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**Animal Experimentation in Scientific Education:  
A Semiological Investigation Based on Circumstantial  
Indications**

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**Animal Experimentation in Scientific Education:  
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**Abstract**

The work presents the results of a doctoral research based on the Semiology of Messages and Signs by Luis Jorge Prieto (1973), especially focusing on one element of semiology called circumstantial indication. The main objective of the research was to identify the role of circumstantial indications in the construction of concepts related to animal experimentation in the initial formation of science teachers. Results revealed that the circumstantial indications can be signs used by the teacher with the purpose not only to clarify the discourse and reduce ambiguities, but also to provoke the students' critical thinking.

**Keywords:** Animal Experimentation, Circumstantial Indications, Prieto's Semiology, Science Education

## Introduction

This work proposes a discussion based on two main axes: Animal experimentation, the proposal main content, and circumstantial indications, which are elements of semiology such as messages and signs according to Luis Jorge Prieto (1973) as the research analytical instruments. The problematization, based on the axes previously mentioned, which are intertwined, was developed aiming at identifying which signs of the circumstantial indication type were present in the discursive process of the classroom, and what their role was in the construction of meaning from the concepts involved in the theme 'animal experimentation' by the students. Circumstantial indication is a type of collateral sign which is not always explicit in the teacher's speech, but which can subsidize the messages transmitted through signs. Compared to circumstantial indications, the signals are signs explicitly and clearly transmitted that are part of the discourse main axis. Eco (2003, p. 32) states that

[...] if I asked ten different people to move their leg, I would probably obtain ten different interpretations to my request. And even more relevant, I might as well obtain many different interpretations of these ten interpretations; by using simple factorial calculation, one can inform how many interpretations could be produced by my initial expression.

For this reason, in the classroom, the teacher must be attentive to the fact that the diversity of interpretations to each sentence of their speech is usually proportional to the number of students present. Among this diversity of interpretations, there might be some that do not correspond to the teacher's first objective, which is the understanding of the messages emitted. The research question that we seek to answer regards the role that circumstantial indications intentionally used or identified in the classroom discourse play in the understanding, lack of understanding or misunderstanding of scientific concepts worked with the students.

Therefore, the main objective of this work, through a re-reading of Prieto's semiology (1973), was to identify the role of circumstantial indications in the construction of concepts such as speciesism, elective speciesism and elitist speciesism related to animal experimentation by students. Due to its semiological view, this work aims at being different from other studies in the area, by seeking to transport the theory of messages and signs by the semiologist Luis Jorge Prieto to the Scientific Education field. Prieto's (1977) terminology was brought to this work for presenting potential characteristics, which enabled the construction of a logical support to the proposal. Moreover, it offers, through a semiotic referential, the learners' cognitive improvement, resulting in a more meaningful learning. In Prieto's terminology, the terms *sender* and *receiver* regard the meaning of the message. Therefore, in a discursive approach which privileges dialogicity, teacher and students alternate the roles of sender and receiver, depending on the meaning of the message.

## Literature Review

Prieto considers the signals instruments used to get a message across. The word 'instruments' is used by Prieto as a metaphor to 'medium' (SANTAELLA; NÖTH, 2004, p. 101). For Prieto, signals are means of communication in the social life. They are also means of obtaining the cooperation of other people and exercise influence on everything which is around us, which is where their characteristic as intentional semiological instruments origins.

Senders and receivers of messages, in the classroom context, must be able to distinguish classes of messages and signs, in addition to establishing a convention between them, under the penalty of not achieving their purpose: the understanding of messages. To achieve such purpose, sender and receiver must be in agreement in relation to the classes of signals and their correspondence with the construction of the meanings intended.

Another semiological element to be taken into consideration for the communication in the classroom is the semic act, defined by Prieto (1977) as an intentional index for the transmission of messages, which requires a sender and a receiver. The semic act is, therefore, an intentional communication act, and constitutes a social relationship (PRIETO, 1973). The semic act might sometimes not be well succeeded. Any disagreement between the users of a code and the sememes which are part of it might appear, sooner or later, in the failure to get the message across (PRIETO, 1973).

There are two situations of failure of the semic act. One is called *misunderstanding*, which occurs when the message that the sender tries to send and the message that the receiver ascribes to the signal are not a single and the same message. That is, the receiver understands something, but it is not what the sender wanted them to understand. In such case, the receiver ascribes a message to the signal. There is another type of failure of the semic act, which is *non-understanding*; in other words, the receiver is unable to ascribe certain message to the signal for the fact that there are two or more possibilities of interpretation. They do not ascribe any message to the signal and, for this reason, we state that they do not understand. The semic act failure occurs for *non-understanding* or *misunderstanding* of the signal emitted.

For the uncertainty to disappear, it is necessary that the class of signals in the emitting plan be composed of a single member, that is, the only and same message emitted must be shared by the receiver and sender. When this condition occurs, we state that there was *understanding*, which means that what the receiver understood is exactly what the sender meant to say. Next, we will describe the two categories of indication that permeate this study: indications via signal (direct) and circumstantial indications (indirect).

The communication process involves being able to select the meanings of messages sent in order to achieve understanding; however, for the receiver of the message, this process is never complete, when carried out only via signals (BUYSSSENS, 1967). To achieve meaning and ascribe a message to the signals emitted during the semic act, it is necessary more than only receiving these signals in a passive way.

