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Pressupostos Éticos de Pesquisas em Educação Matemática: um ensaio

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RESUMO

Neste texto exploramos algumas conexões entre filosofia e educação matemática propondo a exploração dos pressupostos éticos – valores – presentes em trabalhos acadêmicos. Trata-se de um ensaio teórico que aborda brevemente um histórico da subárea de Filosofia da Educação Matemática e perpassa produções que apontam delimitações e objetivos, métodos e objetos desta subárea. Trazemos ainda contribuições do campo da filosofia para pensar ética e linguagem, além de uma produção própria ao campo: o Modelo dos Campos Semânticos. Este movimento e proposta se justificam pela produção de aproximadamente meio século de pesquisas em Educação Matemática em programas específicos e que, de forma explícita ou não, valoram e induzem posturas, seja para a sala de aula de Matemática dos mais diversos níveis de ensino, seja para a própria pesquisa em Educação Matemática que se retroalimenta. Posturas, valores, pressupostos podem assim serem repetidos sem maiores reflexões de seus fazeres e motivações que os originam e que, talvez, já não façam mais sentido na atualidade das produções. Assim, nossas reflexões se concluem em duas direções: a explicitação dos pressupostos éticos pelos autores de pesquisas em Educação Matemática e, também, uma possível agenda para a Filosofia da Educação Matemática que busque evidenciar nestes trabalhos tais pressupostos éticos.

Palavras-chave: Ética; pesquisas em Educação Matemática; Modelo dos Campos Semânticos; Filosofia da Educação Matemática.

Ethical Assumptions in Research of Mathematics Education: a theoretical essay

ABSTRACT

In this paper, we explore some connections between Philosophy and Mathematics Education, proposing the exploration of ethical assumptions – values – in academic works. This is a theoretical essay that briefly addresses a history of the subarea of Philosophy of Mathematics Education and permeates production that highlights delimitation and objectives, methods, and objects of this subarea. We also bring contributions from the field of Philosophy to think about ethics and language, in addition to a production specific to the field: the Model of Semantic Fields. This movement and proposal are justified by the production of approximately half a century of research in Mathematics Education in specific programs and that, explicitly or not, value and induces attitudes, either for the mathematics classroom of the most diverse levels of education, or for the own research in Mathematics Education that feeds itself. Postures, values, assumptions can thus be repeated without further reflection on the actions and motivations that originate them and that, perhaps, no longer make sense in the current production. Thus, we concluded in two directions: explanation of ethical assumptions by the authors of research in Mathematics Education and, also, a possible agenda for the Philosophy of Mathematics Education that seeks to evidence such ethical assumptions in these works.

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Keywords: Ethic; Research in Mathematics Education; Model of Semantic Fields; Philosophy.

Supuestos Éticos de la Investigación en Educación Matemática: un ensayo

RESUMEN

En este texto exploramos algunas conexiones entre la Filosofía y la Educación Matemática, proponiendo la exploración de supuestos éticos – valores – presentes en los trabajos académicos. Se trata de un ensayo teórico que aborda brevemente la historia de la subárea de Filosofía de la Educación Matemática y recorre producciones que señalan delimitaciones y objetivos, métodos y objetos de esta subárea. Traemos también aportes del campo de la filosofía para pensar la ética y el lenguaje, además de una producción propia del campo: el Modelo de Campos Semánticos. Este movimiento y propuesta se justifican por la producción de aproximadamente medio siglo de investigación en Educación Matemática en programas específicos y que, explícitamente o no, valoran e inducen posturas, ya sea para el aula de Matemática en los más diversos niveles educativos, o para él la propia investigación en Educación Matemática que se retroalimenta. Posturas, valores, supuestos pueden así repetirse sin mayor reflexión sobre sus acciones y motivaciones que los originan y que, quizás, ya no tienen sentido en las producciones actuales. Así, nuestras reflexiones concluyen en dos direcciones: la explicación de los supuestos éticos de los autores de investigación en Educación Matemática y, también, una posible agenda para la Filosofía de la Educación Matemática que busca resaltar tales supuestos éticos en estos trabajos.
Palabras clave: Ética; investigación en Educación Matemática; Modelo de Campos Semánticos; Filosofía de la Educación Matemática.

