

# Appropriation of the Gender of Science Communication by Children: Fragments of a Journey

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The purpose of this study is to understand which textual skills children appropriate in interactive situations with science communication texts. For this, oral and written texts were analyzed where children expressed their understanding about a scientific concept. The theoretical and methodological perspective of the analysis draws on the Bakhtin's conceptions of verbal interaction and in the micro genetic analysis. Scenes of work from science classes were recorded. The participants were 9-10 years-old children who attended the 4<sup>th</sup> year of a public elementary school in Belo Horizonte. The analysis of both the episodes and the texts produced by the children showed that the interaction with science communication texts provided to children starting to read an opportunity to appropriate textual skills reflected on the speech and writing during a science class to be closer to the knowledge produced from science communication texts. However, it was observed that such process does not occur spontaneously, since it is necessary that the educational context provides support to work with the language, instead of only talking about it. Therefore, science communication texts may enable to express the knowledge, the appropriation of strategies and textual skills along with the ability of using an explanatory language.

**Keywords:** Appropriation; speech; science communication; Primary school.

## Introduction

In the last three decades, studies on the text have been intensified, introducing a new perspective on the language in the classroom. Presently, the text as a learning and teaching mediation object has been highlighted in major part of the researches in terms of its functioning and in the range of its production/reading context, showing the meanings generated above the formal aspects of the language (ROJO, 2004; 2008; SCHNEUWLY; DOLZ, 2004; GERALDI, 2006;). The present discussions on the textual approaching in the classroom point out practices connected to the use, appropriation, reception and circulation of texts in the school environment.

In fact, Almeida and Giordan (2014), in their studies on the orality in Science

classes showed that children disclose their experiences in their way of speaking by reading texts of science communication in the classroom. Those authors draw the attention to the fact that when children are stimulated to interpret a text and to produce meanings about it, it is generated a mechanism through which they – along with the teacher – take over some ways to *say the text*, characterizing a metalanguage practice. It is a work of comprehension performed by each child when they try to make his/her speech more intelligible and closer to the explanations of the gender being studied. After all, it is required to *say the text*, and for this, it is necessary to make it according to the classroom, conventions of the audience and the content and form of the text. Thus, for Almeida and Giordan (2014), talking about texts of science communication in the classroom constitutes an important literacy practice for children to understand the language used in Science classes.

It is worth remembering that in the National Curricular Parameters of the Elementary School of Science (MEC, 1998), oral and written texts are deemed fundamental modalities for the student to be able to confront and re-elaborate his conceptions. This document points out the difficulty children face to read scientific texts, due mainly to the impersonality of such language, which is opposed to the day-to-day language embraced by personal forms.

In such extent for Espinoza (2010), the gender of science communication is presented as a possibility to know some features of the scientific work and speech. For this author (2010), in Science classes, normally one is not thinking on reading situations as a teaching and learning scenario involving simultaneously the learning of knowledge in the area as well as the reading in a general way. The situations proposed often start assuming that students already know how to read, and this is enough to interpret the text. Espinoza also points out that in the early years of the elementary school, reading scientific contents is often at service of the literacy learning in the sense of learning the reading and writing technique.

By his turn, Gouvêa (2000) points out that working with text in Science teaching is a path for the students to learn how to use the scientific language adequately within its context of use. According to this author, the scientific text is characterized by the formality, and it is denominated as such not only because it deals with science, but also because it presents a conventional schematic organization, and typical syntactic and lexical structures. Therefore, for this author, reading scientific texts demands learning.

Thus, seeking to study literacy interactions and practices in Science classes, we followed for three months a classroom that used the magazine *Ciência Hoje das Crianças* in its routine. In a class mediated by an article from that magazine, the production of oral and written texts was observed. From the analysis of that class, it resulted the textual skills assumed by the children, observing the structure of the teaching activity and discursive actions by both children and the teacher.

## Theoretical assumptions

The movement performed by the child to learn oral and written texts is complex, involving a *continuum* that includes cognitive and metacognitive knowledge and skills. For Soares (1995), speaking and writing involve the ability to select the relevant information on the theme of the text, identifying the presumed interlocutors, deciding how to organize the ideas in the text and how to present them in an adequate way. It is within such context that this paper is inserted, and its purpose, as it was previously explained is to understand the path children take in their appropriation of the textual skills of the gender of science communication. Inspired by Bakhtin, we have as premise the idea that the speech is built through verbal interaction. This is an essentially dialogic construction, once it is not possible to teach textual skills without taking into account the social relationships.

According to the Bakhtin's speech conception (1992), two faces compose every word: one of them when addressing to someone, and the other proceeding from someone. The word constitutes the exact product from an interaction between the speaker and the listener, and it serves as the expression of one in relation to the other. "The word is a shared territory whether by the issuer or by the recipient" (BAKHTIN, 1992, p. 85). That said, a declarative intention is always mediated by the intentions from others. This way, for Bakhtin every enunciation is necessarily driven to the other. For this author, the enunciation is a product of a social relationship, and any enunciation will be part of a gender. Furthermore, genders are perceived along the course of our life as participants of a given social group or member of some community. Thus, every enunciation, regardless its modality is marked by changes of the speaker, and they are connected to previous enunciations and to the enunciations previously announced by the next speakers. The enunciations are produced by pieces of enunciations from others, and even,

our speech.. is fulfilled by words from others, at several levels of what comes from ourselves, variable levels of awareness and removal. The words coming from others carry their own expressions, their own tone of the assessment, which is then absorbed, reworked and re-accentuated by us (BAKHTIN; FAIRCLOUGH, 2001, p. 134).

In such extent, the text absorbs other texts as it was answering them, meaning: "enunciations are intertextual, built by elements from other texts" (FAIRCLOUGH, 2001, p. 134). Bakhtin (1992) points out that two aspects determine a text as being an enunciation: the project of saying something by the author, and the production of such enunciation linked to the condition of the production and its relation to other enunciations. Such understanding is extremely important to identify both the style and the voices present in the enunciations.

Inspired in the studies by Bakhtin, Marcuschi (2001) asserts that every gender is accomplished in texts, and both the spoken and the written discourse share the

same linguistic system to organize their enunciations mobilized according to each social communication event. For this author, those modalities should not be seen in a dicotomic way, but instead, as part of a typological *continuum*. Hence, orality and writing are practices of using the language with specific characteristics, as they present conditions of a different production. Upon such perspective, the studies on the textual genders help to understand how the gender of science communication circulates in the classroom and to identify the strategies used by children in the construction of that gender both in the oral and written modalities.

