Speech as Action in the Classroom:
Semiotic Regulation of Cognitive Processes

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ABSTRACT – This article investigated how determined linguistic actions, the speech acts, create favorable conditions for the emergence and maintenance of Zones of Proximal Development (ZPDs), therefore of cognitive actions. A geography classroom setting of sixth year elementary school was analyzed. "The relief and its agents" was the main conversational topic. Through interactional analysis and videography, we identified patterns in the categories of speech acts used in class. Some types of speech acts were used for to maintain didactic contract and others speech acts were used to clarify school contents. These patterns provide favorable conditions for emergency and maintenance of ZPDs, which were understood as symbolic space built along the discourse of participants, and that promote learning.

KEYWORDS: zone of proximal development, cognitive processes, semiotic regulation, speech acts, didactic contract

Fala-Ação na Sala de Aula:
Regulação Semiótica de Processos Cognitivos

RESUMO – Como determinadas ações linguísticas, os atos de fala, criam condições favoráveis à emergência e manutenção de ações cognitivas, as Zonas de Desenvolvimento Proximal (ZDPs)? Por meio da análise interacional e videográfica, investigou-se uma aula de geografia do sexto ano do ensino fundamental em que "o relevo e seus agentes" era o principal tópico conversacional. A partir da categorização dos atos de fala, foram observados dois padrões de organização conversacional: atos de fala voltados à manutenção do contrato didático e atos de fala direcionados aos conteúdos escolares relacionados ao tópico em curso. Tais padrões providenciam condições favoráveis à emergência e manutenção de ZDPs, compreendidas como espaços simbólicos que favorecem a aprendizagem, construídos ao longo do discurso pelos participantes.

PALAVRAS-CHAVE: zona de desenvolvimento proximal, processos cognitivos, regulação semiótica, atos de fala, contrato didático

One of the biggest challenges for studies which foundations consider the language part of the human cognition is to demonstrate how linguistic phenomena support psychological phenomena. This paper aims to contribute to this discussion by investigating the interface language and cognitive actions, targeting how specific language actions, speech acts, create favorable conditions for the emergence and maintenance of psychological actions, the Zones of Proximal Development.

The Zones of Proximal Development (ZPDs) is one of the concepts developed by Vygotsky (1998) and related to the dimensions of school learning. It deals with the dialectic of the processes of construction of learning and development that occur initially in situations of assistance

(inter-regulation) and, subsequently, autonomously by the individual (self-regulation). ZPD can be conceptually approached from three orientations: psychometric, interactional, and semiotic (Van der Veer & Valsiner, 1991). In this research, the interactional and semiotic dimensions were performed. The first emphasizes the implementation of joint and collaborative actions in the development of activities; and the second highlights the symbolic and discursive characteristics of activities (Bezerra, 2004).

The interactional dimension of the ZPD is closely related to the General Development Law (Vygotsky, 2000), in which interpsychological functioning arising from social interaction precedes intrapsychological functioning within the individual domain (Vygotsky, 1998). Cultural forms of thought and action, therefore, would present a path which origin lies in social activity, from which the individual internalizes them and later return to the collective in order to regulate social interactions (Bezerra & Meira, 2006). Interaction, in this case, highlights the face-to-face relationships, but it also includes the dialectical participation of the individual in broader historical-cultural processes that are marked by meaning (Colaço, 2004).

In order to deepen the investigation on the creation of conditions for the emergence of ZPDs in the classroom, a pragmatic-enunciative methodological perspective of language was adopted in this study (Morato, 2000, 2002), which considers language in the relationship of signs with their users and how they produce, interpret and apply them. Due to this relational character, language is seen as

interaction (Koch, 1998) and the sign as a psychological instrument (Colaço, 2004).

The semiotic and interactional biases of the ZPD, as well as the Speech Acts Theory, are being used in this research in order to identify linguistic actions applied in the classroom by teacher and students that allow the creation of conditions for the emergence of ZPDs. It is important to emphasize that speech acts were considered by their insertion in situational and contextual conversational sequences and not in isolated and artificial sentences, as they have been traditionally studied in Philosophy of Language (Levinson, 2007).

These conversational sequences are commonly referred to as classroom discourse and tend to be linguistically characterized by regular discursive modalities and thus subject to categorization (Sousa, 2002). Hence, conversational sequences are not a random phenomenon but organized and investigable (Marcuschi, 2003). They allow us to identify the resources that members of a community use to signify and act on social dynamics (Forrester, 2014).