The communication process requires reflection, refinement through findings via discoveries at the level of the message receiver. Therefore, the convention on the states of awareness between sender and receiver, during the semic act will be favored. Transmitting a message, when done only through signals, might create a precedent for

the sender to select a meaning among many possible ones. That is, in the direct transmission of a signal, there are several messages that the receiver might admit. The receiver ascribes the message to the signal, according to the situational context of emission and according to their previous knowledge. But, the message is not necessarily effected in the sense that the sender would like the receiver to understand it, generating misunderstanding or non-understanding. In such case, we state that the message transmission with the exclusive use of signals, despite being direct, might be incomplete.

It seems relevant to emphasize that the direct transmission of information, through the exclusive use of signals, does not necessarily imply non-understanding by the receiver. In general, as far as behavior is concerned, signals are *true*, as long as they correctly determine the expectancies of their users and, in this way, free more completely the behaviour, which is implicitly raised in the expectancy or in the interpretation (MORRIS, 1994).

In spite of the culturally conventional character of each signal transmitted in a direct discursive composition being incomplete, the sender of the message might refer to other elements to complete the meaning of the message towards the intended convention: circumstantial indications, whose theoretical bases are explained below.

The selection of messages, among several that a signal might admit, is an essential element of Prieto's (1973, 1977) semiology. This selection becomes possible due to the use of circumstantial indications by the sender. If the receiver is able to select certain message that they ascribe the signal, that is because it is always produced in relation to certain circumstances, and these, in turn, provide a complementary indication to the receiver (PRIETO, 1977).

According to Edwards and Mercer (1993), to communicate it is necessary to be able to abstract and concretize. However, meaning concretization, for the receiver is never perfect.

Selecting a message between two or more possibilities requires identifying that the sender's message admits some interpretation and excludes others. Communication requires proper selection of the message by the receiver so that the semic act is successful. Even if the receiver selects a possible message that the sender tries to transmit, only the indication of the signal is not enough for them to ascribe the message that the sender intentionally planned, since the number of messages admitted by a signal is infinite.

Prieto defines circumstance as every fact that must be (re)cognized by the receiver at the moment the semic act occurs. It is the whole context previously known by them, previous to the signal emission, and that specifies the signal message among several possibilities. Therefore, the indication provided by the circumstance aims at favoring differently the messages admitted by the signal, making the receiver to conclude that the message that the sender transmits is, among all the messages admitted by the signal, the one that the circumstances favour the most (PRIETO, 1973).

For Prieto (1973, p. 19), the receiver selects a message among many admitted by the signal due to the circumstances in which the signal is emitted, and he illustrates this with the following example: when the question "what time is it?" is asked. A response such as "nine thirty" is conditioned to the fact that receiver and sender share certain circumstances which determine whether it is morning or evening (PRIETO, 1973).

Despite being able to share meanings and establishing conventions between messages, the individuals have different experiences in relation to each object, consequently, from each message. The receiver is the one concretizing the message received, and they need

a semiological instrument that completes it beyond the signal.

Circumstantial elements are elements whose function is to refine the message, in the receiver's perspective, so that the message emitted and the one received are the same and only one, a fundamental premise for understanding to occur (PRIETO, 1973). For Peirce (*apud* ECO, 2003), every time the individual thinks, there is, in their consciousness, a feeling, image, conception or another representation, that is, a signal or more, and the human being can only think through words or other external signals.

Through the intermediation of circumstantial indications, the individuals might be able to identify what their interlocutor meant. Receivers of messages, through the emission of these indications, might be able to evaluate the degree at which two meanings are identical or different, and perform satisfactorily what is expected from them in the interlocution process. This is due to the fact that, even if there are not two behaviors or two states of consciousness that are identical, among the infinite messages that might be admitted by a signal, the actors of the semic act are able to recognize the states of awareness of one another, through the messages of the signals emitted. For Edwards and Mercer (1993), misunderstandings are not reduced to matters of contents that are thought and learnt (facts, theories, terminologies, specific procedures, etc.): these are more trivial issues. The most profound misunderstandings might be those implicitly underlying interpretation. Therefore, every semic act must bring with it assumptions about what the receiver must know, taking them as the basis for subsequent interpretation. Grize (*apud* DUVAL, 2004, p. 91) adds that there is no discourse whose elaboration does not take into consideration real or supposed interpretations by the receiver, either present or virtual. Simple propositions admit more than one meaning, since the status that determines the place they occupy in the discourse organization of a set of propositions, or the role they play in the discourse expansion, depends on the utterance context (DUVAL, 2004). Therefore, different ways for the meaning might be achieved, since the individuals leave from different initial conditions of knowledge, experiences and perspectives. For this reason, the effect that a signal exercises depends on the background of the individual responsible for generating some interpretation. Ogdan and Richards (1989, p. 55) state that a peculiar interpretation regards the context that affected the person in the past and became, from then, a recurrent experience for this person. To sum up, the receiver of a semic act is imposed to know the sender's purpose, when a message is transmitted. This purpose is identified, both in the production of the primary signal and in the circumstances that collaterally accompany this production.

As far scientific education is concerned, the discussion about relations between human beings and animals was studied by Rodrigues (2015), who built his thesis from the interpreters of the Peircean's semiotics, and approached the wide range of understandings that students have about these relationships. The discussion this author proposes addresses issues related to animal experimentation in a critical way. The specific approach of the theme animal experimentation, under a critical and scientific view, has been discussed by Greif and Tréz (2000), Lima (2008), Tréz (2008, 2011, 2015), Tréz and Rosa (2013), Godoy and Laburú (2014), Godoy (2014), among others.

