biologist...* 2 Mar. 2013. Available from: <<https://goo.gl/34p69d>>. Access on: 13 Nov. 2015.





be said, discursive formation also ends up circumscribing what is excluded from its saying. This system would then function through the principle of the rarity of discourses, which stresses the fact that discursive enunciations and formations are the only significant sets that could be enunciated (Foucault, 1969). Discourse would be built in this movement of choice of what it constitutes as enunciation and of exclusion of what cannot be enunciated.

In blogs, the conforming to discursive formation of reflexivity implies certain discursive restrictions and silencing of enunciations. We observe, above all, that in conforming certain ways of speaking about science and the scientific institution – focusing on a specific version of science, scientist and scientific community – the discursiveness of blogs erases the social disputes and theoretical ambiguities of the scientific field, not addressing the discussions around what is science and its construction processes, much less the academic conflicts that define the logic of this field.

The non-publishable in these discourses is embodied in the figure of pseudoscience, whose information on scientific facts is not grounded by the application of scientific methods. This simulacrum intends to be believed as science and is often reinforced and spread socially by scientific journalists and other social actors who have little knowledge about the logic of the scientific method. The process of confronting the discursive representation of pseudoscience occurs through the introduction of the scientist as the most qualified enunciator to talk about science. Consequently, this demarcates the discursive object of which we speak – science itself – and the space of interaction destined to the reader of the blog.

The position occupied by the scientist blogger is that of a spokesperson of science (Cortes, 2015), whose function is to interpret science for a lay public. For Cortes (2015), this position conforms the subject-positions of the guardian of science, of science literacy and controller of reading, and shows the power of scientist blogger even in spaces intended for the participation of the reading public, as in the comments section.

The subject position of guardian of science appears, for example, in the post of the Red Queen blog: “*To graduated and undergraduated scientists and teachers: it is up to us to talk about Science*”<sup>14</sup>. The text values the work of the blogging scientists in the production and dissemination of “quality scientific content, free of ideologies that distort knowledge”, putting itself in opposition to other internet content motivated “by financial or political-religious incentives, such as ‘alternative cures’ or climate deniers”. By showing “true science” to its reader, the enunciator ends up by reiterating the explicit demarcations between

<sup>14</sup> The post can be read at:  
<<https://goo.gl/ZB9gvx>>.  
Access on: 7 Mar. 2015.

the position of scientist and laypeople, a typical division of the traditional discourse of scientific dissemination.

Science is represented, in the discourse of blogs, as a finished product, erasing enunciations that deal with the scientific process. In the specific moments in which the enunciator publishes his researches, the reported works are already finished and published in scientific journals. When bloggers escape this rule and report on work in progress, such as the blog *You, Biologist...*, the enunciator provides only a small amount of information about his scientific research, without discussing or explaining his construction process. Specifically, we are talking about the blogger's scientific crowdfunding initiative, which prompted readers to fund the research project developed by their research group on golden mussels<sup>15</sup>. Despite the participation of non-scientists in the project and the explanation of the research object, the research processes and the results developed from this initial phase were not disclosed later in the blog. These elements encourage us to think that the enunciations of the blogs are marked by the restrictions regimes of the saying of the scientific field, since to enter the order of the discourse of blogs it is necessary that the study has been approved by the spheres of discursive legitimation of the field.

A kind of naturalization of what is science is produced, taken as an activity defended by the scientist blogger. This subject hardly engages in a problematization of this concept, treating science as a structure linked to the unraveling of scientific facts rather than being a historically determined construction. For his social position as a scientist, the blogger would naturally have lenses to identify and separate science from pseudoscience. At no time is this ability put in check or is the fact that these lenses are built into communities of specific practices that would be transformed according to the scientific paradigms in vogue in a particular scientific area or historical period. It leaves out, therefore, an entire aspect of the discussions about the construction of scientific knowledge and the separations between science and non-science operated by modern science (Santos, 2006).

The discursivization of science as a product causes readers to access only a simulacrum of science and not the scientific knowledge itself. This type of scientific dissemination, based on “empty information, news, slogans and vague comments about the facts surrounding the world of science,” would place the public in the position of mere consumer of information and would not offer it “the condition of relating themselves to science in a critical and participatory way” (Cortes, 2015: 238).