By the way, the interactions of the reader with the text have been object of an increasing concern in several researches in the field of Science Education (ALMEIDA; ICON, 1993, 2010; ESPINOZA, CAJAMAJOR; PITTON, 2009; ESPINOZA, 2010). However, major part of the production in the area is focused on the final cycles of the elementary school. There have been few studies on the relationships between reading, orality and teaching in Science classes in the early years (ALMEIDA, 2011).

By their turn, Val and Barros (2003), in a research performed with children of the first grade in a public school point out that even before they can dominate the formal mechanisms of writing, the children disclosed knowledge on some textual genders. Thus, that knowledge was identified in the children's orality. Those authors highlight the importance of the orality when learning written texts.

In terms of the researches on literacy, Kleiman (2004) proposes to consider the oral practices. According to this author, the insertion of the student into social practices of the use of writing is supported by the literate orality of the teacher. The core element of literacy events into the school context is the oral practice performed by the teacher, once the complex genders of writing are taught along the class via oral face-to-face interaction (KLEIMAN, p. 23, 2004). The problematic shaped in such optics is the effectiveness or efficiency of the oral speech by the teacher to mobilize references and knowledge related to the construction of the knowledge and practices on the language, particularly in the written modality. This suggests that communication events mediated by language activities constitute the places where language practices are materialized by means of empirical entities which are the texts. In this way, working with language at the school must favor the reading and the discussion on several possibilities of reading, talking and writing a text according to the context, purpose, the text and whom will receive it.

In the Science classes studied by Almeida (2011), when they were invited to talk and write, the students did not repeat the read and heard texts. They transform the language of the texts in the classroom, performing a work of comprehension that, according to Marcuschi (2001), involves a very complex cognitive activity. For Geraldini (1991), when reproducing a text, the individual makes *a proposal of comprehension* to the interlocutor, and in this process, he performs actions *with* the language and actions *on* the language. This is accomplished by means of selections of strategies to the saying that involves the cognitive activity.

By the other side, in her studies on the literacy, Goulart (2006) points out that

the literacy affects the thinking by developing the means to *talk about the* text. Still, the author points out the importance of the teaching practices that: a) work with children different social languages in which the inter-relationship of genders in the primary and secondary discourses be experienced; b) involve situations where the written language is the source for interactions, thus constituting literacy events; c) promote the reflection on the own language in the sense of the metalanguage development.

Within such perspective, in relation to the written texts produced by children, it can be asserted that they appropriate the textual skills, making up a mediated part by the orality and reading. This means movements of coming and going, and important breaks at the textual-discursive level, once such process is permeated by the dialogic interaction. This way, writing can be seen as an arena for dialogic interaction, which is materialized through words that allow to the individual to enlarge and elaborate his world of meanings. Hence, writing demands to understand the language as a way of social interaction and as a product of a collective, unique and historical work, besides the support provided by cognitive and linguistic systems, as advocated by Vygotsky (2009) and Bakhtin (1997). In this sense, writing is a meaningful process of dialogic relationships articulated with other spheres and structured in function of the *other*. Producing oral and/or written texts in the classroom means to set social links to express oneself and to communicate. Hence, the text production is essentially dialectic, as according to Bakhtin (1992), language is both a simultaneously open and closed system, namely a grammatical and lexicon but undetermined sediment, and due to this, essentially creative. Whenever a text is produced, one has in mind the search for comprehension with the purpose to set a link in the dialogic chain of the social-historic relationships set by the subject.

Therefore, speaking, reading and writing a text in Science classes is a procedure conceived in this paper as an important mediational element in the appropriation of strategies and skills of the gender of science communication. In fact, the study on *how* and *what* the children say and write on a text of science communication in Science classes provides us a way to understand the different paths they walk on to appropriate the knowledge of such gender. After tracing some questions on the gender and the textual production in the school, it will be approached next the methodological resources adopted in this investigation.

## Methodology

In order to understand the interactions and practices of the literacy mediated by the magazine *Ciência Hoje das Crianças* in Science classes, it was observed 9-10 years old children from the 4<sup>th</sup> grade of the Elementary School in a school from the Municipal network of Belo Horizonte. This magazine was selected because it is the only publication on science communication for children produced in Brazil. *Ciência Hoje das Crianças* (CHC) was created in 1986, and it is produced by the Instituto Ciência Hoje with the stamp of the Sociedade Brasileira para o Progresso da Ciência (SBPC). Its purpose is to promote an approaching between scientists, researchers and the children public in

general, stimulating the scientific production and knowledge, besides of stimulating the curiosity of the children for scientific events and methods used by sciences. On the other hand, CHC was distributed among public schools of the first and second elementary levels until 2011, period when the Ministry of Education (MEC) acquired it. Its target-public is the 8-14 years old children and preadolescents.

In terms of the selection of the classroom and the teacher, it followed some important criteria for the research. The first of them would be students presenting a certain reading autonomy, as the magazine is driven to reader children. The second criteria for the selection would be the willingness of the teacher to work with the CHC in Science classes, and the permission to film the pedagogic work. By detailing those conditions, a principal considered as committed to her work by the Municipal Secretariat of Education indicated a teacher to participate in the research. It was a teacher actuating in the initial years of the elementary school for twenty years, and who was graduated in Pedagogy for less than ten years. She and every responsible for the children signed a free and clarified term of consent to participate in the research, where it was described the procedures to record, and the assurance of non-identification of the individuals in the research when publishing the results.

As to the works with the events in the classroom, it was decided to perform a micro genetic analysis (GÓES, 2000), due to its link with the social-cultural matrix, resulting in a detailed report on the events. For this, the methodological procedures included video recording, notes from the field and audio recording of the meetings with the teacher, added to the texts produced by the children. The methodology selected was based on the thesis by Bakhtin and Vygotsky according to which the individuals learn from the interaction with the other mediated by the language. Those interactions must be investigated when examining the course of action of the individual.

In fact, in one of the groups where the teacher was actuating, science classes were filmed for three months in a total of 18 hours and sorted by the date. After each filming, it was performed the following procedures: the tapes were watched several times aiming to observe the interaction between the children and the teacher with the texts of science communication from the magazine *Ciência Hoje das Crianças*; the discursive patterns of the class and the work organization with the magazine were analyzed. After such detailed examination of the classes, it was performed the construction of maps of actions dimensioning in a chart those actions mediated by the discourse from the participants, the ways of using the work with the gender of science communication, the time elapsed and the observations in the field (ALMEIDA, 2011). The analysis of the maps showed that in one of the classes, the teacher worked with the children a movie and an article from the magazine *Ciência Hoje das Crianças*; next, they construed written texts based on the scientific concept presented by those media. The study of that class indicated that in the work of understanding the gender of science communication, the children developed skills in selecting information on the subject of the text identifying the audience, organizing ideas about the text to express them in an appropriate way,

among others. Aiming to analyze such skills and considering the impossibility to present every text produced, it was selected an episode and four texts of the representative set of productions of the children, taking into account different levels set in the process of textual production and comprehension of the scientific concept worked in the classroom.