The choice of this theme as the substrate for the transposition of Prieto's semiology theory occurred progressively. After some time, it was strengthened, refined and extended, when we found out empirically that the teacher in the initial education, in spite of mastering basic scientific concepts that permeate the theme, must also build up

subsidies to be able to analyse critically social, political and economic issues that interfere in their practice. In order to provide a good quality initial education, mainly when teaching sciences, teachers' educators must work, with the future teachers, at least minimum subsidies that can provide them with conditions to follow the demand for new discussions and learning new concepts. To achieve that, educators must foster intellectual instruments that enable their students – future teachers – to develop and widen the reflection on the common sense that dominates the construction of concepts and values. We would like to highlight, once more, the importance of understanding scientific concepts to broaden the debate on the use of animals for teaching and research, for the development of a broader view in teachers' initial education.

### **Methodology**

The participants of this research were 15 male and female students in the fourth and last year of Biological Sciences Teaching Course in a public university in the State of Paraná. The study was developed during the regular school year in the subject Mandatory Supervised Teaching Curricular Internship, taught by the researcher in 2015.

The concepts worked through circumstantial indications were speciesism, elective speciesism and elitist speciesism. Such concepts were selected for being a recurrent theme in the main publications related to animal experimentation in Sciences Teaching. A teaching sequence was used as a Potentially Meaningful Teaching Unit (PMTU), which is a set of systematized steps to carry out a learning proposal (MOREIRA, 2011).

The whole intervention was recorded and transcribed literally. However, for analysis purposes, only excerpts of the text in which circumstantial indications occurred were selected. The discourse analysis carried out was based on an instrument elaborated by the author, adapted from Coll and Onrubia (1998), which is described below. The excerpts in which circumstantial indications appeared were reported in a descriptive way. The utterances produced by the teacher and students were identified in parentheses at the beginning of each corresponding utterance, and written in italics and between inverted commas to be differentiated from the rest of the text. Students were identified with letter S (subject), followed by a number assigned to each one by the author (from 01 to 14). Teacher's utterances were identified with letter P. The non-verbal items that were relevant to the understanding of the narrative and our observations are described in parentheses. The objective of this phase was to verify, in the perspective of Prieto's semiology (1977), the understanding, non-understanding or misunderstanding of messages by students, when concepts were worked through signals and circumstantial indications.

### **Results and discussion**

*Concept 1: Speciesism. Circumstantial Indication through analogy and image*  
To work the concept of speciesism, we started questioning:

*(P) - "has anybody heard the term speciesism? If so, in which context? Can you tell me"?*



(S14) - *“I did an extension course about animal rights and heard about it, but I don't remember the concept exactly, I can't define it”.*

(S02) - *“I've heard of it, but I cannot define it well, or say exactly what it is, I think it is something to do with philosophy and if it is about species it is also about animals”.*

(P) - *“yes, it is a term from philosophy used to refer to the human prejudice towards other species. Now, let's bring it to the context of scientific education in special to discuss the use human beings make of animals”.*

(S02) - *“prejudice how? Ours towards animals? I can't understand”.*

Signals provide human intelligence with concepts made up by their respective meanings. When, in the dialogue above, we emitted a direct signal represented by the message *“it is a term from philosophy used to refer to the human prejudice towards other species”*, the meaning was shown to the students through a signal, but utterance S02 above led to the conclusion that that student did not understand the message emitted. A signal almost always conveys an incomplete message, not enough for the receiver to extract from it the meaning that the sender would like the receiver to understand. Then, we started to work a circumstantial indication in the form of an analogy subsidised by questions with the help of a slide (Fig. 1) aiming at complementing the message emitted by the signal, to lead students' reasoning to the concept expected

(P) - *“there are terms used to explain the different ways a human being feels superior to the others, which involve different types of prejudice. Can anybody give an example of these terms”?*

(S02) - *“Sexism, Racism”.*

(S07) - *“Homophobia, Xenophobia”*

(P) - *“That's it. Just to remember then, the concept of speciesism really came from philosophy, but it has been used quite often in papers in the main scientific education journals that discuss animal experimentation. You have mentioned several forms of discrimination in our society. What do the terms 'racism' and 'sexism' mean to you?”*

(S02) - *“racism would be the discrimination because somebody's race or color”*

(S13) - *“sexism is gender and sex discrimination”.*

(P) - *“very well. Now, look at the following slide”...*

*(We then showed the following picture in the slide projected):*

**Figure 1.** Relation Racism/Especiesism/Sexism



Source: [veddas.org.br](http://veddas.org.br)

And we continued:

(P) - “Considering the definition of sexism and racism that your colleagues gave a minute ago, can you define better the concept of speciesism”?

With the help of the *slide*, we used the first circumstantial indication, asking the students to make analogy between the concepts already mentioned and questioning whether they would be able to define, using their own words, the concept of speciesism.

(S05, S07 and S13): - “discrimination of species”. (These three students answered almost simultaneously).

(P): - “but, what this discrimination of species would be, explain it better, please”.

(S06): - “I understood it is ‘a kind of’ contempt or prejudice with the one that is different”.

(P): - “does everybody agree”? (most nodded their heads in agreement). Does this happen when we think about the human being relationship with other animals? Can you give an example?

(S05): - “I believe we discriminate animals every time we think that we have the right to explore them. Thus, when we are not able to put ourselves in the animals’ position we are being speciesists. Their lives are important for them. But we don’t think like that. For the human beings in general, it is not important whether the animal feels or suffers. If it is for the human beings’ own benefit, the animal will be used. Like when somebody asks, if it is not tested in animals, how can it be tested? It is typical, because nobody admits that human beings become guinea pigs or are eaten, for example. But, the animals can, even if they suffer just like the human beings. I think that is to be speciesist”.

