REVERBERATIONS OF WITTGENSTEIN'S PHILOSOPHY ON MATHEMATICAL EDUCATION

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ABSTRACT

The present text aims at elucidating the possible contributions resulting from Wittgenstein's philosophy, in its second phase, so as to allow us to consider some of the propositions presented to Mathematics Education. First of all, we shall start by emphasizing the importance of the conceptions of rationality and language developed by the Austrian philosopher in the sense of our questioning of the academic mathematic claim for universality, then, on a further moment, we move on to analyze one of its implications for School Mathematics Education. In a specific way, on the second part of the text, making use of the theoretical tools provided by the work of the second Wittgenstein, we problematize the deep-rooted truth spread in the educational discourse which states the need to take into account and starting point, the student's reality in the classroom as a way to attribute meaning to school mathematics. We claim here that such enterprise is impossible, by arguing that the language games of school mathematics and those which constitute the social practices, in spite of having family similarities among them, are, in fact, different, and the "passage" from a language game, pertaining to a certain form of life, into another, would not guarantee the permanence of meaning. Rather, it suggests its transformation.

Keywords: Ludwig Wittgenstein; School Mathematics Education; Student's Reality; Rationality; Language.

RESUMO

O presente texto busca evidenciar as possíveis contribuições advindas da filosofia wittgensteiniana, em sua segunda fase, para pensarmos sobre algumas proposições que têm sido colocadas à Educação Matemática. Começamos destacando a importância das concepções de racionalidade e de linguagem desenvolvidas pelo filósofo austríaco no sentido de interrogarmos sobre a pretensão de universalidade da matemática acadêmica para, em um momento posterior, analisarmos uma das implicações para a Educação Matemática Escolar. De forma específica, na segunda parte do texto, servindo-nos de ferramentas teóricas oriundas da obra do segundo Wittgenstein, problematizamos a verdade que se propagou e se enraizou no discurso educacional ao afirmar a necessidade

de se trabalhar a partir da realidade do aluno em sala de aula a fim de se atribuir significado à matemática escolar. Sustentamos aqui a impossibilidade de tal empreendimento, argumentando que os jogos de linguagem da matemática escolar e aqueles que constituem as práticas sociais, apesar de guardarem semelhanças de família entre si, são distintos e a "passagem" de um jogo de linguagem pertencente a uma forma de vida para a outra não garantiria a permanência do significado. Antes sugere sua transformação.

Palavras-chave: Ludwig Wittgenstein; Educação Matemática escolar; Realidade do aluno; Racionalidade; Linguagem

1. To start with...

Bearing in mind the divergences and criticisms directed towards Ludwig Wittgenstein's work made by the French philosopher Gilles Deleuze, we begin this text by reminding the reader that in 1979, Deleuze wrote a little text whose title, rather promising and provocative, questioned "how philosophy could possibly be of any use to mathematicians, or even to musicians: specially and, above all, when it does not speak of music or mathematics" (Deleuze, 2002, p. 225). Driven by the desire to question the pedagogic model imposed by the rules of the Ministry of Education, to which Vincennes did not oppose, but resisted to, Deleuze, in a certain way, stressed the need for a pragmatic philosophy, one which provided the students with a more effective participation in the classes, so as to enable interventions concerning their particular needs, whether they were mathematicians or musicians. For Gilles Deleuze, "throw in the interior of each discipline resonances between levels and domains of exteriority" (Ibidem, p.226) is more than a mere advisable or necessary action, it stands for an extremely healthy and productive movement, which would not only avoid universal propositions, but would also problematize the permanence in a fenced-like, self-sufficient, therefore comfortable, safe, privileged terrain, thus avoiding to remain within the limits of a royal science. Through this attitude, Deleuze ends up by positioning himself in a place which avoids the *modus operandi* of the traditional contemplative philosophy, that would be strong only within itself, forcing us to think, before anything else, about the power resulting from the discussions which embrace in its core the exteriority and, in this case, we examine the relation between philosophy and Mathematics Education, so as to question ourselves whether "it works, and how does it work?" (DELEUZE, 2000, p.16).

We believe that Mathematics Education has been empowered by these discussions, since it has been establishing itself nowadays as a field that has been embracing a multiplicity of theoretical approaches and a plurality of objects of analyses resultant from the contributions of researchers who are interested in problematizing the mathematical knowledge as well as its educational implications. The breadth of this debate involving these different approaches and perspectives have aroused relevant re-significations in the field of Mathematics Education and this seems reasonable to us due to the boldness arising out of the desire for knowledge of some researchers who have engaged in the adventure of searching in other territories – philosophical, aesthetic, anthropological, sociological, among others – the theoretical and conceptual tools which enhance thought, making, in an apology to Nietzsche (2001, p.313), the Mathematics Education *dance*.