Based on the perspective that speech acts are mutually constructed actions, the person who uses language cannot be conceived in isolation, because of the linguistic action employed by the speaker gains meaning both from what they intend to say and from their own. Interlocutor interprets and the numerous negotiations that can be done interactively (Miranda, 2001). In this way, observing them from this contextual perspective is essential, as it becomes possible to consider the conversational aspect and the exchanges and the semiotic constructions established in interaction.

SEMIOTIC REGULATION AND ZONES OF PROXIMAL DEVELOPMENT

The organization of the conversation allows us to take a fresh look at what ZPD is and how it is established. According to Mahan (2015), although there is a considerable number of investigations that support the concept of ZPD, little progress has been made in attempts to clarify its functioning dynamics, which dialectically related learning and psychological development with the use of symbolic tools.

In this sense, it is necessary to understand the ZPD not as a property of the individual, or as something pre-existing to the relationship, but as a constituent of a symbolic space, continually emerging, which allows an interactional and semiotic analysis of communications that takes place during joint activities (Meira & Lerman, 2010).

Meira and Lerman (2010) propose that the contributions of semiotic exchanges for the establishment of ZPDs can be classified in two ways: *content-oriented language,* focused mainly on the central topics of the class (school curriculum), which receive individual attention from the teacher; and *language directed to communication*, directed to the interventions that teacher and students make, aiming at the regulation of the conversational activity itself. The term language used here is not limited to speech only but includes gestures, body positions, use of artifacts and forms

of registration (Goodwin, 2000), such as writing that set the symbolic space.

In semiotic exchanges, sharing and collaborative construction of meanings occur in classroom activities. Thus, ZPDs help, on the one hand, in the development of autonomy and conceptual mastery through the various interactions established between teacher and students, between the students themselves and between the student and the knowledge in question (Souza Cruz, Souza, & Santos , 2014); and, on the other hand, in the appropriation of the organizational dynamics of conversation - in this specific case, of the didactic contract - which is also a manifestation of human social activity (Markee, 2015).

These exchanges are called semiotic regulation and represent the regulatory function of language over cognitive processes in face-to-face interaction. Such processes of semiotic and cognitive regulation occur through social relations (inter-regulatory activity) and pass into the individual domain (self-regulation) (Coudry & Morato, 1988). The discursive positions that teachers and students assume are, therefore, concerned with interaction and, through their dialogue, create semiotic regulation processes linked to care and social support for actions (Wertsch, 1988).

In short, the regulation of thought and actions is accomplished through semiotic mediation that occurs in conversational activities (sequences). In this study, speech acts are highlighted as linguistic resources for the regulation of actions that contribute to the construction of teaching-learning-development activities in the classroom.

CONVERSACIONAL SEQUENCES AND SPEECH ACTS

As it was already pointed out, conversational interactions, where speech acts are spoken, are modalities of semiotic regulations that make up interpsychological functioning (Morato, 2002). The conversation is a highly organized and contextually situated phenomenon and to flow, there is a set of essential predicates, such as changing speakers and speaking each at a time. These requirements makeshift taking an essential conversation operation that responds to the interregulation processes. Conceptually, the shift can be understood as what the speaker says or does while speaking, including the possibility of silence. The shift taking would be the distribution of these shifts during the conversation (Marcuschi, 2003). It is within these shifts and, alternately, that speech acts are performed.

For understanding among speakers throughout shift exchange sequences, conversational coherence is required (Koch & Travaglia, 1993). Consistency is a feature of discourse that also involves the use of speech acts (Blühdorn & Mannheim, 2008). For conversational coherence between speakers, it is first necessary that a speech act has something to do with the next act and, where appropriate, with the previous one (Marcuschi, 2003). Coherence enables intersubjective accessibility among those involved in discourse; that is, it allows interlocutors to create a temporally shared social reality; this occurs as long as there is a collaborative interaction between speakers and listeners. Its main feature is the mediation character of cognitive activities (Marcuschi, 2006).

In a way, coherent discourse is essential for the creation and maintenance of ZPDs, as it points to processes of joint and collaborative construction of discourse objects, which make up the referential activity constituted through situated social-interactional processes (Koch, 2005). That is, they form public versions of the world, actively negotiated and transformed by interacting subjects (Mondada & Dubois, 2003). Both the teacher and students establish conversational contracts that regulate their speech so that there are complementarity and understanding between them.