PHILOSOPHY AND MATHEMATICS EDUCATION

The intimate relationship between Mathematics and Philosophy is a common place in most discussions, either because of the importance attributed to it by several philosophers, from Plato and Pythagoras to Spinoza and Kant, or because of the absence of differentiation between one thing and the other in the work of certain personalities, especially those who dedicated themselves to Logic: Bertrand Russell, Ludwig Wittgenstein, Alan Turin. In a certain way, every science has among its own those who oversee substantiating its practice, of highlighting issues that put its practices back in relation to the possible perspectives adopted in its time. It is possible to speak of the philosophy of mathematics[2], as well as the philosophy of science, psychology, etc. Thus, we can also speak of the philosophy of Mathematics Education as well as trace approximations between the fields of Philosophy and Mathematics Education, beyond what is already known as Philosophy of Education.

Mathematics Education as a research field is constituted by the several possible interactions between other fields and, more specifically, of professionals involved with Mathematics teaching (at the most diverse levels) and theorizations coming from other areas,

[2] We highlight the works of Newton Carneiro Affonso da Costa on Logic and Gilles Gaston Granger's texts on philosophy of science and mathematics. Besides these, a good introduction to discussions of this nature can be found in The Mathematical Experience (DAVIS; HERSH, 1986).

such as Education, Psychology, History, Sociology, Anthropology, etc. In Brazil, the creation of the first graduate program in Mathematics Education is linked to a conjuncture of external factors, but, more directly, to an occasional situation of the existence of a group of researchers coming from areas such as Mathematics and Education in the same campus of Unesp, in Rio Claro (SP).

In the movements for the creation of Unesp, there was a redistribution of teachers that belonged to the then called Philosophy Faculties of the state of São Paulo, so that teachers of the same area were gathered in certain campuses for the creation of centers/departments, thus, Mathematics would remain in Rio Claro and the teachers that lived there and worked in Education would migrate to other campuses, regardless of their personal realities. It was necessary, for them, to get closer to the courses that would be established in Rio Claro in order to remain there. This is what Maria Aparecida Viggianni Bicudo tells us in an interview with Antonio Vicente Marafioti Garnica, on the occasion of the III Enaphem. Bicudo and Garnica, by the way, have several productions that deal with Philosophy in and of Mathematics Education, which we will explore later. The Rio Claro Program is recognized as the first Brazilian graduate program in Mathematics Education, before that, related research was developed in other programs, mostly in Education. Several movements about the creation of this Program, beyond, far beyond, what the documents say, and the importance of her participation in this process and in its consolidation - in which she still acts today - are described in the interview by Maria A. V. Bicudo. Her close relationship with the field of Philosophy and Philosophy of Education brings into the Graduate Program in Mathematics Education references such as: Paul Ricouer, Edmund Husserl, Martin Heidegger, among others. These names can also be seen in his publications and discussions until today, besides, of course, in the theses and dissertations of his students. These references and, mainly, the ways of questioning the world and the doing of the mathematics teacher, and even of the mathematics education researcher, are present in many current productions, especially in the papers submitted to Working Group 11 of the Brazilian Mathematics Education Society (Bmes), which in its history presents:

> The GT Philosophy of Mathematics Education WG was created, under the coordination of Prof. Dr. Maria Aparecida Viggiani Bicudo, in the context of the II International Symposium of Research in Mathematics Education, SIPEM, held in 2003 in Santos/SP, through Prof. Dr. Tânia Maria Mendonça Campos, then

> president of the Brazilian Society of Mathematics Education - SBEM - and responsible for the organization of the II SIPEM. [...] The need for a working group (WG) that involved philosophical issues inherent to mathematics education was felt in the I SIPEM, held in 2000 in Serra Negra/SP, when there was not a specific WG for this line of research. At that time, numerous investigations in this area were already being developed, for example, by the Faculties of Education at USP, Unesp and Unicamp, and by the Graduate Education Program of the Federal University of Paraná. The members of the Phenomenology in Mathematics Education research group, FEM, allocated to the Graduate Program in Mathematics Education of Unesp - Rio Claro campus, questioned the inexistence of a specific WG that would deal with themes concerning Philosophy seen from the Mathematics Education dimension. The guiding idea of a WG in this area was to bring together research, studies and debates that dealt with mathematics, its teaching and educational processes from the perspective of epistemology, ontology, and axiology. Prof. Dr. Maria Aparecida Viggiani Bicudo, supervisor of many research and doctoral themes of FEM members, took the lead to organize a space where these ideas could be realized, with the support of Prof. Dr. Adlai Ralph Detoni and other members of FEM, sending invitations to professors of her knowledge who had been working in the area. (SBEM, s/d, n.p.)