It is in the sense of potency, of functioning and of making the Mathematics Education *dance* that we have appropriated ourselves of Wittgenstein's work, more specifically of the propositions presented in his book called *Philosophical Investigations* (2004). Such undertaking becomes possible, because, according to Richard Rorty (1988, p.286), there are significant differences between what he called systematic and edifying philosophers. According to this author:

> The great systematic philosophers are constructive and offer reasoning. The great edifying philosophers are reactive and offer satires, parodies and aphorisms. They are deliberately peripheral. The great systematic philosophers, like the great scientists, construct for eternity. The great edifying philosophers destroy for the sake of their generation. The systematic philosophers want to place their subject in the safe way of a Science. The edifying philosophers would like to keep the space open for the feeling of awe which the poets may cause - admiration for the existence of something new under the sun, something that is not an exact representation of what has already been there, something that (at least for the moment) cannot be explained and can be barely described.

It is the open spaces, the flows and the currents of air present in Wittgenstein's work which allow us to problematize the field of Mathematics Education to, who knows, take it to the level of the unthinkable so far. Our effort, however, is preceded by several works which, even embracing a theoretical multiplicity, have made use of tools applied by this philosopher so as to support their researches. Among these, we have highlighted KNIJNIK et all, 2012; WANDERER, 2007; VILLELA, 2007; GIONGO, 2008; DUARTE, 2003, 2009. It is in the wake of these works that our text inserts itself and, in order to facilitate the reading, we have split our text in two parts. The first part refers to the problematizing, based on Wittgenstein's tools, of the claim for universality intended by mathematical knowledge. Such questioning was problematized by a great number of researchers, as above-mentioned, although, we believe that it is not possible to mention Wittgenstein, without pondering over his contributions to the shattering of any claim for universality intended by mathematical knowledge. More emphasis, however, is given to the second part of the text, for it deals with the results of a research of PhD in Education (Duarte, 2009), and refers to the pedagogical as well as political implications of the Austrian philosopher's work for the Mathematics Education.

2. Problematizing the supposed universal rationality of academic Mathematics

The theories proposed by Wittgenstein in the work "Philosophical Investigations" (2004) have contributed, in a unique way, to problematize the universal character claimed by the academic mathematics and, indeed, support the assertions concerning the existence of varying forms of mathematics. At that rate, we conclude that

> [...] One of Wittgenstein's major contributions to the contemporary culture might be precisely this "deconstruction" of a supposed universal rationality, which was hugely based on the idea of categories, which is not just idealistic, but also more loftily ethnocentric. (CONDÉ, 2004, p. 139)

This important contribution was enabled by the understanding of rationality suggested by this philosopher, who accomplished to keep away from the seductive temptations to search for the final reasoning resulting either from essentialist stances, engendered through the quest for an essential logic (idealistic), as well as from stances which look

for the positivity of facts (positivist). Following this line of reasoning, Wittgenstein refuses to accept rationality as a result of a representational model of language - which proposes an isomorphism between language and the world. Conversely, his theorizing privileges interaction rather than representation, that is, rationality, for this philosopher, emerges out of grammar, out of the rules present in the interactions of the language games, out of the everyday life social practices found in a given form of life. As there are different forms of life with different language games, it is possible to infer that the existence of different grammars enables the construction of different rationalities.

The expression *forms of life* used by the philosopher aims at highlighting the "intertwining among culture, world vision and language" (Glock, 1998, p. 173). According to Quartieri (2012), "one could not say that there is only one form of life, but different forms of life with characteristics of different cultures and times" (Ibidem, p. 28). In other words, for Wittgenstein there would be different forms of life, in which different language games would be used according to the context in which they were inserted. Following this line of reasoning, Glock (1998) asserts that "a given form of life is a cultural or social formation, embracing the totality of communitarian activities in which our language games are immersed" (Ibidem, p. 174).

Generally speaking, Wittgenstein's philosophy of the last phase, destabilizes the understanding of language while representation of the world, that is, it implies a deep questioning and a criticism of the paradigm of representation, whether it originates from a metaphysical or empiricist conception. In other words, for this philosopher, that very thing that we know and to which we attribute meanings, can be neither placed in the object itself, fruit of an essence, intended here by idealism, nor in the positivity of facts, which functions as an excuse for empiricism. In this respect, Wittgenstein sets apart from idealism, since he does not believe in the essence of meaning and, on the other hand, from empiricism, for not believing in the existence of the objectivity of facts or of the object.