In the teaching-learning context, such conversational interactions are predominantly guided by the *didactic contract*, consisting of a group of rules that guide the actions of the teacher and students in the classroom. This process is composed of ruptures that allow the modification of the person's relationship with the knowledge that is being shared and built (Souza Cruz et al., 2014). In some conversational situations, these breaks are considered "*topic disruption*" and cause the change of subject, leading to a discontinuity concerning previous shifts (Souza, 2006). Maintaining the topic, as noted above, depends on conversational consistency. In order for this to occur, a preserved referential base is indispensable (Marcuschi, 2006), that is, that during activities occur joint actions of sharing and construction of discourse objects. In the classroom, speech acts are used by the teacher to maintain the development of this referential base.

Thus, paying attention to how speech acts present themselves in conversation allows us to identify them as resources in the processes of interregulation in the classroom. The relevance of this identification is to demonstrate the conversational characteristic of speech acts, used in a combined and specific way in order to favor regulatory activity and contribute to the maintenance of conversational coherence. Thus, the emergence and maintenance of ZPDs are preserved, promoting an articulation between language directed to communication, which contributes to the conservation of the didactic contract, and language directed to content, directed to the conceptual domain of curricular topics.

The act of speech is considered a basic unit of meaning and has three integrated dimensions: locutionary, illocutionary, and perlocutionary. The locutionary dimension involves the linguistic aspect of the act, such as grammatical rules and reference. The illocutionary dimension has as its central aspect force. Moreover, the perlocutionary dimension represents the consequences of speech acts concerning the speaker or other people (Marcondes, 2005).

Searle systematized the theory of speech acts by presenting five illocutionary forces as five basic types of action one can perform while speaking. Thus, speech acts can be assertive, when they commit the speaker to the truth of the expressed proposition (eg, affirm); directives, characterized as the speaker's attempts to make the recipient does something (eg, ask); commissive, when they commit the speaker to some future course of action (eg, promises); expressive when expressing a psychological state (eg, congratulate); and declarative, when they result in immediate changes in the state of affairs through complex extralinguistic institutions (e.g., baptizing) (Levinson, 2007).

Speech acts can also be indirect, performed by uttering sentences that do not express their literal meaning (Searle, 2000), reveal that the speaker meant "something else" by uttering their speech. In the question "Can you reach the salt?", For example, the goal is to order salt. These same indirect situations are present in metaphors, metonymy, irony, sarcasm, hyperbole, and euphemism, which are commonly used in everyday life, including during classroom activities, both by the teacher and, less frequently by the students.

Searle (2000) considers the speaker as a central factor in the interpretation of the speech act, neglecting factors such as the interlocutor and the context of the meaning of the speech act itself. In this study, however, was adopted a perspective of language as situated action that only takes place in contexts of human interaction. It is through language that human beings characterize the world and mediate their actions, so all factors are equally important: speaker, scenario, and interlocutor (Miranda, 2001).

The meaning, according to the literature of the different areas involved in approaching this theme, such as Linguistics, Philosophy of Language and Psychology, would involve different components, such as interaction, material artifact and action-oriented, but language appears as the main one (Correia, 2009). In this study, it wa seek to pursue the participation of language in the process of construction of meanings and the configuration of psychological phenomena.

In this sense, the process of constructing meanings needs to be abstracted from linguistic manifestations produced in specific situations. Also, accompanying language, mostly spoken, typical of face-to-face interaction, is advantageous because it has the characteristic of being planned in real-time (here and now), highlighting the very process of its construction (Correia & Meira, 2008).

METHODOLOGICAL PROCEDURES

Forty students from the 6th grade of elementary school of a public school in Maceió / Alagoas, aged between 11 and 13 years old, and a teacher of the Geography subject participated in this research.

This study was approved by the Research Ethics Committee of the Federal University of Alagoas. The informed consent form was signed by the teacher; and the terms of consent were signed by the students' guardians.

As instruments for the construction of the data were used a camcorder for the video recordings and two researcher's cellphones to record the audios of the classes. At the end of three months of participant observation, teacher-student interactions in the classroom were recorded on audio and video, forming a total of eight videos lasting an average of two hours each. Data were analyzed through regular filmed sessions and microgenetic analysis.

"Videography" is a record that becomes a fundamental tool to identify psychological actions with the aid of microgenetic analysis by preserving communicative actions and gestures (Jordan & Henderson, 1994). Generally speaking, microgenetic analysis aims to describe in detail the interactional phenomena, as in conversational situations, to understand how these psychological actions occur (Meira, 1994).

Since conversation is a central phenomenon for this investigation, the selection of filmed data was based on the regularity of shift changes identified during the participant observation period of classroom dynamics. The same procedure was used in the process of selecting the filmed material for microgenetic analysis. In other words, the classroom situations in which shift changes were frequent were selected for videography; and, for microgenetic analysis, the materials in which shift changes were most frequent, regardless of the curriculum content being worked on during the class.