The creation of this GT, as reported above, highlights both the importance of Philosophy in Mathematics Education research and the role of Maria V. Bicudo in this approach. It is important to point out that such an approach is not taken as automatic or natural, if there are programs in which Philosophy is presented in a substantial way, constituting lines and research groups, there are others in which it appears in a tangential way, centralizing aspects of practical application and more immediate uses of such research. We could highlight the need for professional masters' degrees to have a product directly applicable in the classroom in order to obtain the title, and here we could open a parenthesis in our discussion: how is Philosophy linked to practice? How can it, if at all, subsidize practice or does it, as the philosopher Ludwig Wittgenstein states, leave everything as it is? (WITTGENSTEIN, 2009)

Going back to our historical path, besides the numerous articles and chapters coming from the members of the WG 11 of Sbem, we could demarcate a position of relevance of this theme in Mathematics Education by the publication in 2006 of a volume in the Collection Tendencies in Mathematics Education of *Autêntica* Publishing House focused on Philosophy of Mathematics Education, in which Bicudo and Garnica (2011) present us how this region of inquiry dialogues with Philosophy of Education and even with the philosophical foundations of Mathematics and outline faces of Philosophy of Mathematics Education:

> Philosophy of Mathematics Education is responsible for the critical and reflective analysis of educational proposals and actions concerning the teaching and learning of mathematics in the different contexts in which they occur: in public institutions, in families, in the street, in the media. The core work of the Philosophy of Mathematics Education is to critically analyze the assumptions or the central ideas that articulate the curriculum or the pedagogical proposal, seeking to clarify its statements and the consonance between the actions visualized. (BICUDO; GARNICA, 2011, n.p.))

The excerpt above exposes a doing - a critical and reflective analysis - and a locus on which this doing is focused - proposals and educational actions in public institutions, families, the street, the media - this analysis. We can understand that the vast majority of works in Mathematics Education present a critical and reflective analysis of educational proposals and actions concerning the teaching and learning of mathematics - first part of the citation -, even if they do not have a direct adherence to the research lines or groups in this subarea.

However, to critically analyze assumptions and central ideas present in proposals and curricula - the final part of the excerpt above - greatly restricts the range of research, even if the line or groups related to Curriculum and Mathematics Education adhere well to these proposals. These undelimited, and perhaps unwanted, separations reinforce the look not for the object, but for the doing, the way of doing. Theses and dissertations in Mathematics Education present, even if in their own ways, analyses, either of bibliographic data, or of data produced in interaction with people: would it be thus the way of doing these analyses that would locate such works in a "philosophical" scope? Or the dialogue (methods or tools of analysis) with so-called "Philosophical" thinkers?

In a class given by Maria Bicudo in 2009, which became an article, she affixes the characterization of this movement as a meta-comprehension, a turning back on what is done with a central question: why is it done?

> It is about performing a meta-understanding of the activities being carried out. It is a movement, therefore, that goes beyond "what to do" and "how to do it", going into the questions of "why do it?", a question directed to the epistemological, ontological, and axiological aspects that show themselves in what is done. Note that it is always a movement of "going back over" what one is doing (to be done or even already done). (BICUDO, 2009, p. 231))

Or, further on, pointing specifically to the mode of investigation, the procedures of Philosophy,

> [...] characterized by comprehensiveness, systematicity of the critical and hermeneutic analyses, and by the work of constant reflection, are also taken as a guide in the investigation carried out by the Philosophy of Mathematics Education. They are principles of procedures, which gain nuances and forms according to the conceptions of world and knowledge present in the schools or philosophical lines assumed. (BICUDO, 2009, p. 234-235)

If in the text by Garnica and Bicudo (2011) it pointed more directly to objects of analysis related to teaching and learning processes of Mathematics, this last text by Bicudo extends this scope by also including research in Mathematics Education (BICUDO, 2009, p. 230). This inclusion is important from our point of view because we aim in this text to focus precisely on research in Mathematics Education by proposing certain reflections to researchers, especially regarding the ethical assumptions that we adopt in our work, consciously or not.

The work of Oliveira (2020) shows us how these research are also conductors of norms for the school space and, we add, for the academy itself. Every way of doing things can induce behaviors, whether by direct prescription, or indirectly, by example or exaltation, in a propagation of what is understood as "good" (or simply 'interesting' in a more popular language) and what is distant from the good, the bad or undesirable - and here enters the ethics announced in our title.