From those data and adopting the micro genetic analysis perspective, it was examined how children appropriate textual skills of the gender of science communication. According to the purpose of this study, it started from the assumption that the appropriation of textual skills of this gender is related to the interaction between the children and the orality and writing. Thus, the analysis of the data demanded attention to the senses construed by the children when they related texts of science communication to the way by which they were incorporated to different voices; to the way by which the children mentioned scientific concepts available in the classroom; to the way by which the explanations on the texts of science communication were presented – the first purpose of that kind of text. Although the comprehension of children in relation to the concept of evolution is an element liable to be analyzed in the class investigated, in this paper, the aim of the analysis relapses only on the interaction of the children with the discourse of science communication and the appropriation of the textual skills of that gender. In the next topic, it is presented a description of an episode in one of the classes observed.

### **The monologic dialogue in Science classes: one voice and many echoes**

In the morning of the second day of work with the articles of the magazine *Ciência Hoje das Crianças*, the last class in the schedule was Sciences. Upon the sign to the teacher exchanging, the students kept their books of the Portuguese class in their packs, and picked up their book of the Science class along with the CHC magazine. It is important to point out that in major part of the classes, the students received original issues of the magazine for their individual use.

Upon entering in the classroom, the teacher greeted the children with affection and occupied a place in front of the group to talk to the students. Soon, the teacher asked them to open the magazine and to comment *with their own words* what most caught their attention in CHC. Next, many children shared their reading. Among those voices, a boy said he was interested in the article ‘Why has the giraffe a long neck?’ Everyone looked at him in expectation and curiosity. However, when the teacher invited him to explain the matter, he shook his head denying, declaring immediately that he did not understand the text. Upon such doubt, the teacher remained in silence and continued listening to other children who were waiting their turn to speak with their fingers raised.

The issue of the neck of the giraffe returned one week later. After accomplishing the rituals in the beginning of the class, as the topic of the day, the teacher put a problem to be collectively solved: “*in one of our classes, it appeared a question we could not answer. So, today we are going to work on such question: why has the giraffe a long neck?*” Within a few minutes, several ideas were known. The teacher recorded all of them in the

blackboard. After listening all the manifestations, the teacher announced the exhibition of a movie<sup>1</sup>. It was a short movie produced to children<sup>2</sup>, explaining in a more general way, the theories presently legitimated about evolution.

At the end of the movie, she distributed a text photocopied from CHC that generated all the questioning about the size of the giraffe's neck. After exhibiting the movie and reading the text, the children were asked by the teacher what they had been identified in those materials, as it is recorded in the Chart 1 below:

**Chart 1.** Episode 4: *Why has the giraffe a long neck?*

(to be continued)

T	Participants	Discourse	Comment
1	Teacher	Why has the giraffe a long neck? We have there (...) one, two, three, four, five, six paragraphs (...) she wants to begin, but people, it must have a lot of attention (...) because when one is reading, the other talks and the reasoning of the text is lost (...) go	Teacher aim at a child authorizing the reading
2	Helena		Oral reading
3	Teacher	And then? What do you think that the movie and the text have in common? Let us see (...) is the text's subject similar to the video?	With the end of the reading, the teacher returns to interact with the students
4	Tereza	The same title of the text is (...) the movie /	
5	Teacher	And the subject of the text and of the movie? Do you think it is the same stuff? Which is the difference among them? /	
6	Nina	I know! Because he is talking about its ancestral, and in the movie it is not talking /	Aiming to the text
7	Clara	About the mutation, mutation /	
8	Aparecida	The text's got more details /	
9	Teacher	Does the text present more details than the movie?	
10	Felipe	Oh, yeah! (...)	
11	Teacher	What appears in the movie that does not appear in the text?	
12	Diogo	It appears two (...) two men who I think were remarkable (...) /	

1 Available on the website: <<http://pontociencia.org.br/experimentos>>. Accessed on: 10/21/2011. The movie was produced for children and presents the Lamarck and Darwin theories.

2 The names mentioned in these articles are fictitious.

**Chart 1.** Episode 4: *Why has the giraffe a long neck?*

(continuation)

<b>T</b>	<b>Participants</b>	<b>Discourse</b>	<b>Comment</b>
13	Lívia	Two scientists who (...) who (...) /	
14	Natália	Who was explaining /	
15	Tereza	The explanation of the second scientist is similar to this one	She aims the text related to Darwin
16	Teacher	There are two scientists in the movie explaining two things, two theories (...) who can talk about their ideas? /	
17	Estela	That along the time, the giraffe was stretching its neck, and when it grew up much, its neck was becoming longer /	
18	Teacher	Oh! So, Lamarck is going to explain the theory by the use – the more you use it, the higher your neck gets /	
19	Salete	He talked that the giraffe was already...that their mother was already tall... that their neck already had that same size, and by the time they grew up, they looked the same way than their mother (...)	
20	Clara	It is that previously, the giraffes did not have a ne... they did not have many necks; it was being developed, it was growing to eat the food, and when its pups were born, they already had a big neck /	
21	Teacher	Moreover, about the text? Which is Darwin's idea? What does the text explain on why the giraffes had a so long neck?	
22	Simão	that (...) they studied the giraffes, some with a big neck, others with smaller necks, and then the giraffes with long necks found more food, it remained more leaves from the taller trees, and then, smaller giraffes could not seize, and thus, those giraffes with longer necks developed while the giraffes with smaller necks could not /	
23	Felipe	It is because the neck of the giraffes (...) some have longer necks and others don't, and (...) some survived more than others – those with a longer neck survived more because they picked up more food, and the smaller ones could not and they died...then, the pups of the bigger got a bi (...), they already were born with big neck	
24	Natália	There were some with a big neck, and the ones with a small neck, by the time of the drought, those ones with a big neck survived (...) because what remained in times of drought, it was what remained in taller trees (...) and the pups of the taller giraffes have already been born with a long neck /	

**Chart 1.** Episode 4: *Why has the giraffe a long neck?*

(continuation)

T	Participants	Discourse	Comment
25	Teacher	the text explains why the giraffe has a long neck (...) the same way we take after our parents; it is the same with the giraffes (...) the babies INHERIT from their parents their genetic features (...) it is not a coincidence that you have a black eye, you are short...	Emphasis on the tone of the work inherit
26	Pilar	I took after my mom (...)/	

Source: Almeida (2011, p. 206)

As it is shown in the Chart 1 above, in this episode with 26 speech turns, the voice of the teacher appeared in 9 turns. The students appeared in 17 turns, in the majority explaining their understanding on the theories perceived both in the movie and in the text. Until turn 20, the children's answers are short; after that turn, their oral productions are longer, articulate and conceptually more complex, possibly because the children speaking after that turn were building a kind of *review of the other's speech*. Thus, the concept expressed in the text and in the movie is enlarged and reconstrued, comprising ideas from the children who exhibited their comprehensions in the beginning of the episode.