(S02): – “then, at the beginning, when I said that there was race discrimination in racism, speciesism is discrimination of species”.

(P): – “how come? Can you explain it better?”

(S02): - “that’s what I understood. The human beings are speciesist when they despise other species, when they give no importance the lives of other species”.

Little by little, we noticed through the externalization of some students' thoughts (S05, S06, S07 and S13), that they had understood the concept. Through the individual's speech we could notice that they coincided with the expected messages. Our questioning allied to the slide worked as a circumstantial indication of the type analogy, leading to the expected answer, which corresponded to the concept of speciesism. Even after we had given the direct answer through a signal, we noticed that S02 contribution made it clear that the message had not been understood, when this student said "*prejudice how? Ours towards animals? I can't understand*" at the beginning of the provocation.

By stimulating students' participation through the circumstantial indication of the type analogy, we provoked their complementation of the message, through autonomous thinking. We used elicitation to subsidise the provocation of the circumstantial indication used.

We continued the speech seeking evidence that more students had understood the concept worked

*(P) - "think now in a general way about the context of animal experimentation and answer: do you think there is speciesism involving such practices"?*

*(S01) - "looking from this perspective, yes. Of course there is".*

*(S14) - "if we look at it here at the university, they use animals such as rats, birds and others and justify it saying that they are easy to manipulate, there is the ethics code and etc".*

*(S01) - "this has been naturalized, the habit that animals can be treated like things, like some material, that it becomes difficult to see there some kind of contempt, of speciesism, but it is there".*

*(P) - "but is there some indication of speciesism in these cases? How"?* (most students nodded in agreement).

*(S02) - "I think there is, because from the moment you use an animal as a thing, you already think you are superior, and that you have the right to explore them the way you want. And then you are being speciesist, you are using another species".*

When we emit a circumstantial indication, we expect that most students understand the concept that is being worked, even if they do not take part actively in the discussion. In the dialogue above, it becomes clear that the circumstantial indication had effect, not only on the students that took part in the interactive discourse, during its emission, but on the others, who were only paying attention to the discussion. S01 and S14, who had not taken part in the dialogue when the circumstantial indication was emitted, demonstrated, in turn, that they also understood the concept of speciesism, since their speech made that evident. We continued:

*(P) - "then, what would be the definition to the concept of speciesism? What could you understand?"*

*(S06) - "it would be the term used to explain the prejudice that human beings have towards other species. For example, this is clear when somebody does not consider that the life of a laboratory rat is important for the rat. What matters is that for professors or researchers, examples that we see here at the university, the rat is a laboratory material just like any other".*

This case shows clearly student S06's understanding, because they managed to relate the concept to the meaning that they built, and we realized that the circumstantial indication used to work the very concept of speciesism ended up triggering discussions that went beyond the definition. Even if our intention with the use of circumstantial indications was to make students understand the meaning of a concept, they manage to relate it to a real context, going beyond the concept to a situation experienced at the laboratory. We went on then, to work a second concept, that of elitist speciesism, which is transcribed below.

*Concept 2: Elitist Speciesism. Circumstantial indication through Pantomime and Analogy*

*(P) - "Then, as it has been mentioned by your colleague, there are two categories of speciesism, elective and elitist. Elitist speciesism explains the fact that the human being feels superior to other species. Do you understand that? And the elective speciesism means to elect certain species as entitled to have moral consideration while others are not".*

The excerpt above shows that we started by transmitting a signal, that is, some direct and specific information to explain the concepts to the students. We introduced the concept in an expository way, sending some information, and went on as follows.

*(P) - "Can anybody explain with their own words these concepts in the context of animal experimentation? Think about the concept of speciesism that we already worked. What would then be the elective and elitist speciesisms"? (we wrote both concepts on the board).*

There was no answer (students were looking at the words written on the board and thinking). This demonstrated that they were still thinking about the question we had just asked. Since there was no answer, we went on.

*(P) - "S06, can you help"?*

*(S06) - "It is difficult, madam. I couldn't understand the definition".*

We realized that S06 demonstrated not having understood the concept, in other words, the message sent had no effect. We went on.

*(P) - "do you want to read it again"? (everybody read, but they remained silent)*

*(P) - "can anybody help"?*

*(S09) - "Elitist has to do, for example, with the pharmaceutical industry that uses animals and that only a small portion of the society has access to"?*

*(P) - "what you've just said is part of a broader concept which is valid. But, this is not the concept"*

When we emit a direct sign, two possibilities might be created for the semic act failure, these are *non-understanding* and *misunderstanding*. These two possibilities became evident in the example above, in which we talked to S06 and S09. Regarding S06, we can affirm that there was non-understanding, since the student was unable to select a possibility of

interpretation for the message emitted. We then state that he did not understand the concept that the message conveyed. In the case of S09, we can state that there was misunderstanding, since the message that the sender (professor) tried to send, and that the receiver (S09) ascribed to the signal, were not a single and the same message. Misunderstanding happens when the receiver of the message tries to select, among several possibilities that the signal admits, the one that is the closest to the one intended by the sender, but they do it in a wrong way, understanding a message different from the one the sender would like them to understand. In the case above, when we emitted a message using only the signal, we ended up generating non-understanding and misunderstanding. To complete the message conveyed by the signal, we used a circumstantial indication, in the form of analogy through elicitation.