Consequently, the video extracts with the most frequent patterns of interaction and conversation between teacher and students were selected. The video of a geography class whose topic was "relief and its agents," lasting about 40 minutes, was used as the primary extract for the discussions of the data that follow by presenting more regularity of these patterns. The transcription was performed according to the conventional conversation analysis format (Marcuschi, 2003), plus codes for specific contextual situations not provided for in these guidelines.

In the data analysis, the first step corresponded to the process of categorization of speech acts, considering the referentiality and the predication, the illocutionary force, and its perlocutionary effect. In this sense, besides the illocutionary force as an essential factor that enables access to communication (Searle, 2000), it is also considered other elements, such as interlocutor and referent, considering that linguistic actions are participatory and not autonomous (Miranda, 2001). Thus, when spoken, the act of speech has an effect on the interlocutor, called perlocutionary.

The second stage sought to identify the relationship and frequency between speech acts and situations potentially promoting topic disruption that could compromise the construction of discourse objects, that is, the production of public versions of the world.

In the third stage, an alignment was made between the specific attributes of language actions (represented here by speech acts, interaction, conversational coherence and referencing) and the creation of favorable conditions for the emergence of ZPDs. As a result, speech acts were classified into two distinct categories, discussed in the next follow-up, based on the type of contribution to the emergence of ZPDs.

RESULTS AND DISCUSSION

The communication scenario analyzed was a geography class, in which "the relief and its agents" formed the main referential base - conversational topic - of the activity. Thus, the speech acts used by the teacher were focused so that the current topic would be maintained throughout the conversation. Additionally, the force was considered, as well as the effects that the teacher's speech acts had on the students. This whole process was taken as representative of the regulation of the thought and action that occurred in the classroom activity, which, in turn, enabled the creation of favorable conditions for the emergence of ZPDs, which involved the use of speech acts for regulation both through communication-oriented language and content-oriented language.

From the analysis of the conversations established in class between teacher and students, it was observed that the teacher used a series of speech acts in an attempt to avoid topic disruption and establish semiotic regulations which purpose was to develop joint actions of sharing and construction of objects discourse leading to the constitution of shared meanings on the topic "relief." In the interruptions recorded, both to prevent a break from being generated and to resume what was being said, the teacher made frequent use of different arrangements of illocutionary forces when using speech acts to maintain the didactic contract.

In this investigation, most of the speech acts uttered by the teacher were intended to focus students' attention on the main topic of the class. By observing the regularity with which these speech acts were issued, it was found that there are organizational patterns in the way the teacher delivered them. Certain types of speech acts are used to maintain the didactic contract; that is, they constitute examples of language directed to communication (Meira and Lerman, 2010). Others are used more specifically to clarify curriculum content (content-oriented language), demonstrating the existence of patterns of speech act organization for the production of discursive coherence and the conditions of emergence and maintenance of ZPDs.

The classification of speech acts came from the observation of the function that each one played in the speech, whereas in isolation, it is not possible to visualize the context and the emergence and maintenance of the ZPDs. Therefore, it was necessary to seek regularities in the language production activity of the interlocutors, which allowed us to glimpse the existence of a language performance system (Correia, 2008). Thus, the organizational patterns of speech acts were identified to maintain the didactic contract and conceptual domain, as indicated in the following subtopics.

Language Aiming Communication and Didactic Contract

The following examples are in line with the statements of Marcuschi (2003, 2006), as they indicate situations of potential threat to the teacher's maintaining mastery of the shift, suppressed in order to preserve conversational coherence. Which, in turn, is essential for the emergence and maintenance of the ZPDs, since by creating symbolic spaces for inter-regulation of actions, they enable the joint and situated construction of meanings (Meira & Lerman, 2010), as well as updates of the public versions of the world among the participants (Koch, 2005). On the other hand, they contribute to the understanding of how the appropriation, especially by students, of the organizational characteristics of conversation takes place (Markee, 2015).

Directive act-indirect act. Directives of speaking, used in orders or requests from the teacher, appeared more often. Then the indirect speech acts, representing what is beyond the explicit in the sentence, such as metaphors and ironies. Regularity as to the sequence in which directive acts were arranged indicates an association with indirect speech acts. By using this sequence, directive act-indirect act, the teacher was able, by restraining conversations not related to the main topic and resuming the contract, maintaining the current topic more subtly (Table 1).