Before doing so, however, it is worth taking a little time on this induction of behaviors, often unilateral, from the university to the school. The work of Oliveira (2020) tries to find in the research that call themselves "critical mathematics education" (CME) manifestations of a discourse that produces a teacher able to work with such approach, in other words, it lists actions and knowledge that would be proper to work with CME in the classroom. Thus, even if in a hidden or indirect way, Oliveira evidences in a diversity of academic texts on the subject a line of subjectivation of teachers and students, in the end, he produces from the data, two sets of statements:

> the responsibility of the mathematics teacher for the duty of grounding the learner's consciousness and making him/her critical; the mathematics teacher rethinks his/her pedagogical practice and the mathematics teacher rethinks the contents. Statements referring to the student: a citizen-critical-conscious-active who is responsible, an agent of social transformation, politically engaged, who interprets and acts in situations structured by mathematics and who is a questioner of the uses of mathematical models present in society. (OLIVEIRA, 2020, p. 180))

Besides these, he also highlights desirable curricula for a teaching based on CME. This induction of curricula, if we can call it that, is not exclusive to this approach, on the contrary, some lines and strands of research in Mathematics Education seem to attack more strongly and propositionally the curriculum of Basic and Higher Education, teacher training, initial or continuing, textbooks, etc. For example, actions such as pointing out a conceptual error present in a book, a specific way to approach the content, the presence or not of social issues amidst the content reveal some assumptions of what should or should not be the curriculum, what should or should not be the textbook, or even, bringing a word used before, what would be 'good' for a book to contemplate, what would be 'good' for students to do in the classroom, what technologies would be potentially good for teaching mathematics, etc. ultimately delimiting directly or indirectly a good and, consequently, a bad mathematics education.

ETHICS

The issues listed above concern the propagation of modes, models, and conduct, and are closely related to a branch of philosophy, ethics. Marcondes (2007) distinguishes three dimensions of what he understands by ethics:

> In the first place we have what may be considered the basic or descriptive meaning of ethics, very close to the original meaning of ethos, which designates the set of customs, habits and practices of a people. All nations thus have their ethics, or ethos; that is, the customs and practices that define, although often in *an implicit and informal way*, the correct or adequate way of behavior in that society. Then we have ethics as a system in a prescriptive or normative sense; that is, as a set of precepts that establish and justify values and duties, from the most generic, such as Christian or Stoic ethics, to the most specific, such as the code of ethics of a professional category, of which perhaps the most famous and traditional is that of medical practice. Thirdly, we have the reflective or philosophical sense, which concerns the philosophical theories or conceptions of ethics, such as ethics of responsibility, ethics of principles, utilitarianism, and others, *aiming at examining and discussing the nature and foundations of systems and practices, analyzing the concepts and values that are intended to give them foundation.* (MARCONDES, 2007, n.p., our emphasis)

We highlight from the quote above the third movement, which aims to examine and discuss the nature and foundations of systems and practices, concepts and values, this point seems to us to be in line with the one previously presented by Bicudo (2009) and Bicudo and

Garnica (2011) - critically analyze the assumptions and central ideas, moving from the "how" to the "why" to do -, however, slightly changing the object of analysis, introducing the term "values".

The word ethics, however, has worn out use in our vocabulary, expanding increasingly its meanings, often being confused with moral judgments. When we talk about ethics in research we are taken, almost automatically, to discussions about procedures and processes put in place by the Ethics Committees of institutions that aim to ensure, from a legal point of view, security for the institutions promoting research, operating in ways that are often questionable, as Fernandes and Garnica (FERNANDES; GARNICA, 2021) point out.

Examining the nature and foundations of research (we would add here the words assumptions or values) in Mathematics Education seems to us a possible task to be inscribed in a research agenda in Philosophy of Mathematics Education [3]. After almost half a century of professional research in Mathematics Education in Brazil, the diversity of lines and modes of operation is great. Sbem has today 15 Working Groups, each with its own events and several associated research groups, each with its own theoretical particularities and methodological preferences. In the same way, there are very different assumptions among researchers and, in particular, regarding the role of research in relation to the school of Basic Education. For some, the interlocution with the mathematics classroom is primordial, for others, taking the school space as much beyond the specificities of mathematics is the tone, there are still those who see themselves as distant from the school spaces and, thus, understand that they must stay in their research - all of these postulate good and bad works, perhaps not directly, as we have already said, but by the degree of legitimacy they attribute to them, by the evaluations produced in juries and periodicals, by the types of comments made in events, and especially by the choices of merit, citations and mentions of the most varied forms (in events, lectures, research groups, indications of readings, etc.).).