*(P) - "let's think together: what's the meaning of the word 'elitist' for you"? (We wrote the word on the board).*

*(S02) - "elite".*

*(P) - "Ok. But when we use the word 'elite' which terms immediately come to our mind? What meanings are linked to this word"?*

*(S01) - "rich"*

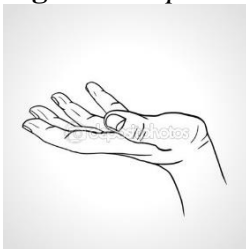
*(S04) - "burguoise"*

*(S11) - "a person who thinks they are better than the others"*

*(We wrote the words and expressions on the board as the students went on saying them).*

*(P) - "From these words, can you reach any conclusions about the concept of elitist speciesism in the context of animal experimentation"? (after students had checked the words and kept silent for some minutes, I used a circumstantial indication in the form of pantomime. (At the same time that we mentioned the word elitist, we made a complementary gesture with the palm of the hand upwards, just like in figure 2 and raising the arm with the palm upwards we used a facial expression indicating superiority, with the nose slightly up and a snobbish look).*

**Figure 2.** Representation of the Gesture with my Hand



Source: [pt.depositphotos.com](http://pt.depositphotos.com)

Then the students started to externalize their meanings.

*(S02) - "it's somebody who thinks they are better than the others. In such case, human beings discriminate other species because they think they are superior. It has to do with discriminating a species that is not important. In animal experimentation the single fact of using a species, since keeping them captive reveals subliminally certain superiority".*

- (P) - *“but, is there a species that is more important than the others”?*  
(S02) - *“I think... well. It’s kind of relative. Between my dog and my dad, for me, my dad is more important, from the life standpoint”*  
(S09) - *“well, it depends. Because if we are talking about invigilating the house, your dog would be more important”.*  
(S02) - *“well, that’s why I said it is relative”.*  
(P) - *“guys, let’s focus on animal experimentation”.*  
(S02) - *“well, my father is more important than my dog if I had to choose one to take part in an experiment”.*  
(P) - *“is this elitist speciesism”?*  
(S09) - *“Yes. It’s already implied who is more important in this case”*

Students understood, through the complementation of the gesture, that the term elitist has to do with elite, and managed to make a relation of the term with the superiority that appears in some relations between human beings and other animals.

- (P) - *“any other examples”?*  
(S07) - *“we usually see mainly in biology and science books that the human beings place themselves at the top of the zoological scale, then somehow this shows certain superiority. Is this elitist speciesism”?*  
(P) - *“what do you think? (pointing to S05).”*  
(S05) - *“I think so. Not only in the studying books, but in many situations”.*

At this point, we noticed that, through the circumstantial indication emitted, students started to make relations between the concept and its meaning. We elicited some more examples.

- (S14) - *“people who eat other animals already feel they are superior in relation to the other species”.*  
(P) - *“why”?*  
(S06) - *“because it’s a form of exploitation”*  
(S14) - *“but I did not kill or make money with it, I only ate it”*  
(S11) - *“but, if you did not eat it, there wouldn’t be such exploitation. In fact, all of us who eat other animals are elitist speciesists because we place ourselves at a superior level in relation to this context”.*  
(P) - *“bringing this discussion to the scenery of animal experimentation, is there elitist speciesism? (students remained silent). Why”?*  
(S10) - *“in experimentation it is even worse, because I think that the elitist speciesism becomes even more evident. The fact that experiments are carried out with animals implies that the researchers believe they have the right to do so”.*  
(S06) - *“They might say they do not think they are superior, but if you ask them whether they would open their mothers’ belly or would accept to inject drugs in their daughters, they would say no, because they are human beings. This sounds to me as placing the human species in a superior position”.*  
(P) - *“let’s remember that we are not judging right or wrong. There is no moral value judgement here in the sense of stating that speciesism is right or wrong.”*

*Speciesist and elitist are not swearing. This is a very particular issue. I'm trying to make you understand the concepts to be able to identify them when they appear in the most varied contexts and then make an opinion, ok? Can you formulate the meaning, in your own words, of the elitist speciesism concept"?*

*(S02) - "it's the type of speciesism in which one species think they are superior to the other, and in the elitist speciesism human beings believe they are superior to other animal species".*

*(S01) - "this does not mean that the researcher thinks he is superior as an individual, but as a species in the zoological scale".*

*(S07) - "thinking like that, we can say that animal experimentation is all based on elitist speciesism".*

Through the circumstantial indications sent in the form of pantomime and analogy, through the questioning as a social category of the semic act, we realized that the students apparently understood the concept of elitist speciesism through the complementation of the signal emitted. The utterances above, by S02, S01 and S07, although emitted in different ways, each one in their own way, demonstrated the understanding of the concept. It became clear that the circumstantial indications improved the students' discourse universe in relation to the concept. The emission of the word allied to the pantomime reinforced the message previously emitted, through the oral verbal signal (direct), that is, at the moment we supplied the information in relation to the term definition, at the beginning of the provocation.

### *Concept 3 – Elective Speciesism. Circumstantial Indication through Analogy, Problem Situation and Image*

To work the concept of elective speciesism, we started resuming orally the concepts of speciesism and elitist speciesism. We started informing that, in addition to the elitist speciesism, there is another form of speciesism, which is the elective one. Then, we read together with the students the definition of the concept from a slide projected on a screen. We asked S14 to read aloud:

This is called Elective Speciesism: the preference for determined animal species, taken as entitled to consideration and respect, while there is a cold indifference in relation to the suffering of all the animals that are created and killed under the greatest torment in industrial scale, to provide meat eaters and those who consume products manufactured with the raw material of their carcasses. If we commit such discrimination, we cannot be ethical. Therefore, it is not only necessary to be ethical, abolishing the elitist speciesism. It is also necessary to abolish elective speciesism, that is, the form of discrimination that believes it is only necessary to choose some kind of animal to respect and this will solve the moral conflict that results from judging that the vital interests of certain animals count more, or count less than the interests of others (FELIPE, 2007, p. 136).