This configuration would reinforce what Lévy-Leblond (2008) considers to be the very logic of scientific dissemination, which treats activity as a

<sup>15</sup> Published in April 2013 through a website, a Facebook page and blog posts, the project had more than 350 donors and collected over R\$ 40,000 in 60 days. The initiative was the first Brazilian scientific crowdfunding experience and it was also advertised in high-circulated newspapers and magazines, such as *O Globo* and *Estado de São Paulo* newspapers and *Ciência Hoje*, *Galileu* and *Superinteressante* magazines. The posts on the blog *You, Biologist...* about the crowdfunding are available from: <<https://goo.gl/w5wiQR>>. Access on: 29 Nov. 2017; and <<https://goo.gl/UwD12p>>. Access on: 29 Nov. 2017.



mere matter of understanding knowledge rather than addressing its political dimension and the sharing of power implied in the processes of democratization of science. For this reason, an uncritical view, that does not problematize the speech power granted to the subjects that know the world of science, denied to the lay public, is developed.

The positivity of blog discourse reinforces values about science as an activity that generates products and knowledge of public interest and, therefore, deserves to be disseminated to society. The maxim of public interest permeates the image of the scientific community constructed by these discourses, as a group of people committed to the collective undertaking of making science, in a collaborative logic of scientific knowledge construction. At the same time that it reinforces the social values of the scientist as humility, curiosity and disinterest, this positivity leaves out the disputes of power existing in the scientific community, which is also constituted by the symbolic struggles for scientific capital among its actors. Enunciations about enmities, academic conflicts and authorship, that sometimes become so existent in scientists' relationships, are excluded.

By deciding to exclude from their enunciations the academic conflicts, the discursivities of blogs produce the image of the scientific community as an area ruled by ideals of universalism, communism and disinterest. The idea is that the scientist cooperates with his colleagues in the production of scientific knowledge and has as sole objective the progress of science, erasing aspects related to the individual interest of this subject and disputes for legitimation among the agents of the field. In our view, this discursive construction strengthens the scientific community before other social actors, since it legitimates scientists as responsible for producing a collective good. This process of legitimation would be put in check if the cracks of the scientific system were shown, such as personal interests that also govern these social actors, or even the climate of dispute and competition that sometimes prevails in scientific laboratories.

### **SOME CONSIDERATIONS**

In this article, our goal was to understand the logic of the constitution of the discourses of scientific dissemination blogs written by scientists. Through an interpretative gesture, we explain the enunciations of these spaces as governed by the same formation rule, called discursive formation of reflexivity. There is thus the reiteration/modification of enunciative positions – from Scientist protagonist to Scientist commentator and disseminator –, of discursive objects and enunciative modalities of talking about themselves, talking about the



scientific institution and talking about science and its products. In the midst of the universes of Science communication and blogging discourses, various meanings are produced.

The construction of the scientist's self conforms through the establishment of an enunciative position of the legitimized subject to talk about science. The strategies of the enunciator's involvement with his enunciation predominate, either through the narrative of his daily research or the insertion of his opinions and reflections on the functioning of the scientific system. We see this position of involvement even in posts focused on the dissemination of science and its products. Here, the use of informative records is blended with an engaging and colloquial narrative about the scientific universe. The addition of emotive fragments and personalities in the discourse of scientific dissemination makes these enunciations unique in relation to other enunciations of the field, whose formal marks tend to erase the enunciator. It is shown, in a way, that the manners of talking about science do not necessarily need to be linked to formal records of enunciative departure.

Another interesting element is the way in which the opinionated and emotional fragments overflow to the discourses on the scientific practices. Circulating enunciations in the informal spheres of research practice are textualized in blogs, taking shape in posts where the scientist blogger poses as a critic and commentator of his practices, of his colleagues' practices, and of the scientific system. This reflexive process installed in this materiality still occurs in a punctual way, which can be noticed by the discursive restrictions present in blogs. Blogging scientists do not reflect on the nature of the science they produce by excluding broader discussions about scientific epistemology from their agenda. The naturalization of science serves as a mechanism to reinforce the enunciative position of the blogger, in so far as it does not make room for ambiguities around what is or what is not science.

The reflexivity of the scientist and the science in the blogs does not imply the proposition of discussions/debates or discursive reformulations, but rather it moves to the sphere of the scientist's promotion of himself. It acts in the consolidation of a specific image of science and scientist, whose elements are consistent with the images conformed by the scientific community in other spaces. Discursive elements of scientific communities are perpetuated in these discourses, such as the separation of science from non-science and the position of the scientist as a legitimized subject to disseminate science. The scientist blogger maintains, then, social control over the discourse on science, reiterating his position before other social actors. ■

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