After the reading of the article performed by one of the students, in turn 3, the teacher wanted to know what the movie and the text of the magazine had in common. Her purpose was to drive the children towards the comprehension of the ideas being studied in the dialogue between different media of science communication dealing with the same concept. Therefore, in turn 4, a child recognized the similarity between titles, but without showing understanding on the concept. In turn 5, the teacher approved the observation of that student, but she insisted in the question, asking the students to indicate the subject of the texts and the difference between them. In that turn, at the same time, she was directing the discourse to avoid missing the purpose of the class; she encouraged the children to set comparisons between the movie and the text.

Next, one of the students agreed to talk mentioning the ancestry – a core concept of the theory (turn 6). The student highlighted the presence of a specific term in the article to explain the difference between the language of the movie and the text. She related the magazine to the material that brought the discussion on the concept of ancestry. Presumably, this is due to the way in which such concept appears in both texts presented. Hence, in the movie, the concept is depicted through the narration of the story of the production of these knowledge by Darwin and Lamarck. In the movie, it

was chosen to use the word heredity. By its turn, the CHC article brings the discussion pointing out the word *ancestors* just in the first paragraph of the text.

Next, in turn 7, another girl helps the colleague mentioning the term mutation, also present in the article. As it can be observed, the enunciation is not a supportive act, and one word refers to another. New forms of thinking and expressing the phenomenon are consolidated, in this case as a complement. However, expressing the word may not indicate the comprehension of the scientific theories. However, the scientific concepts available in the classroom are incorporated to the awareness of the child, and this allows the verbal formulation of a concept, since for Vygotsky the use of the word, upon its appropriation is essential to the construction of the scientific concept (VYGOTSKY, 2009). In the dialogic movement of appropriation of the other's words, the selection of specific words to talk about a text is a work of comprehending the gender, acknowledging it as a means to spread ideas, practices and values from a social group.

By their turn, Mortimer and Braga (2003) assert that the concepts are not simple expressions, but instead constructions presenting a defined functional value; they are not isolated formulations of the gender of the scientific discourse; they arise from the text with different functions: to provide names to entities, classes and processes or recapitulating them. Thus, even if children do not comprehend the concept, they acknowledge the function of each word. For instance, children recognize the mutation concept – the authority argument presented in the article – even if they do not comprehend it completely.

Related to turns 8 and 10, once again, two children considered the article explained the theme in further details. Such aspect perceived by the children is important, as it shows a perception of the different languages and ways to inform employed by the media of science communication.

On the other side, the movie was more appealing, and with its narrative, it was closer to the children, centralizing the explanation on the image of the scientists tending to facilitate the comprehension of the concept. The article presented a more explanatory language, emphasizing the concept in study, and hence, presenting *more details*, more unknown words to the universe of the children, which tended to compromise the comprehension.

In turn 9, the teacher returned to the comment of the child and transferred the question to the whole group. Remembering Bakhtin (1997), the process of comprehension and meaning only happens by means of the production of counterwords. For such process to be effective in the classroom, it is fundamental for the teacher to allow counterwords from the students by dialoguing with them, thus allowing the voice inter-animation, and consequently generating new meanings. That attitude from the teacher will remain along the whole episode.

Stimulated to set comparisons between the movie and the article, in turns 12 to 15, the students indicated the presence of two scientists who appeared in the movie. However, they did not present a clear explanation on the concept, despite they manifested

that the Darwin's theory is *similar to the text*, same as occurred in turns 6 and 15. The comparison between the media of science communication does not result in further effects on the oral expression by the children.

In turn 16, the teacher changed her strategy in relation to the comparison of the texts by aiming the scientists and their ideas, redirecting the discursive flow of the group allowing *explanations* to the concepts. She used the word *theories* to mention ideas and the explanations performed by scientists. Within that same path, she returned to the question through the path indicated by the children: the scientists. Talking about ideas of the scientists constituted an articulate exposition of the concepts in study, thus allowing the comprehension of their theories.

In resume, from turn 19 on, it is possible to identify an indirect and monologic discourse based on the narrative thread of the movie. From that shift on, there is no variation of style in the explanations provided by the children. Still in turn 17, one of the children refers to the theory by Lamarck. The expression *along the time* used in that turn seems to be anchored in the ideas of *transformation* present in the article. Consequently, the children mention the words: *along the time, mutation, developing, feeding, survived*, which are not often found in an informal discourse of groups of that age. By the way, the notion of time is an important element to comprehend the theory of evolution. Nevertheless, the use of some expressions related to the time does not mean that the children appropriated the concept, as children do not easily build the notion of time (PIAGET, 1946). According to Carletti and Massarani (2011), the majority of children comprehend evolution as something quick, individual, and non-population basis. In turn 18, the teacher talked again about the speech of the student, and she assumed an assertive tone, pointing out both the name of the theory and the scientist.

Until the end of the episode, there is a re-elaboration of the ideas, a coming-and-going of enunciations showing the need to negotiate the sense of the concept in order to have it comprehended. That quest construed in the interactive game is well marked when the children change the oral text of the colleague. They appropriate the word of the other changing its sense with the comprehension they succeeded in building. This shows the need to resume the discourse and to change the content in order to build a shared meaning to the concept. However, the ambiguity persists and not all the children are able to get a new meaning on the oral text ensuring what was the purpose of the article. It is possible to note the two main ideas overlapped: the ways of feeding the transmitting the characteristics along the generations.

However, such re-elaboration helps the children in building new ideas on the phenomenon dealt in the classroom. That discursive movement helps the student to achieve and build other ideas on the concept developed in the class. This way, different ideas on the concept are presented in a movement involving advancements and setbacks as part of the interaction process between orality and writing. In terms of those issues, it can be inferred that along with such interaction process, children appropriates new possibilities of thinking, and consequently expressing themselves in Science classes free

from the impositions of a sole answer to a given question.