In a recent talk given by Alexandre Pais[4] to the Asociación Aprender en Red, via YouTube[5], when asked about ways in which it would be possible to work in Basic Education

[3] It should be noted that there is work that relates ethics and mathematics (ERNEST, 2019; SKOVSMOSE, 2020)

[4] Portuguese researcher working at Manchester Metropolitan University, Faculty of Education, UK.

[5] The full speech is available at: < https://youtu.be/rrwI8jwIMw8>

on mathematical literacy from local socio-cultural practices towards something more global, he emphatically replied:

> Each teacher with his or her students in their classroom has to decide what is best to do. Why are they waiting for someone to tell them what to do? We are always saying that we don't want to be oppressed, we don't want people telling us what to do... why are you asking me to tell you what to do?)

This answer, if taken from its context and from some explanations of the researcher himself at the beginning of his speech, such as the fact that he is exclusively dedicated to research in Mathematics Education and not teachers or classrooms, could cause strangeness among other researchers in the same area, possibly due to the difference of assumptions that each researcher takes, consciously or unconsciously. For those who assume the improvement of mathematics teaching as an assumption of the existence of our area, they might ask themselves: how can a highly qualified researcher have "nothing" to contribute to the teacher's practice?

The veiled, hidden, or not explicit, is an essential component of human communication. We can, here, analyze it through the Semantic Fields Model or Wittgenstein's Philosophy of Language. There is a seminal text in Brazilian Mathematics Education in the sense that it leads us to question the assumptions of the theories we may adopt in our conduct and research: *Why discussing theory of knowledge is relevant to mathematics education (*LINS, 1999). This text explains how the assumptions of Piagetian and Vygotskyan perspectives are extremely different, and yet, we add, some punctual procedures may be possible in both approaches, teachers may, as announced in the beginning of the text, agree with both theories in some aspects. However, when searching for the assumptions: "we are all the same" versus "we are all different" we are invited to position ourselves more forcefully in front of our beliefs.

As Maria Bicudo (2009) said, already highlighted above, when we question the "whys" we are led to meta-understandings and to a work proper to the Philosophy of Mathematics Education, although not exclusive. The highlighting of these different assumptions (and values) can then promote understandings about the theory itself, but mainly about the actions of the other and the difference that can be the other (perhaps, in the limit, inaccessible in its fullness).

Lins (1999) also presents a model of communication aiming at the classroom in which we produce meanings from enunciation residues and cognitively produce a being that says what, effectively, we think we have read/heard in that interaction. From Lins (1999) we can say that the centrality of "my" production of meanings, besides the presence of the other and of what I think I have read/heard, are my own experiences, my own ways, and nuclei (always constructed in front of others). Along with this, he brings concepts like the new and the given from Bruner, as Silva (2003) clarifies:

> In the process of meaning production, three major categories coexist: the new, the justification and the given. This statement, in part, is the result of the ideas of the French linguist Oswald Ducrot (1972) whose central idea, from which we will work, was filtered by Bruner (1998) through the following phrase: "what is not said is the presupposition or given, what is said is the new". In an adaptation to this idea, it is possible to observe that "the speech of the person solving a problem tends to make explicit the 'new' and silence the 'given'. That is, when we are solving a problem, we 'speak' the things we are trying to understand or discover, but we silence the things we take for granted, as given." (LINS, 1997, p.122). In fact, our field observation has been indicating that this silence is not total, it is partial. Throughout the justification, the speech leaves traces of what is given to the subject at that moment. And these traces are of utmost importance for our understanding of the way this subject operates. Because the datum is what tells us where he [subject] is and from what "place" he is speaking. In this process, justification has the important role of being the link between the new and the given. It is from it that occurs the process where the new is transformed into data in face of new situations. (SILVA, 2003, p. 69)

In our interpretation, in an interaction that aims at communication,

> Not everything is (or can be) made explicit/spoken, some things are taken for granted and don't need to be said, that is, it is believed that for our interlocutor they are already clear. These "premises" (borrowing from Bruner) are called "given", and what is effectively said in an interaction of this type is called "new". (PINTO, 2009, p. 35))