In this case, the excerpt above served as a signal that transmitted the information in a direct way to the students. Since the number of different messages admitted by a

signal is infinite, to eliminate the possibility of different interpretations, we started the circumstantial indication emission process aiming at directing students' thoughts to the interpretation that was closest to the concept expected.

(P) – *“Can you say with your own words what you understood from the definition read?”*

(S09): - *“just a minute, because now it became confusing”.*

(P) – *“S14, you read, can you tell us what you could understand?”*

(S14) – *“it is a definition of elective speciesism”.*

(P) – *“yes. But what did you understand”?*

Students remained silent; we noticed that they were reading the concept projected on the screen again.

(P) - *“ok, read it again and tell me what you understood as elective speciesism” (teacher).*

(S11) – *“I don't know, it seems to be more 'punk'”.*

(P) - *“'Punk' how? What do you mean by 'punk'? In what sense”?*

(S11) - *“I don't know. More complex than the other (the student is referring to the concept of elitist speciesism previously worked).*

(S12) – *“It seems that it has to do with preferring certain animals rather than others”.*

*We noticed that S12 started to get closer to the concept.*

(P): - *“Ok. You're on the way. Elective speciesism involves choosing species that we prefer to different demands, such as food, entertainment, experiments, etc. and others that we prefer as companion or affection”.*

(S01): - *“ah, but entertainment no. What is entertainment? Circus? Rodeo”?*

(P): - *“Yes. We are not questioning the ethical aspects of these practices. This is also important. But, now I'm trying to make you understand the concept of elective speciesism”*

(S10): - *“then the 'farra do boi'<sup>1</sup> is also entertainment”?*

(S08): - *“Yes. For the ones who practice it, it is. The bull is chosen for the rodeo, the tiger for the circus, the monkey and others for the zoo...”.*

We could observe that S08 understood the concept of elective speciesism seen previously, since they made a correct relation of the use of different animals in different contexts, mentioning the elective concept correctly. This student had not said anything during the discursive manifestations when the circumstantial indication through which the specific concept was being worked occurred. This shows that circumstantial indications might lead students to understand, even if they did not participate in the discussion, but were attentive to the dialogues produced.

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<sup>1</sup> Translator's note: *farra do boi* is a popular festival in the State of Santa Catarina in the South of Brazil in which an ox is provoked to run after the individuals taken part in the activity. The ox is usually beaten in order to get angry and run more. After the animal is exhausted it might be returned to the field, or it might be even killed during the chase on the streets. This practice was officially banned in 1998.



To continue working the concept of elective speciesism, after S08's speech, above, we noticed that the students remained silent and did not emit any other considerations. Then, we used a circumstantial indication in the form of problem situation, in order to trigger other processes of complementation of the messages that had been emitted so far. Based on Melgaço, Meireles and Castro (2011), we handled to the students a text with the problem situation below, and asked them to read it and solve it in groups. After having formed the groups, students should present to the class as a whole their choices and justifications.

*“Consider the following problem situation: Test DL50 is a common test in industry and research. It is carried out with animals and consists in forcing the groups of different species to ingest some amount of a substance through a gastric probe up to the point when 50% of this experimental group is dead” (GREIF; TRÉZ, 2000, p. 32). In the hypothetical situation, a group of animals will be used for this experiment. Number in ascending order the groups of animals below that you would choose to take part in the test”.*

*a)Monkeys b)Rabbits c)Rats d)Human beings e)Dogs*

The procedure presented in the activity led students to categorize the groups in order of preference. This is the main characteristic of the elective speciesism: to elect species according to the individual's own criteria of affection (FELIPE, 2007). We never stated throughout the activity that this choice was compulsory and none of the students questioned this fact. The objective was to use this activity to complement the message emitted through the signal (the concept definition projected and read by the students at the beginning of the lesson), functioning as a circumstantial indication. The intention was that the students finally reached the understanding of the concept of elective speciesism. For that, we tried to generate an emotional conflict among them, one that would put them in confrontation with a choice, the one that would select species to take part in a lethal experiment. The social relation of the semic act that illustrates the relevant circumstantial indication is of the type positive order, aiming at the cooperation of the message receiver, represented by the sentence: ‘Number in ascending order the groups of animals below that you would choose to take part in the test’. Students organized themselves and formed four groups of work. Among the options (human beings, cats and dogs), students elected the ‘rats’ as the first option to take part in the lethal experiment. According to Felipe (2007), we tend to treat animals as ‘things’ when they are not the ones that we would choose as companion, guard or affection, reinforcing the elective speciesism. It was expected, then, that the students chose the rats, which was confirmed. The justifications that they gave confirmed the predominance of elective speciesism. To make clear the distribution of individuals in the groups of discussion for this activity, the groups formation is listed below: S02, S04, S05 and S11 formed the first group; S01, S06, S07, S12 and S14 formed the second group; and S03, S08, S09, S10 and S13 formed the third group. When the analysis and discussion of the problem situation ended, the dialogue that represents this passage occurred and is transcribed below:

(P): - *“Ok, who would like to start? You have to say the order and justify why you chose those species to take part in the lethal experiment”.*

(S02): - *“lethal and sad”*

When the results were presented, we noticed that the rat was the species chosen by all groups.