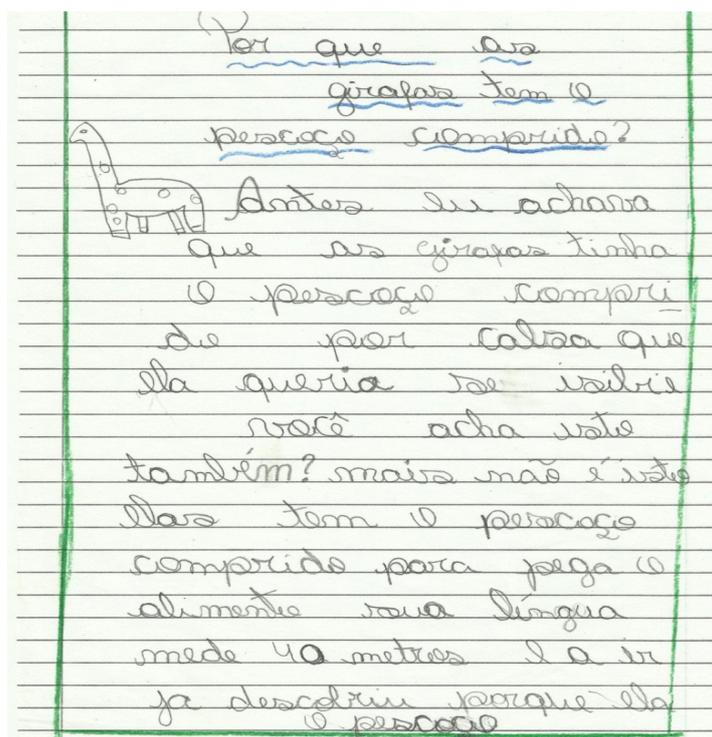
Ultimately, the teacher is back to the conduct of the flux of the discourse and synthesizes the idea of a genetic heritage, articulating it to a more familiar way of thinking to the students. Indeed, the approaching of such colloquial (take after) and scientific (inherit) speech is an anchoring mechanism of ideas between genders by juxtaposition of meaning, and in this case, it occurs by means of an analogy.

Finally, in turn 26, a child recalls the physical characteristics inherited from her parents, and so, other children follow the same idea. This is a work of comprehending the theme linked in the class. It is not easy to delimitate the origin of the children's discourse, but it is in the polyphony of the discourses that the conceptions on the theme are enlarged. After the dialogue about the movie and the article, children were stimulated to write a text on what they had learnt on the subject. The interaction of the students with such supportive texts and dialogue performed in the classroom is perceived in the written discourses as well, as it will be discussed in the next topic.

### **The dialogic monologue of the texts written in the Science classes**

In the same class in which the teacher asked to the children to make a comparison between the movie and the article from the magazine, they were asked to perform a paper record on what they have learnt in the class to help the researcher in her work. Next, she wrote the title of the text on the blackboard, and stimulated the children to produce a text on the subject of the class. Thus, although there is a particularity in such practice – the use of the writing to assess what the children have learnt on the subject discussed – it cannot be considered artificial, since that discourse is based on an authentic communication relationship between the children and the researcher. Therefore, by analyzing the text, it is possible to identify a communicative purpose in the records: to write for the researchers about the knowledge construed over the concept in study. Within such perspective, the text fulfills the requirements, since the children answered the question announced in the classroom.

Through the mediation of the texts circulating in the classroom, they were able to perceive the interpretative bet inherent to the interlocution, which was proposed to the text, and it was sought strategies to make clear the sense they postulated to validate their intents. In this case, children did not write texts of science communication, but instead, they appropriated some textual skills and discursive strategies of science communication to communicate their knowledge. One of the texts can be observed in Figure 1.



**Figure 1.** Text elaborated by the student Tereza.

Source: Almeida (2011)

“Why has the giraffe a long neck? I thought before that the giraffe has a long neck because it wanted to show off. Do you also think that way? But it is not so. She has a long neck to catch the food her tongue is 40 meters long and then have you already discovered why it has the [long] neck” (Translation – Text elaborated by the student Tereza)

As it can be seen, the author of text 1 does not master the conventional rules of writing, but she masters knowledge on the production of a school text; she is aware of the content of the class and takes position of someone who is clear and writes to communicate to the researchers her knowledge, thus allowing to the reader the intended interpretation.

The title of the text is placed in the middle of the page duly underlined. The text presents some traces of the CHC article, such as: it is illustrated with a drawing of the giraffe and the writer presents an approaching trying to be closer to the reader. In the first period, it is perceived the concern of the author in presenting to the reader her first hypothesis about the size of the neck of the giraffe: “I thought before that giraffes had a long neck because it wanted to show off”. In this case, the conditions in the classroom guide the strategies of production. Thus, as it was requested to the children to write

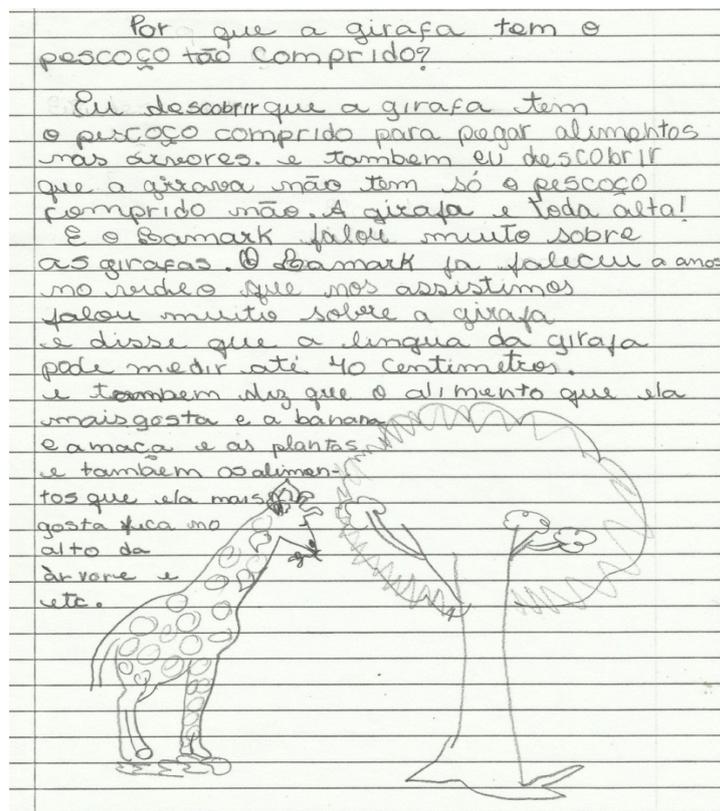
what they thought about the subject, she exposed her first ideas right in the beginning of the text. Despite the teacher had explained that the record would be for the researcher, the author of that text did not explained who was the recipient. This can be related to the type of activity proposed or with the impersonal speech of the texts of science communication. Although she had not made clear the recipient, the student creates a text by using an interactive discourse: “Do you also think that way?”. In this case, she uses an interrogative phrase seeking to interact with the reader. It is worth remembering that interactive dialogical relationships abound in the CHC magazine. Hence, it is part of the language of the articles to perform questions involving the reader to engage him in the reading of the text. The child appropriates such strategy that expresses dialogicity with the other’s text.