The axiomatic thought, since Euclid, invades most of the scientific fields, including Philosophy itself, which, beyond logic, has in Spinoza the exponent of this way of writing. The latter operates very clearly with the given and the new, for each new proof, it shows only what is necessary beyond what has already been proven, at most indicating such an occurrence. Such a procedure that preys on the economy of writing and that understands that

once an assertion is proven, it cannot be questioned anymore seems to work well within a work, when the whole set there performed can be taken as a text and, thus, everything is (supposedly) declared at some point, premises, axioms, common notions, etc. However, it is notable from the work of Marvin Jay Greenberg (1993) in pointing out (from the work of David Hilbert) the various logical flaws of Euclid, who assumed and accepted much more than what was stated[6] . Besides this, we could also call Friedrich Nietzsche, with his blunt criticism of the logic operated by René Descartes in his Method, the German philosopher shows how the "I think, therefore I exist" carries a series of certainties that are not obvious, moving away the statement of a logical and unquestionable conclusion:

> 16. There are still naive self-observers who believe that there are "immediate certainties"; for example, "I think", or, as was Schopenhauer's superstition, "I will": as if here knowledge apprehended its object pure and naked, as a "thing in itself", and neither part of the subject nor part of the object were falsified. [if I break down the process that is expressed in the proposition "I think", I get a series of reckless assertions, whose foundation is difficult, perhaps impossible - for example, that it is I who thinks, that there must necessarily be a something that thinks, that thinking is the activity and effect of a being that is thought as a cause, that there is an "I", and finally that it is already established what to designate as thinking - that I know what thinking is. For if I had not already made up my mind about it, by what measure would I judge that what is happening is not perhaps "feeling", or "wanting"? In short, that "I think" presupposes that I compare my momentary state with other states that I know in myself, in order to determine what it is: because of this retrospective reference to a "knowing" elsewhere, it has for me, in any case, no immediate "certainty". - In place of this "immediate certainty" that people can believe in, in the present case, the philosopher is faced with a series of questions from metaphysics, real questions of conscience for the intellect, which are: "Where do I get the concept of thinking from? Why do I believe in cause and effect? What gives me the right to speak of a Self, and even of a Self as cause, and ultimately of a Self as cause of thoughts?" Whoever, invoking a kind of intuition of knowledge, ventures to answer these metaphysical questions at once, as does one who says, "I think, and I know that at least this is true, real, and certain"-that one will find waiting for him today, in a philosopher, a smile and two question marks. "Dear sir," the philosopher will perhaps say, "it is unlikely that you are not wrong; but why always the truth?" - (NIETZSCHE, 2003, parag. 16))

Beyond the given and the new introduced here by Lins (1999), Ludwig Wittgenstein in his mature thought presents us with interesting tools to describe the functioning of language, or of languages, in plural, as the language games - always anchored in ways of life. For the Austrian thinker, each context and way of life produces and is produced by its

[6] It is important to draw attention to the temporal displacement of such criticism. Euclid's text suffered several criticisms over time, all of them centuries removed from its production, which is estimated to be the 3rd century before the Christian era.

language, which works in a particular (but not individual or private) way, with unique ways of using certain words and expressions. The same person can participate in different language games throughout his or her life and even throughout his or her day, each game has its own rules, its own grammar (whether taken deeply or superficially[7]).

These grammars govern our moves in these games. They limit and enable, delineate what can and cannot be said in a given game. We are not pointing here to the level of agreement and divergence of opinions about a theme, for example, but to the possibility of using certain adjectives and not others, the grammar imputes uses to certain verbs and nouns, etc. In a sense very close to what Lins names the Nucleus (JULIO, 2007; PINTO, 2009).

To situate oneself exclusively in a certain language game to read the world, the other, can cause limitations such as those that Wittgenstein calls one-sided diet: "A principal cause of philosophical diseases-one-sided diet: we feed our thinking only on one kind of examples." (WITTGENSTEIN, 2009, § 593). For the thinker, one of the great problems of philosophy is precisely that philosophers take words out of their ordinary language games and put them back into another, in which these words start to refer to other contexts, dislocated from the language games where they are effectively used, heading towards dogmatic definitions that, supposedly, would serve for any and all language, for all language games.