Through the examples in Table 1, it is possible to notice that the language regulation actions produced by the teacher emerge when there are parallel conversations of the students that compromise the development of the current topic (referential activity). The directive speech acts are followed by indirect speech acts on lines 8-9 and 169-170, respectively. Perlocutionary effects result in noise reduction or complete interruption of parallel conversations by students, paving the way for further development of the main topic, following the position presented by Blühdorn and Mannheim (2008). So, there is a recurring movement regarding the maintenance of the didactic contract: when there is a parallel conversation, there is an action of the teacher (act speaking directive accompanied by the indirect act) that results in the students' shift of silence. This modality of interregulation is an example of language directed to communication and, according to Meira and Lerman (2010), acts to maintain ZPDs.

It is interesting to note that the friendly lexicon (love; kitten) and the joking tone (irony) that appears in the teacher's indirect speech acts ("yes my love I also want to know what you are talking about"; drink milk"), indicate the existence of a gradation in the way it interprets the potential threat of topical breakage by students. In cases where the

threat level is low, it uses indirect speech acts after issuing the directive acts ("Psst"). That is, the speech acts emitted are situated and contextualized, as proposed by Miranda (2001), and become meaning in and for the preservation of conversational coherence, as proposed by Marcuschi (2006). In the next item, when identifying a higher level of threat of topical break, the teacher makes use of speech acts that make direct reference to the didactic contract: the commissives.

Directive act-commission act. Another organizational pattern identified was that of commissive speech acts that represent a commitment of the interlocutors regarding what was said, as occurs in promises, for example. In class, there

are situations where the contract is explicitly recalled by the teacher, such as when she recalls the rule of raising her hand to request the speaking shift. Some of the commission acts appear in the same way as indirect acts, that is, after the issuance of directive speech acts, demonstrating the importance and frequency of directive acts in maintaining and resuming the current topic (Table 2).

In specific situations in which there was no student dispute, such as Lines 47 and 48, when identifying a situation threatening to the topic continuity, the teacher performs the commission acts promptly, without the need for them to be preceded by directive acts. In this particular case, to situate

Table 1

Direct and Indirect Speech Acts.

Speaker	Referent	Predictive	Strength	Interlocutor	Effect
Example 1[a] **Teacher**	Test	L.7/8 We have to talk about the reliefs. **PSIU::**I'm going to talk to.	Directive	Student	Reduce the conversation
Teacher	Test	L.8/9 I'm going to talk to V. **YES, LOVE. I WANT TO KNOW WHAT YOU ARE TALKING ABOUT TOO.** = ((teacher calls the attention of a student in the back of the class)) (.) Thank you (0.8)	Indirect (irony)	Student	Stop the conversation
Example 2[b] **Teacher**	Tectonic Plates	L. 169 SO, SEE HERE. The tectonic plates, they have, they are rocky pieces **PSI::U**: (.) rocky pieces are broken. So, look, the tectonic plates, they don't have rocky pieces.	Directive	Students	Reduce the noise
Teacher	Tectonic Plates	L.169/170 rocky pieces are broken, fragmented. That moves because of the constant (boiling) of the magma (.) **ISN'T IT, KITTEN? (.) meows and drinks milk**	Indirect (irony)	Student	Turns the attention to the teacher

Notes. Examples.
[a] Beginning of class, establishment, and reestablishment of the didactic contract.
[b] Middle of class. Topic: internal relief agents (tectonic plates). Attempt to maintain the topic.

Table 2

Commissioner and Directive Speech Acts to Explicit the Didactic Contract.

Speaker	Referent	Predictive	Strength	Interlocutor	Effect
Example 1[a] **Teacher**	Relief	L. 47/48 **Of course you were paying attention, so tell me, what is a relief? Because I just forgot HUM::, (.) do you know that score system, you lost more ten points.**	Commissioner	Student	Remain silent
Teacher	Relief	**L 48/49/50/51 You lost more ten points. PSIU::::: YOU, my love, that were in front of me, what is relief?** ((The teacher points to a student. He shakes the head in a negative gesture))	Directive	Student	Remain silent
Teacher	Relief	**L 51 °minus ten for you too.** ((teacher remind of the "score system" for the answer for the question))	Commissioner	Student	Remain silent
Example 2[b] **Teacher**	External agents	L. 251 : the meteor can't be the external agent, guys. **PSIU psiu**	Directive	Students	The noise decreases
Teacher	External agents	L. 252 **want to talk to we (.) us ((The teacher makes a gesture to indicate that they have to raise their hands to talk.))**	Commissioner	Students	One student talks and the other one raises a hand
Teacher	External agents	L. 332 ((A lot of questions about meteors came up)) **psiu** (.) it only has the right	Directive	Students	The noise decreases
Teacher	External agents	L. 332: it only has the right to talk to not continuing the noise because the classroom is full **(.) who does what the does (.) raise the hand (.)**	Commissioner	Students	Some students raise their hands.