For this philosopher, meaning and, accordingly, knowledge, takes place according to the use we make of language in a given form of life, that is,

> [...] neither the logical and ultimate stipulation of minimal formal units, syntactic or semantic, nor the postulation of such units as being the tenets of meaning are relevant for the understanding of meaning. It is a matter, now, of searching for units of another order, or rather, for the ones that will be distinguished according to other criteria. The new criteria, nevertheless, will present a distinct nature concerning the previous ones, since it shall not be possible, through them, to detect precisely and ultimately, the units of meaning. The new criteria will be given in accordance with the use we make of language, through the multitude of games, that is, through the most different forms of life. (MORENO, 1995, p.56)

According to this perspective, his conception of language supports the non- existence of

> [...] **language**, not simply languages, that is, with a huge variety of uses, a plurality of functions or roles which we could understand as language games. However, as there is not a unique or privileged function responsible for the establishment of some kind of essence of language, there is also nothing that may be considered as being the essence of language games. (WITTGENSTEIN apud CONDÉ, 1998, p. 86).

Wittgenstein, in advocating for the absence of an essence of language, admits that no language can claim to be universal. There are particular languages and rationales, and they are a result of the context in which they are inserted. According to this perspective, Wittgenstein's work provides the researchers with the possibility, especially those linked to Ethnomathematics[1] to question the academic language of Mathematics claim for universality. So:

> Academic Mathematics, School Mathematics, Country Mathematics, Indigenous Mathematics, in short, the set of Mathematics created by specific cultural groups, can be understood as assemblages of language games engendered in different forms of life, aggregating specific criteria of rationality. These different games, though, have neither a steady essence that holds them completely incommunicado ones with the others, nor a property common to all of them, but some analogies or kinships - what Wittgenstein calls family similarities. (Knijnik et ali, 2012, p.31)

For this philosopher, there are language games, and these are articulated according to the possibilities of their uses in the forms of life. Such condition undermines the possibility of assertion of a universal, ideal language. Besides, according to the author's perspective, the function of language is not denotative, that is, it is not representative of the things which surround the world, but rather attributive, since there is not, therefore, a one-to-one correspondence between words and things. This way, "truths" are not found through reason, but made up by it. In such case, it is through the uses of language, that sense is attributed to activities, to objects and to events and not just to aspects achieved through perception. As a consequence of this, what we designate "reality", is built in and through the pragmatism of language, that is, "something that for men seems to be this way, it corresponds to their criteria to determine what is this way." (WITTGENSTEIN apud MORENO, 1995, p. 33).

According to this perspective, all the language games are correct as long as the criteria for their validation make sense for a certain form of life. This implies that, "(...) naturally, diverse forms of life establish differentiated forms of life, as well as, different grammars and, as a consequence, different intelligibilities" (CONDÉ, 2004, p.110). In this respect, one cannot speak of the intelligibility of the world, but of possible intelligibilities. Nonetheless,

> The ideal is rooted in our thoughts in an unmovable way. You can come out of it. You have always to return to it. There is not such a thing as an out there; out there lacks vital air. – Where does this come from? The idea has been placed, so to speak, as glasses over our nose, and what we see, is seen through them. It does not come to my mind to remove them. (WITTGENSTEIN, 1991, p. 69).

It is with the glasses of academic Mathematics that the supposed "ideal" has been built. Nonetheless, it is necessary to consider academic Mathematics as a lens, a possibility, a language that is not the reflex of the world, but that, in "saying something about the world", ends up by constructing it and does this in a very peculiar way.

[1] We understand Ethnomathematics as a box of tools which allows us to [...] study the Eurocentric discourses which establish both the academic and school mathematics; analyze the effects of truth produced by the discourses of both academic and school mathematics; discuss issues of difference in mathematical education, concerning the centrality of culture and the power relations which inform it; and examine the language games which constitute each one of the mathematics, thus analyzing its family similarities. (Knijnik, 2006, p.120)

Along the history of mankind, distinct peoples have created their own ways of telling, measuring, registering time and understanding the natural phenomena. These specific ways of understanding the world, through a mathematical perspective, present themselves in different social practices.

Ubiratan D'Ambrósio (2005, p.6) states that, from the end of the fifteenth and throughout the sixteenth century, the establishment of colonial regimes, on a world basis, has determined that the different local modes of production and trade suited the European model. This way, the vanquished peoples' intellectual particularities have been fully abandoned. By so doing, specific ways of measuring and quantifying languages, as well as the cultural diversity of other expressions, have been silenced. The question that is raised, before the existence of other kinds of validation, of other rationales, has to do with the fact that some are legitimate, while others are not, because while some deserve space within the school curriculum, others do not.