The text presents the following explanation for the long neck of the giraffes: “She has a long neck to catch the food”. It is necessary to point out that the movie shows ideas by Darwin and Lamarck on the theory of evolution. Therefore, it is perceived in that explanation that children present a more general comprehension on the Lamarck’s *theory of the use*. This does not mean that it is few, as the great majority of the students did not present a causal relation to the phenomenon.

The more frequent words in the oral speech, such as mutation, ancestral, scientists and the expressions related to the time are not present in the text of Figure 1. The author starts the text asserting: “I thought before that the giraffe had a long neck because it wanted to show off”. Such statement coming from the oral discourse indicates that both in the orality and in writing children appropriate words circulating in the classroom. However, they build a social-discursive action with the word, instead of merely reproducing a text.

After explaining the size of the giraffe’s neck, the child presents an information on the size of the tongue of the giraffe. It can be observed in the text that the size of the tongue is recorded with 40 “meters”. Possibly the misconception of such information is due to the difficulty children have in relation to measurements and to the strong impression caused by the information expressed in the movie about the size of the tongue of that animal. Finally, the text ends with another interrogative phrase: “and then have you already discovered why it has the [long] neck”, again driven to the reader, expressing familiarity with the discursive style from the CHC.

The text in Figure 1 presents a hypothesis using the expression “because”. Such interlocution indicates that the child is already able to identify some linguistic marks of the explanatory/informative speech; she is able to explain them and to adapt them to the written text. The following text that in a first glance can be considered only a repetition of the aspects of the first one, presents another form of appropriation of the gender of science communication by the child.



**Figure 2.** Text elaborated by the student Clara.

Source: Almeida (2011)

“Why has the giraffe a so long neck? I found out that the giraffe has a long neck to catch food on the trees. and I also found out that the giraffe has not only a long neck, no. The giraffe is all tall! And Lamarck told a lot about giraffes. Lamarck is already dead for years, and the video we watched talked a lot about giraffes, and it was said that the tongue of the giraffe may be 40 centimeters long and the food she likes most is banana, and apple, and plants. And also that the food she likes the most is on top of the trees and etc.” (Translation –Text elaborated by the student Clara.)

As in the previous text, this one presents a title as well, an illustration and a first hypothesis on the reason for the giraffe to have a long neck. This way, the author of the text fulfills the requirements of the teacher about the content of the production. She also does not take into account the controversy presented in the movie between Lamarck's and Darwin's theories. Possibly, the students did not appropriate different points of view, as the ideas from both scientists were not marked in the texts analyzed.

On the other side, this student mentions Lamarck, because she seems to comprehend better the relationships between the physical characteristics of the giraffe

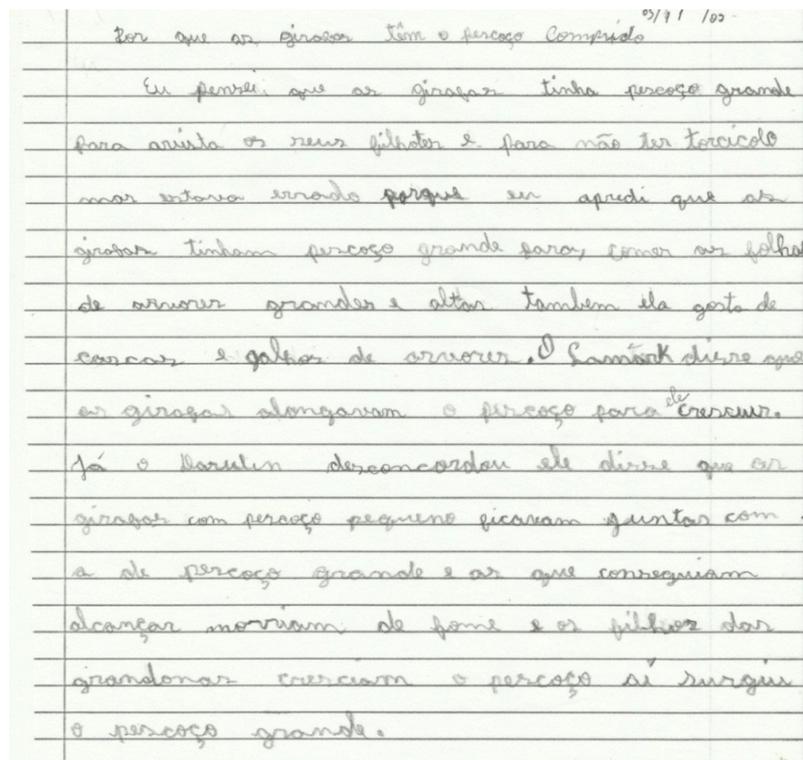
and its feeding habits. She started her text back to the initial hypothesis, highlighting the size of the tongue of the giraffe, and she does not make clear who is the recipient. Some words used in the oral discourse such as mutation, ancestral, time, development do not appear in the writing.

As it is shown in her text, she assumes herself as subject of the discourse by appropriating the alien's discourse, as it is seen in the portion: "I found out that the giraffe has a long neck to catch food on the trees. and I also found out that the giraffe has not only a long neck, no. The giraffe is all tall!" This is the information broadcasted by the movie that allows such *insight*. Moreover, she adds later: "Lamarck told a lot about giraffes. Lamarck is already dead for years, and the video we watched talked a lot about giraffes, and it was said that the tongue of the giraffe may be 40 centimeters long."

It also draws the attention in that text the syntactic and lexical patterns – close to the oral language and dialogicity, characterizing the informative text construed by the child. It can be verified that the previous text was more explanatory, and in this one, the information is the tonic.

It is even observed in that text that the student consults both the scientist and the movie – authority arguments – to inform. In fact, her text is built upon composition of voices. It is noticeable the voice from the person narrating the movie and informing the characteristics of the giraffe and the Darwin's and Lamarck's theories; and the voice of the teacher informing that the scientists have already died.

In every textual production, the threads of the dialogic weft have been weaved based on the movie, the CHC magazine article, and in conversations performed in the classroom. With such material, the author performs as an artisan the careful and delicate work of text composition, mixing voices in an open dialogue, as it can be observed in Figure 3.