Notes. Examples.
[a] Beginning of the class, reestablishment of the didactic contract and attempt to introduce the "relief" topic.
[b] Middle of the class. Topic: external agents of relief. Attempt to maintain the topic and reestablish the didactic contract.

the speech act that will be issued, the teacher contextualizes her speech by highlighting a student's inattention to the topic of the current class. In making this introduction, although directed at a particular student, she makes public the importance of maintaining the agreement outlined in the contract.

However, when situations threatening topic continuity persist, directive acts, such as appearing following lines 48-49-50-51, are again used to precede a commissive speech act (line 51) as a means of effect the contract. This contract had already been taken over in the previous lines when talking about the "scoring system" for answering questions.

Another curious aspect, observed during the participant observation and also found in Sousa (2002), is that such threats concerning punctuation never actually take place. The teacher did not use any system to take notes and control for this, and none of the students had any reduced score. That is, the use of such a strategy is solely intended to ensure continuity of topic coherence and collaborative interaction (Wertsch, 1988).

In the first example, the strategy that the teacher uses is an explanation of the didactic contract through the use of directive and commissioning speech acts, which also constitutes a language modality directed to communication (Meira and Lerman, 2010) for the maintenance of ZPDs. Here is a persistent event in classroom situations in which students' attentional processes are redirected towards the establishment of a temporally shared social reality. That is, it is only possible to agree on the discourse objects developed in the communication directed to the curricular contents if the preservation conditions of the didactic contract are maintained (Blühdorn & Mannheim, 2008).

In the second example, lines 252 and 332, respectively, are punctuated by the speech movements of the students who were not respecting the agreement to ask permission to take the shift, in this case raising their hand. The teacher's language regulations, through directive speech, acts, followed by commissioning acts, represent the need for order that arises in classroom speech: speaking one at a time, after obtaining permission for the shift (Levinson, 2007). At this time, all students tried to talk at the same time, establishing a shift dispute, mainly to demonstrate to the teacher that they were following the development of the current topic, by Sousa (2002). However, there was a dispute for possession of the shift that was not foreseen in the didactic contract, which caused the teacher to perform a movement of resumption of the shift (directive act) and clarification of the contract (commission act): one of each time after raising their hand and obtaining permission from the teacher. After this action, the participants returned to the development of the topic itself (relief agents). Finally, the perlocutionary effects of the teacher's speech act on the

students (Table 2) that is, the silent shifts, are indicative of the tacit, albeit momentary, acceptance by them of the conditions established in the didactic contract.

It is interesting to note that the conditions of preservation of the didactic contract are not only in situations where parallel conversations occur, or students' attention diminishes. In this second example, the teaching contract is retrieved by the teacher because everyone wants to participate in class at the same time and demonstrate that they have intersubjective accessibility to ongoing cognitive activities, as proposed by Marcuschi (2006). That indicates that regulation through communication-driven language emerges whenever content-driven language is in some way threatened. This, in turn, is an aspect of the discussion that does not appear in the productions of Meira and Lerman (2010). That is, communication-driven language only emerges explicitly throughout classroom interactional activity when there is some disturbance in content-driven language development.

Target Language to The Content and Conversational Topic

Assertive acts. The other organizational pattern is Assertive Speech Acts, used to designate or affirm something. From the analysis, it was found that some assertive acts used to exemplify the topic in question were employed in order to clarify curriculum content. In these cases, the assertive acts were linked to the students' daily knowledge (Table 3). Such a strategy is a teaching mediation that creates conditions for the development of intersubjective accessibility to discourse objects through the approximation of the curriculum content of some aspect of students' daily life.

It was found that the teacher was able to maintain a relationship between scientific knowledge and everyday knowledge using and allowing students to present everyday examples in order to facilitate the mutual understanding of the current topic (Nébias, 1999). Scientific knowledge is the knowledge learned from schooling and its relationship mediated by other concepts. In this case, they were mediated by everyday knowledge, those learned from experiences with the world (Wertsch, 1988).

The relationship between these modes of knowledge, even with different origins and development, is not necessarily conflicting (Nebias, 1999), as can be identified in the example of the conversational sequence in lines 128-133 of Table 3. In this case, common knowledge about the way to produce the milk pudding syrup is used to mediate the construction of scientific knowledge: the formation of magma by the volcano.