> When philosophers use a word - "know," "being," "object," "I," "proposition," "name" - and aim to grasp the essence of the thing, they must always ask themselves: Is this word really always used like this in the language in which it has its native soil? - We lead words from their metaphysical employment back to their everyday employment. (WITTGENSTEIN, 2009, p. 72)

The entire Philosophical Investigations (WITTGENSTEIN, 2009) seems to us an endeavor against dogmatism and essentialism of assertions about language, about games, colors, and conducts. The emblematic "don't think, see!" draws our attention to the fact that the aspects that may interest us about the use of language and words described above are available in their original games, they don't need to be "theorized" with new meanings and new modes of use. This does not prevent, however, an endeavor to make these uses explicit,

[7] Wittgenstein in the Philosophical Investigations, specifically in paragraph 664, points to the possible distinction between a surface grammar and a depth grammar. The first is more connected to the categorization of words, while the second touches on modes of usage that are legitimate or not, even if in perfectly correct sentences from a linguistic point of view. (C.f. SILVA, 2019).

here we would say, with the initial goal of this text, to make explicit the theoretical and ethical assumptions that guide the doing of research in Mathematics Education for each research line or group.

For this mature Wittgenstein, or second phase, we identify, based on Martinez (2001), an ethical thinking based on an empathic vision that leads to a practical action: the philosophical therapy. Such way of identifying in this phase of the thinker an "ethical thinking" inspired us in another study (PINTO, 2018), in which we sought to make explicit 'what ethics moves our research'. In that exercise, by revisiting our production we could notice the desire to make explicit a diversity of language games, either about mathematical objects in teaching contexts, or about the history of mathematics education. At the time, we fired off:

> The first aspect that we highlight from these points is the perception of the other as a complete and coherent being with his/her life contexts (with his/her language games and ways of life).
> By this we mean that we should not look at the other looking for absences, mistakes, or imperfections, as many academic researches usually do - even if in a veiled way.) Many researchers look at mathematics classrooms, teachers, or textbooks in search of mistakes and successes, of the possibility of finding weaknesses or contradictions that can be overcome by the researcher's theoretical framework. More than an "attention" or "care" to our interlocutor, this is an epistemological position-taking: in the belief that I do not know their language games and the ways of legitimizing themselves in them; in the impossibility of translating their actions (occurring in those language games I do not know) into my games - in this we would perhaps be able to point out some kind of incongruence or legitimate way of playing. (PINTO, 2018, p. 340

The possibility of access or not to the other, to what he is according to his own language games, comes to life in Eduardo Viveiros de Castro's work. He shows us how the concept of human brought by the Europeans does not fit something similar for the Amerindian populations. For them, we are all human from our own point of view, and others take on the characteristics of animals or food depending on who sees them. He brings, from Lévi-Strauss, the case in the Antilles after the discovery, the two questions that moved the curiosity of the two groups that were there: the Spaniards wondering if the natives had souls (if they were human) and, on the other side, the natives submerging white prisoners to see how their bodies behaved (2009), the cultures were so different that they also posed different questions, to some extent untranslatable. Viveiros de Castro works in his argument not only on the punctuation of this difference, something already done by Levi-Strauss, but, above

all, what this difference puts us to think about anthropology itself and, in short, what it does, or should do. From its presuppositions, there is no sense in an anthropology that explains the other, that translates him into its language games, but rather, in the face of the other, in a previously failed attempt to translate him, to install itself in this failure,

> for what every experience of another culture offers us is the occasion to make an experience about our own culture; much more than an imaginary variation - the introduction of new variables or contents into our imagination it is the form itself, or rather, the structure of our conceptual imagination that must enter into a regime of variation, be assumed as a variant, version, transformation. (VIVEIROS DE CASTRO, 2009, s/n)

In this proposition of the author there are numerous ethical assumptions about what seems to us to be for the author a "good" anthropology, or a desirable anthropology. In the case of the work mentioned above, much of it is an approximation with certain philosophies that seem to cohere or even establish such non-structuralist modes of thinking. We emphasize, these approximations are made on the surface of the work. However, in Mathematics Education research, when it comes to methodological discussion, Fernandes and Garnica point out incongruences between what is stated and what is actually done methodologically in some works:

> A considerable number of research projects, at the same time as declaring their attachment to and support for qualitative research approaches, are distant from this approach in the development of their work. They are qualitative projects only from a declaratory point of view. In fact, qualitative research approaches arise exactly in opposition to the plastering of traditional and hegemonic research modes until the 1970s. (FERNANDES; GARNICA, 2021, p. 5))