(P): - *“why does the rat appear as the first species chosen by all the groups”?*

(S04) - *“it was a consensus”*

(P) - *“based on which criteria? can you explain that to the rest of the class? Why didn't you choose a different species”?*

(S07): - *“Well, the rat is already the most used animal in this type of experiment because it is the most distant from our own species”.*

(P): - *“Distant how? In the zoological scale?... the one we have the least contact with? Explain it better, please”.*

(S11): - *“in fact, because the others are closer in terms of interaction. Everybody agreed that it would be less difficult for us to carry it out (the experiment) with the rat”.*

(S09): - *“well, in our group we even thought that in the zoological scale the degree of importance would be practically the same, but we ended up choosing the rat also, because only imagining dogs and cats in the laboratories, we felt sorry for them. I can imagine my dog. God forbid”.*

In the dialogues above, the correspondence between the choices and the students' emotional preferences was clear. None of the groups mentioned easiness of handling, lower cost, etc. We went on:

(P): - *“and you”?* (pointing to the second group that had not presented yet).

(S14): - *“the same, madam. We are in a certain way more used to seeing rats in laboratories, it is more usual, it might be shocking, but not as much as if it were a cat or dog. Human beings, then, out of question”.*

(P): - *“ok. Resuming the concept then. When we refer to the concept of elective speciesism, is it somehow related to what we have just experienced? What did the problem situation demonstrated in relation to the concept we are working on”?*

(S02) *“in fact, we are choosing a species that we judge more important to the detriment of others. In this case, we chose the one that had the least importance for us”.*

At this point, we started to realize that the students' thought was being directed towards the correct message, the one expected for the concept.

(P): - *“How is this related to the concept of elective speciesism”?* (the words were written on the board). *Could you understand what your colleague has just said?*

As the students remained silent, we presented a second circumstantial indication of the type analogy, on purpose, focusing on the term *elective* and questioning its meaning.

Then, the social relation of the semic act was the elicitation. Many students answered simultaneously that the term refers to electing, choosing (S04, S01 and S05).

*(P): - "So, now are you able to formulate the concept of elective speciesism based on the problem situation that you were asked to solve?"*

*(S10): - "Elective speciesism was made concrete here in our classroom, with our examples. To define, this means that when we choose a species, elect it as more important (than others). This is elective speciesism. As we chose the rat to take part in the experiment. This means we chose the other species as more important and the rat as the least important".*

We noticed that S10 understood the concept when this student produced the speech above, through the two circumstantial indications sent in a complementary way: the first, as a problem situation and questioning; and the second through analogy and elicitation related to the work, both intending that the students reached the understanding of the concept.

*(P) – "can you say what you understood now? And you?. (Pointing to S09 and S11).*

S09 and S11 were students that had shown non-understanding of the concept at the beginning, through the signal. We expected that after the emission of the circumstantial indication they had understood it. However, both remained silent, which made us think they had not. But S09 said:

*(S09) – "then, I think it is when we use animals the way we want".*

We had observed that, based on their silence, and later on based on the answer above by S09, that the semic act had not obtained success with these two students. One of them had demonstrated non-understanding (S11) and the other, misunderstanding (S09). In S11's non-understanding, the receiver did not ascribe any message to the signal that we tried to send. And S09 revealed misunderstanding, when attributed a different message from the one we had expected as the sender of the message. For these students, the message, even if emitted through the first circumstantial indication (problem situation), was still incomplete in relation to the concept that we would like them to grasp. Therefore, S09's answer was not satisfactory, since it did not coincide with that the researcher had expected as a teacher. Still trying to favor the understanding of the elective speciesism concept, we used an image of the type illustration, which is reproduced below, in Figure 3.

**Figure 3.** *Illustration by Pawel Kuczynski*



Source: Kuczynski (2012).

The students were invited to analyze the image above, in the elective speciesism viewpoint and to report their perceptions orally.

*(P): “Look at this illustration. And think whether it helps to better understand the concept of elective speciesism. You don’t have to answer now. Write one sentence that represents the concept. In one sentence, write what you understood. Individually”.*

*I waited for five minutes so that the students could elaborate the concept and asked them to volunteer to read it.*

*(S05) – “elective speciesism happens when human beings think that some animals exist to be eaten and others do not”.*

*(P) - “exactly. Who else could report what you understood of the concept”?*

*(S14): - “elective speciesism comes from ‘electing’, that is, choosing certain animal species according to our preferences, needs or culture”.*

*(S12): - “the example in the illustration makes it clear”. Elective speciesism becomes really evident. In this case, the cat is well treated while the other species are about to be slaughtered to become food, even cat feed”.*

*(S02): - “this illustration is an example of elective speciesism in the food industry, where the animals on the right were chosen according to our culture and that happens in many sectors where animals are used such as the pharmaceutical industry, where the animals used are rats and mice already elected as laboratory preys”.*

*(S01): - “this way of treating the animals is also related to people’s culture. If it were in India, the illustration would be different, instead of a cat, there would be a cow and maybe the rat, which we like to place in the lab, and on the other side, other animals”.*

*(S09): - “elective speciesism, isn’t it? When there is a choice of certain species that deserve our affection and moral consideration. We choose some (species) to receive such consideration, indirectly we also choose the ones that do not deserve this consideration. The cat on the one side and the other animals, waiting to be eaten, on the other side show this”.*

Here we noticed that S09 that had not understood the concept before, now gave evidence that the circumstantial indication, in the form of illustration, made the semantic act

successful.

(P): - *“well said! We choose some (animals) to the detriment of others”*.

(S05): - *“then you might choose not to develop the experiment, as we did not choose the cat, the dog or the human being, for example”*.

(P): - *“that’s it. Can you read what you wrote, please”?* (pointing to S03).