The strategy of relating this two knowledge, which is expressed in assertive speech acts, is part of the regulatory

action that occurs in class because, with the help of the daily knowledge of both students and teacher (inter-regulation), scientific knowledge will be collaboratively built. Thus, in these interactions, it is observed the production and co-production of meanings through cognitive-discursive actions that promote the production of shared meanings for certain discourse objects. It is in the identification of the elements and brands involved in the emergence of that activity that we can follow the production of meanings (Koch, 2003).

This process is a characteristic example of the ZPD concept, as discussed by Meira and Lerman (2010). In its interactional aspect, the teacher is providing direct assistance to students' learning processes by performing, together with them, an operation that they cannot yet do autonomously. In the semiotic aspect, the construction of a temporally shared reality is working by bringing the concept of magma closer to the daily experience of the students, particularly the students, through the notion of syrup. That is, acting in processes of signification and referencing with a view to building a public version of the world, according to Mondada and Dubois (2003). It is important to note, however, that such an occurrence of regulation through content-driven language is only possible because there is an implicit didactic contract that underpins the ongoing conversational sequences.

Simultaneously Targeted Communication and Content Language

Expressive acts. Finally, we identified the emergence of Expressive Speech Acts that represent psychological states, such as the manifestation of joy in a congratulation. These acts appeared in situations of maintenance of the topic, which the teacher encourages the students, through compliments, to contribute to the development of the activity (Table 4). Through these acts, it was possible to preserve the conversational interaction that allowed categorizing the "relief" through a more scientific language, as observed in lines 75 and 226, but also through everyday examples (lines 220-221).

To categorize is to locate a phenomenon so that it can be identified within a set of relationships (Marcuschi, 2006). This process is organized from social interactions. Thus, the categorization of discourse objects occurs within a context and depends on a linguistic organization and can be recategorized during the conversation. The movement that the didactic contract takes over the course of the class is constant, which allows us to say that it is always subject to modification in order to help students' learning (Souza Cruz et al., 2014).

Table 3

Assertive Speech Acts and Curriculum Contents.

Speaker	Referent	Predictive	Strength	Interlocutor	Effect
Example 1 **Teacher**	Internal Agents	L. 128/129/130/131/132/133 (.) So the volcano(.) it is the result of the movement of the tectonic plates (.) the magma (.) is exists in high temperature(.) so it bubbles **do you remember of the sugar thing (.) the girls, righ (.) when we're going to make milk pudding, we don't have to (.) take the sugar (.) also it is delicious but we ( ) you boys, we are going to give some tips right, The milk pudding SYRUP is made of sugar (.) then we take the sugar and let it bake(.) when it hits high temperature it becomes kind of pasty right. so, this paste is very hot so it is like the magma ok.**	Assertive	Students	Interact with the teacher during the explanation of how the milk pudding is made.

Note: Example 1: Middle of class. Topic: internal agents of relief. Use of daily knowledge (to make syrup) in the construction of the concepts of the internal agents (magma).

Table 4

Atos de Fala Expressivos, Manutenção Tópica e Categorização.

Speaker	Referent	Predictiveness	Strength	Interlocutor	Effect
Example 1 **Teacher**	Internal agents	L.75 ((the teacher asks for and example of external agents)) **Seaquake very good**	Expressive	Student	More students answer
Example 2[b] **Teacher**	Earthquake/ Tectonic plates	L. 220/221 see the the:: PSI:::U listen, **he did a interesting question** he asked it was like happened in Japan right (.)	Expressive	Student	The other students remain attentive
Teacher and Students	Tectonic plates	L. 225 ((Teacher)) here we have the Equator line ok (.) Tropic of Cancer (.) PSIU (0.6) L.226 ((Students)) Capricorn L. 227 ((Teacher)) **Very good who said that**	Expressive	Student	A students points to the other

Note: Examples.

[a] Beginning of the class. Use of expressive speech acts to encourage the participation of the students and focus their attention.

[b] End of class. Use of expressive speech acts to encourage the participation of the students and focus their attention

In this sense, expressive speech acts as a meeting point of the two classifications of ZPD presented by Meira and Lerman (2010): maintaining the contract and clarifying curriculum contents. For the compliments of the teacher work both the didactic contract (student participation and attention) is constructed and reaffirmed, as well as the discourse objects to be categorized and recategorized in order to provide the construction of scientific knowledge through the valorization of the students' answers (scientific and daily).