The declaratory aspects contrasting with the practice conducted in these researches can lead us to different readings, from the point of view of a plausible reading, as proposed by Lins (1999), it is possible that these authors identify their actions exactly with the nomenclatures that matter for their texts, reaching here a hermeneutic divergence. It is worth remembering that the production of an academic text is a social practice that imposes certain rules on those who aim at its laurels, not always in agreement with them. We are not pointing here to isolated cases of merely "bureaucratic" research, but rather to quite divergent assumptions in our area, such as the majority valorization of theoretical, methodological, and well-articulated discussions on the one hand, and, on the other hand, the production of successful materials and interventions for the mathematics classroom (returning here to an initial question of our text). Professional master's degrees seem to fray these positions,

placing again at opposite poles, even if forcibly, theory and practice. If at one time there was an exaltation of theory over practice, in this case it seems to us the opposite, under the accusation of taking themes that are too theoretical for academic research, a training based on professional practice and mathematical knowledge is explored. In our case, there is still a diversity of positions at stake, such as 'who' determines what should be the mathematics teacher's training and 'what' mathematics should inhabit this training space. Beyond the disputes of space and public policies, the assumptions that guide these works from one side and the other are quite different and they are the ones that, to a certain extent, delineate what is a good work in their respective area[8].

Among the assumptions assumed by a researcher (or adopted without further reflection), whether procedural, evaluative, theoretical, aesthetic, or political are also the ethical ones. Again, we stress, not the mandatory procedures to which they submit themselves in front of the committees, but those that, by directing the work, make them choose between one path and another. They value, but without necessarily attributing a numerical value, the approach to the school, the approach to certain theories, the focus on the public school, the variation or the deepening, the unity or the multiplicity, the empirical data, or the invention, etc. These research ethical assumptions may also be, for reasons already explored here, hidden or not evident. This argumentation impels us in two movements, on one hand, as writers of academic works, to explore in our productions these aspects, enabling the reader a positive reading, an understanding of the procedures adopted from our presuppositions and not from his - the confusion Wittgenstein often refers to, about trying to play/participate in one game/speech game based on another. With this exercise we believe it is possible that we ourselves may realize what we assume without realizing it, as Nietzsche rightly points out to Descartes. But perhaps, on the other hand, we do not make the 'given' as 'new' by taking the other (our cognitive reader in this case) too close to us and to ourselves very little needs to be said, not by assuming that the other already knows, but by naturalizing these actions. Descartes, who doubted everything does not say the things Nietzsche points out because he thinks the other already knows, but perhaps because of the naturalization of his way of questioning the world and the naturalization of his language as

[8] We emphasize that theory and practice are not taken for us in a dichotomous or dual way, we even make this defense in Pinto and Silva (2019).

a reflection of the world and thus of truth. Likewise for Euclid, it seems unnecessary to prove his axioms and common notions - naturally accepted. Thus, for writing, it is perhaps the exercise of being estranged (and here we clearly manifest an ethic of ours in front of the research) and making explicit these estrangements and what was found in them.

On the other hand, we argue that for those who take on the Philosophy of Mathematics Education it is up to not to ground the practice, since philosophizing/researching/writing is also a practice, and neither should Philosophy do so, Philosophy, as Wittgenstein warns us, leaves everything as it is, it does not touch the effective use of words:

> Philosophy must in no way touch the actual use of language; it can only describe it. For it cannot substantiate it either. It leaves everything as it is. It also leaves mathematics as it is, and no mathematical discovery can advance it. A "preponderant problem of mathematical logic" is for us a problem of mathematics like any other. (WITTGENSTEIN, 2009, § 124)

If it is not up to the Philosophy of Mathematics Education to ground these uses, procedures, then what is up to it? Based on Wittgenstein, we could suggest that it is up to it the therapeutic-panoramic exercise of evidencing this multiplicity of ethical assumptions which are effectively manifested in researches in Mathematics Education. With this, we do not seek, in each work, the deepening of ideas not contained therein, but an exercise that takes place on the surface of the writing, of the actions effectively described in these works in the search for an overview (panoramic view in other translations) of a multiple and polysemic scenario.

> (WITTGENSTEIN, 2009, § 122
> One of the main sources of our lack of understanding is that we do not master with a clear vision the use of our words.- Our grammar lacks a clear arrangement. An overall exposition conveys comprehension, which consists exactly in "seeing connections". Hence the importance of finding and inventing connectives. The concept of set exposition has a fundamental meaning for us. It designates our way of exposition, the way we see things (WITTGENSTEIN, 2009, § 122))

It would be up to us, we propose, in the field of Philosophy of Mathematics Education, to observe these connections and to make explicit differences in the comparison of these language games. The hidden valuations or, as we prefer, indirectly manifested in these works on the surface of the writing, can be explored in a broadening of the senses of doing research in Mathematics Education.

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