**Figure 3.** Text elaborated by the student Felipe.

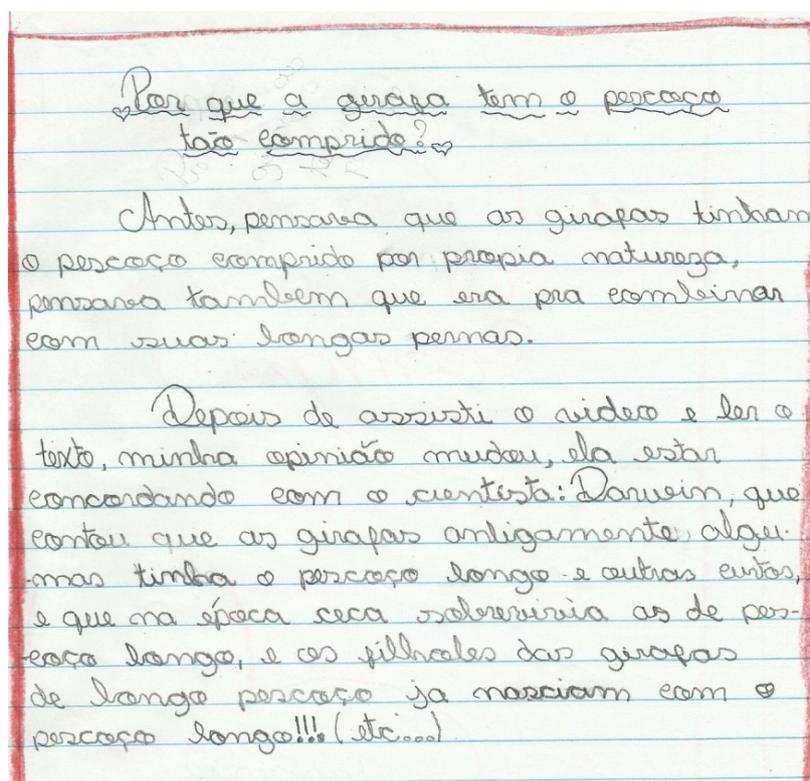
Source: Almeida (2011)

“Why has the giraffe a long neck. I thought that the giraffe had a big neck to see her pups and in order not to have a torticollis” but I was wrong because I’ve learnt that the giraffes had big necks to eat the leaves of big and tall trees and she also likes barks and branches of the trees. Lamarck said that the giraffes lengthen her neck for it to grow up. But Darwin disagreed and he said that giraffes with a small neck got together with those with big necks and those who succeeded to reach died of hunger and the pups from the bigger ones grew the neck and then it appeared the big neck.” (Translation – Text elaborated by the student Felipe.)

The author of this record also presents a title to the text and an initial hypothesis on why has the giraffe a long neck: “to watch their pups and in order not to get a torticollis”. Different from the previous texts, he does not present any image. However, he follows a line of reasoning shared with the previous texts and necessary to understand the gender of science communication: “the giraffes have a big neck to eat leaves of big and tall trees”. As in the other texts, he explains his meaning on the theory and presents a discourse with a high level of individual authorship in the beginning of the text, but major part of the text is relatively rigid, indicating that the child acknowledges the discourse legitimated in the Science class. In fact, the author of the text asserts that his hypothesis was wrong. Such statement is possibly due to the knowledge children have from the school discourse

which driven to the homogeneity and agreement. In the text being studied, the author displaces himself from the lived – from his hypothesis to the authority voice of the text by the scientist – to the one who talks. In addition, it is possible to perceive in that record the weft of voices: the voice from the child, the scientist's and the journalist's. It is not clear the understanding of the child on the heredity or mutation, as she writes that “the pups from the bigger ones grew the neck and then it appeared the big neck”. Even upon such mistake of the adverb of negation in relation to the dispute for the food supply, “those who succeeded to reach died of hunger”, probably due to the lack of revision of the text, where it is verified the use of an important concept of the theory of evolution: the competition.

It is observed as well that the student mentions an important aspect of the scientific production: the controversy between Lamarck and Darwin. He incorporates more elements from the oral discourse than his colleagues do, and the explanation is closer to the materials presented. The word *disagreed*<sup>3</sup>, presented in the textual production is a clue to the creative and dialogic manner found by the child to handle with the “other's word”. It is still observed that he uses expressions like *lengthen*, *reach*, *Lamarck said*, *Darwin disagreed*. Those terms are barely found in the children's speech, as it can be also observed in text presented in Figure 4.



**Figure 4.** Text elaborated by the student Cecília.

Source: Almeida (2011)

3

In the Brazilian text, the word is a neologism.

“Why has the giraffe a so long neck? Before, I thought that giraffes had a long neck by their own nature, I also thought it was to match with their long legs. After I watched the video, my opinion has changed, and it is agreeing with the scientists: Darwin, who told that formerly, some giraffes had a long neck and others, a short one, and in the dry season, it survived those with a long neck, and the pups from giraffes with long neck already were born with a long neck!!! etc...” (Translation – Text elaborated by the student Cecília).

This text also presents similar features to the previous texts. However, it is noted that the author chooses to describe the phenomenon using in the narrative discourse. Thus, she starts from a conception on the theme and, after interacting with material of science communication, she adheres to the scientist’s idea. Hence, the access to the media of science communication and the mediation justify the changing of her conception. Her text is related to the scientist Darwin, as he was a character of a story; presenting fragments of the explanation of the phenomenon by means of a narrative in the monologue presented in the movie by using a type of structure and form to describe the phenomenon, providing a discursive continuity that sets another way of writing. The text produced by that child also presents the title, the hypothesis, the scientist, but it excludes casual relationships in the narrative. It is different from the others by the apparent objectivity in describing the phenomenon and by the comprehension she presents about it. It is still observed that the author justifies the phenomenon showing the variables: giraffes with a long neck, the dry season, survival of the giraffes with long neck along the dry season and genetic heritage – pups of the giraffes with long neck were born with the long neck. It is also presented in her record, words and typical expressions from the texts circulating in the classes, such as formerly; season; survived; long neck; before, thought; formerly, some giraffes; already were born with a long neck. Finally, it is pointed out that the text produced by that child presents ruptures and adaptations of the usual way to talk.

## Final considerations

The aim of this paper is to show fragments of a path in the appropriation of the gender of science communication by children. This way, it was presented an episode and written texts disclosing aspects of such process. Therefore, it was possible to verify that the interaction of the children with the gender of science communication contributes to the learning related to the way of talk and write about science. The *corpus* analyzed shows that the re-elaboration of the information helps the child to comprehend the text, to learn the ways to talk the text and to build new ideas on the concept dealt in the classroom. The speech and the written mediated by a text of science communication allow the use by the children of the words from their repertoire at the same time when new words are inserted in their discourse, thus accomplishing a kind of gender hybridization clearly from the point of view of the child’s discursive production.