Furthermore, assertive and expressive speech acts were used as strategies that enabled mutual interaction, signaling the fact that the speech objects developed in the activity were produced through joint and collaborative actions.

To summarize, promoted interaction is an indispensable prerequisite for the promotion of coherent discourse (Koch & Penna, 2006; Marcuschi, 2006). Another requirement for consistency is topic continuity (Koch & Penna, 2006). It is here demonstrated through the linguistic actions issued by the teacher in order to avoid breaks and return to the topic through the use of speech acts that implement the didactic contract. Thus, it can be said that coherence is the point at which the two dimensions of the regularity of speech acts related to the emergence of PPDs converge. As we have seen, both the maintenance of the didactic contract and the

clarification of curriculum contents were used speech acts that provided the realization of discursive coherence.

Through classroom communication, there is a co-construction of knowledge between students and teacher, which is responsible for the mediation between students and cultural knowledge encapsulated in the formal curriculum (Coll & Solé, 2004). The participants' expectation of this conversation is that the interlocutors build mutual understandings, that is, act in a temporally shared social reality.

By transposing this discussion to the research analysis scenario, it is possible to state that the topic - relief and its agents - is being built from a referential activity in which discourse objects are categorized and recategorized. So that the referral processes related to the topic in question were not interrupted, the teacher used as a strategy, throughout the class, speech acts that prevented the suspension of the topic or promoted its resumption in cases where the students threatened to generate breaks.

The result of these actions of the teacher was to create and preserve potentially favorable conditions for the emergence and maintenance of ZPDs by allowing the joint construction and assistance to the processes of meaning and discursive object creation through semiotic regulations during the interaction.

FINAL CONSIDERATIONS

The analyzes and theoretical relations presented in this investigation aimed to demonstrate how linguistic phenomena (Speech Acts) help in the emergence and maintenance of psychological phenomena (Zones of Proximal Development), pointing out,

at the same time, for the existing relations between cognition and language and for linguistic activity as a sponsor of learning-enhancing environments.

There is no doubt that sign mediation is the central concept of Vygotsky's Sociocultural Theory, for which thought is realized in language. Thus, studying the interactional and linguistic activities of participants in face-to-face interaction is a necessary condition for the explanation of how the processes of appropriation and mastery of the cultural forms of thought and action, called by Vygotsky called superior mental functions, occur. In this sense, we consider it fundamental to understand the processes of signification and referencing that occur in local conversational interactions between teacher and students. That is, to explain the modes of realization and updating of the regulatory function of language.

Among the innovations of this research that contributed to such an enterprise, it is possible to list: (1) the use of conversation analysis, particularly the concept of conversational coherence to investigate the interpsychological

construction of referential activity, that is, actions for the development of a conversation reality temporally shared between participants of an activity; (2) the use of Speech Act Theory taking into account situational and contextual characteristics, which includes the consideration of speech acts in conversational sequences and interaction during the activity; (3) the ZPD approach from an interactional and semiotic perspective, not as an individual property or as an enclosed assessment tool of actual and potential levels of development; (4) the adoption of the concept of didactic contract to deal with a second level of regulation of sociocultural activity that occurs in classroom situations; (5) and the use of interactional and filming analysis techniques, as well as microgenetic analysis, to investigate activities in concrete situations of realization.

The above contributions are in line with a scientific research project that seeks to clarify the impact of the regulatory function of language, particularly speech, on cognition. We argue that human psychological activity is closely related to sociocultural activity and that the two are dialectically constituted mainly through language. However, we take this issue not as an assumption, but as a research enterprise to be continually investigated and problematized.

In summary, this research is a small sample of what can be done in terms of approximation between the theoretical

and methodological tools of interactional sociolinguistics and Vygotsky's Sociocultural Theory for the study of educational activities.

The results point to a possibility of delineation and articulation between the linguistic and cognitive characteristics of conversational activities that take place in formal educational settings, notably in the classroom, and that have a direct impact on teaching-learning-development processes.

Further research is expected to deepen such characterizations and assist in understanding the regularities of classroom discourse in order to allow for the creation of resources for intentional, planned and systematic teaching actions that will have a powerful impact on classroom activity and about student learning processes. As well, that the advance and the systematic development of this research area generate new theoretical and methodological possibilities for the study of the relation between language and cognition in Psychology.

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ERRATUM

Regarding the article "Speech as Action in the Classroom: Semiotic Regulation of Cognitive Processes", with DOI number: http://dx.doi.org/10.1590/0102.3772e3633, published in Psicologia: Teoria & Pesquisa, vol 36, elocation e3633:

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