(S03): - *“I wrote that the human beings, according to their needs, choose or elect the species either to put on their plates, to use in experiments or to give them company and affection. This is elective speciesism”*.

We also realized the understanding in S11’s speech, a student that had shown non-understanding of the message before. The students showed to be more at ease to express themselves orally, while the intervention went on.

(S07): - *“I understood it in a simpler way... that it is to do with choosing animals to take part in an experiment according to what we are more used to”*.

(S05): - *“but it is not only about experiments. The figure makes it clear. There (pointing to the picture on the board) it isn’t experiment, it’s food”*.

(S03): - *“but, aren’t we discussing experimentation”?*

(S05): - *“yes, but the concept can be applied to all uses we make of animals. Isn’t that right madam?”*

(P): - *“Yes, elective speciesism occurs in many contexts. Besides food and animal experimentation, can you give another example”?* (pointing to S08 who seemed not to have understood the concept).

(S08): - *“well, like a fur coat. Certain animals are chosen, seal pups... foxes... nobody makes a fur coat of a dog or a cat. Even if seal pups are also cute. I feel sorry for them, I do. We elect, we also choose”*.

(S05): - *“Ok. But cow leather is also used to make coats... do you eat meat? Nobody feels sorry for the cow, because we are used to eating meat – this is pure elective speciesism”!*

Because we had asked students to write what they had understood, we could notice the result of the circumstantial indication in the written representation of each one of the them, and follow their reasoning which was expressed through their reading. We noticed that there was understanding of the concepts by the students, mainly S05, 07 and 08, in the excerpt above. The students externalized the message we had expected during these interactions. Although S08 had only understood the concept in the context of animal experimentation, after having been asked by the teacher to give another example, in addition to the ones already mentioned, this student was able to do it, showing understanding of the meaning of the concept.

The message sent by the students who read their representations coincided with the message expected by the professor, which revealed understanding by the receiver. I noticed, that while every student externalized the meanings built, the correct definition of the concept was reinforced. We went on with the discussion aiming at making students realize the concept worked in the context of animal experimentation.

- (P) – “and regarding animal experimentation, do you have any examples”?  
 (S04) “cats and dogs are also used in laboratories and this use is not so legitimated by the population as the use of rats and mice ”.  
 (S02) “I agree, look at the case of the ‘Beagles’ in São Roque” (referring to the case that gained visibility in the media according to OLIVEIRA, 2003) “Why didn’t the population remove rats, rabbits and guinea pigs that were in the laboratory too?”  
 (S06): - “Isn’t this elective speciesism? They chose dogs to save because of their affinity with these animals”.  
 (P): - “that’s it. This is also an example of elective speciesism”.

In this case, through the elicitation above, S02 ended up playing the role of a non-intentional circumstantial indication. S02’s questioning, motivated by the discussions that we had promoted, directed S06’s thought and complemented the message, serving as a circumstantial indication for the other students. This demonstrates that circumstantial indications do not need to be sent exclusively by the teacher, and that they might appear at any time as non-intentional circumstantial indication in the learning process. Another observation is that the semic act, which starts with the message transmission by an interlocutor and ends with its reception by another, might direct the message to the semic act success (understanding) or failure (non-understanding or misunderstanding).

**Table 1.** *Evolution of the Concepts Worked in the Intervention Based on Signals and Circumstantial Indications*

Subjects	Phase	Concepts		
		Especiesismo	Elitist	Elective
S1	Signals	0	0	0
	Circ. Ind.	1	1	1
S2	Signals	¼	0	0
	Circ. Ind.	1	1	1
S3	Signals	0	0	0
	Circ. Ind.	0	0	0
S4	Signals	0	0	0
	Circ. Ind.	0	0	0
S5	Signals	0	0	0
	Circ. Ind.	1	1	1
S6	Signals	0	¼	0
	Circ. Ind.	1	1	1
S7	Signals	0	0	0
	Circ. Ind.	1	1	0
S8	Signals	0	0	0
	Circ. Ind.	1	0	0
S9	Signals	0	½	½
	Circ. Ind.	0	1	1
S10	Signals	0	0	0
	Circ. Ind.	0	1	1
S11	Signals	0	0	¼
	Circ. Ind.	0	1	1
S12	Signals	0	0	0
	Circ. Ind.	0	0	1

S13	Signals	0	0	0
	Circ. Ind.	1	0	0
S14	Signals	0	0	0
	Circ. Ind.	0	1	1

Key: 0: did not manifest; ¼: non-understanding; ½: misunderstanding; 1: understanding.

## Conclusions

We could notice how much the hegemonic discourse about animal experimentation present in an institutional learning process, might represent a potential factor of alienation of a culture historically built on the concepts of animal exploitation in Sciences. The promotion of these discussions in higher education courses might provide some critical thought regarding the issues of animal exploitation and suffering and shed some light in a more critical way towards animal experimentation in teaching and research.

We demonstrated that the conscious planning of circumstantial indications emitted by the professor, mediated by an interactive discourse, under the perspective of a subversive significant learning, served as a teaching provocation to maximize significant notifications in the teaching-learning process in scientific education. Under a constructivist perspective of learning, we tried to show that circumstantial indications might be a semiological element used by the professor, aiming at not only clarifying the discourse and reducing ambiguities, but also provoking substantially, a form of reflective thought by the students, with the purpose of leading them to the understanding of the concepts under study.

This paper proposes an analytical view based on semiological elements, mainly circumstantial indications, intending to organize and understand discursive efforts resulting from the professor-students' interactions in the classroom in the context of scientific education.

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