Within such perspective, the children in the interaction with different discursive genders, media and pedagogic strategies made different usages of the idea of evolution and textual styles of genders of science communication. It is worth remembering that the teacher did not define the concept for the children. It is in the coming and going of words that the students were building generalizations around the theme of the evolution. The mediation of the texts circulating in the classroom, in a teaching situation, was that made possible such generalizations. Furthermore, although the marks of the language in the science communication were not object of the teaching, not even highlighted when developing the school tasks, the children had appropriated some of them by the time they were asked to put the word in use.

As advocated by Rojo (2004) Geraldi (2006), Schneuwly and Dolz (2004), when reading, talking and writing, the children had been confronted with multiple language practices. Reading, writing and *saying a text* meant to the children a way to reflect and re-elaborate conceptions about a scientific concept and textual gender. In order to develop a written text, they were guided by the understanding that something is written because there is *the other* to whom it can be said – the readers; *the other* from whom the word is taken to be said – the models; *the other* from whom it is said something, and *the other* participating in the text – colleagues and teachers.

The questions proposed by the teacher after exhibiting the movie and reading the CHC magazine along with the request to produce a written record to the children characterize the school gender, as they guide the subject of the class, selecting and directing the statements trying to take the children to the appropriation of the secondary genders. The rules of those activities in the classroom are the ones that frame the aesthetic and functional aspects of the discourses.

In relation to the oral discourse, it was verified that upon comparing the movie and the article, the students acknowledged the subject content of the movie, the purpose and the different languages found in both media. For the children, the article “*is more detailed*” and the Darwin’s theory was identified in the article. This seems to show the perception of the students related to the written text, which is more explanatory in relation to the text.

The language of the media limited the discursive action of the children imposing restrictions and standardizations to the orality and writing, but it allowed the use of other forms of expression to approach scientific theories. Thus, the authorship of the texts was manifested in the set of strategies used by children to build their enunciations.

Now, when the child is asked to talk or write about a text of science communication in the classroom, his position as an author is construed as a way to incorporate different voices, by deleting the individual through the way that the explanation is presented. Thus, the first side of the dialogic movement of voice assimilation happens through the *accumulation of authorship*. In the oral texts, the children were asked to compare an article to a video which concept had been presented in different ways. Consequently, when talking about the concept and the scientists, children mentioned the materials

as an *interposed author*, sustaining the scientific responsibility. In fact, in some shifts of the episode, the children mention it – the article or the movie, as the *material that talks about the concept*. Hence, by the interactive situation, the circulating voices on the media are assimilated by children to develop their narratives. In written texts, as the orientation was to make written records on what was learnt in the classes, highlighting their thoughts before the study, the mention of the movie and the article appears in two of the texts that were analyzed, not as pillars sustaining the explanation, but rather as credibility instruments to the text, as they bring inside them data with which the authors maintain dialogic relationships that provided materiality to their records.

Another strategy used in the children's discourse in such dialogic movement of voice orchestration is the incorporation of what has been said. In the oral text produced by children, it is possible to *map* the voices appearing more frequently in the enunciations. Initially, they mention the support and they incorporate the central words showed on the video and in the article to explain the concept such as ancestry and mutation. In that case, the children evoke the scientist to sustain their arguments, and call other children and the teacher in a kind of *review* of the other's speech. Hence, listening to the explanation from other children about the size of the giraffe's neck is important for the audience, since it makes viable to the listeners and speakers the exercise of revisiting the text, rectifying, increasing, reconstructing the enunciation to comprise ideas more and more sophisticated about the theme. In the written text, the appropriation of the textual skills of the genre of science communication by children can be perceived by the presence of voices from journalists (by means of stylistic-compositional marks) and from scientists (through the explanation of the phenomena). In this case, it is important to point out that the children introduce a written text presenting their hypothesis on the phenomenon because the teacher guides the way the text must be produced, or possibly because articles of science communication from CHC have as main feature to present the explanation in the beginning of the text. Other remarkable features of those written statements are the presence of questions trying to involve the reader; the use of the pronoun *you*, withdrawing the impersonal quality of the text; and the abundant interactive dialogic relationships, as it is usual in the language of that magazine.

Regarding to the dialogic movement of distancing, it is observed in the oral texts from the latter children talking in the episode analyzed the isolation work from the other. In such sense, the voices with which the author of the text is confronted are erased. The children talking in the episode analyzed assumed the other's word working with ideas, which are not necessarily theirs, in such extent that they only represent the perspective of the discourse from both the article and the video. For this, they distance themselves from their *own words*, and such distancing movement present in the oral text produced by the children is not so clear in the written texts. The written text is populated by the others' words, but opening possibilities for children to report their explanations, reconstruct and think individually about what has already been talked in the group. This way, in the written record, the counterword production seems clearer, as children are put

alone with the voices that populated the classroom, and then, they are freer to *write their ideas with their own words*. In the oral text, the explanation is construed by means of the voice inter-animation, generating new meanings for some words, and by the questions and answers from the teacher, which are focused on the children's statements. By means of word repetition, the author of the oral text *mines* the other's explanation, which is incorporated in his discourse.

In the written text, the explanation is incorporated to the discourse of the child as if she and the other voices in the text would talk from the same evaluating position, in a relationship of agreement, not necessarily understanding the concept. On the other hand, in the oral expressions, children seem to *re-vocalize* the text of the article, while in the written text, they present themselves freer to expose their comprehensions. By the way, it is perceived a more emotional tone in the written text. Despite of this, there is no change in the perspective both in the oral and written texts altering the explanations. Even while not every child has appropriated Darwin's ideas, in the texts it is possible to observe that the majority of them set up relationships of cause and consequence to explain such phenomenon.

At this point, it is adequate to point out that as several authors warned (DOLZ; SCHNEUWLY, 2004; ROJO, 2004; BEZERRA, 2010), the narrative texts prevail in the school. However, this investigation shows that the interaction of children with texts of science communication, since the early years, allows that the discursive strategies is developed whenever there will be pedagogic interventions favoring its learning. Thus, it is worth pointing out the need of further studies to help teachers to comprehend the explanations presented by the children when interacting with texts of science communication, as well as with the strategies used by the teachers when teaching those texts. Studies on the use of texts of science communication in the classroom bring the chance to analyze the discursive interaction under the perspective of textual hybrids, as it was observed in the dialogue in the classroom and in the texts that may come into circulation. For this reason, it is conclusively highlighted its importance to foster the scientific culture in the school.

## Support

Fundação de Amparo à Pesquisa do Estado de Minas Gerais – FAPEMIG; Pro-rector to Research and Post-graduation of the Universidade Federal de Ouro Preto and Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq.

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Submitted on 28<sup>th</sup> July 2016  
Accepted on 1<sup>st</sup> November 2016