Several Ethnomathematics researchers and scholars have tried to understand and validate these "other" forms of logic present in the most diversified cultures. Monteiro (2002) reports an experiment that he conducted with a group of Sumare's Rural Settlement. In that place, the female author describes her meeting with Zé do Pito, a tomato grower, who, besides being dedicated to his tasks as a farmer, was also responsible for collecting the money among the settlement's inhabitants for the payment of the light bill. The rural worker's procedures in order to calculate the bill were limited to the splitting of the basic tax among the ones who had used the light and the remaining value was divided taking into account the financial conditions of each family. His division was proportional, but the criteria established a kind of proportionality based on "solidarity relations and not on capital ones" (MONTEIRO, 2002 p. 104). According to this authoress, such situation

> [...] Full of life, does not report just a division, it proposes a division's criteria, it discusses the reason why we are supposed to share, commenting on the figures involved in this practice. The calculation is secondary. Mr. Zé do Pito has never studied and yet knew how to calculate, as he used to say, in his head, or with the calculator that his children had taught him how to use. (MONTEIRO, 2002, p. 105).

An also differentiated experience concerning other forms of mathematize, or in Wittgenstein's language, other language games, were experienced by Mariana Kawall Ferreira, as a Portuguese and Mathematics' teacher at Diauarum School in Xingu Indigenous Reserve. She proposed to her group of students the following problem: "Yesterday evening I caught 10 fish. I gave 3 to my brother. How much fish do I have now?" (FERREIRA, 2002, p. 56), she got 13 fish as an answer. When we analyzed the figure found, through the lens of academic Mathematics, we could think that such result was, at least, equivocated or that there was a "cognitive disability" on behalf of that student, since the arithmetic operation that answered this problem "correctly" would, by all means, be the subtraction that would produce 7 fish as a result. The reason however, for the choice for the addition operation is truly astonishing. According to the student's explanation:

> I came up with 13 fish, because, whenever I give something to my brother, he pays me back twice. Accordingly, 3 plus 3 equals 6 (what the brother would pay him back); 10 plus 6 equals 16; and 16 minus 3

> equals 13 (total number of fish minus the 3 which Tarinu gave to his brother). (FERREIRA, 2002, p. 56).

Situations like those suggest that the imposition of a given rationality, through academic Mathematics, means much more than prioritizing a way of thinking, a specific grammar: it means the possibility of destroying the values and meanings which are on the basis of other cultures' rationality. What would be the meaning, for such communities – of Sumaré's Rural Settlement or of Xingu's Indigenous Reserve - of the imposition of criteria for the validation of results based just on those used by School Mathematics? Tomaz Tadeu da Silva (1998, p. 194), in emphasizing the importance of "perceiving the curriculum not just as being constituted of 'doing things', but also as an agent that is able to 'do things to people'", draws attention to the perils of the imposition of a unique rationality. In this respect, Wittgenstein's tools have helped us to problematize the existence of a unique mathematics that would be the result of a unique and "truthful" rationality. Nonetheless, as we have previously stressed, this text aims at delving into the discussion of some propositions made for the teaching of Mathematics in the light of Wittgenstein's theorizing.

3. Problematizing one of the truths of School Mathematics discourse: Work with the student's reality attributes meaning to school mathematics.

Besides undermining the claim of mathematical knowledge for universality, Wittgenstein's work provides us with tools to problematize the pedagogical proposals that attest to the need of working with the student's reality, so as to confer meaning to school mathematics. It seems to us that this need would legitimize itself by the double effect that it could entail: on the one hand, it would render school attractive and, on the other hand, it would awaken the student's interest for school mathematics' learning process. It would represent the attempt to capture the "brightness of reality" (LARROSA, 2008), in order to overcome the opacity and artificiality of school contents.

Such prescription, thus, is rather recurrent in the educational environment, being supported by different perspectives. Theme categories such as Mathematical Modeling and Ethnomathematics, for instance, stress, many times, the need for the integration of school knowledge with the student's reality. Nevertheless, this need extends over the time and extrapolates the present times. Through the analysis of some works of important theoreticians from Western Education, we realize the concern with the avoidance of the cleavage of school with the real world. This way, exponents such as Wolfgang Ratke and Jan Amos Komenský (Comenius), from the seventeenth century, and Jean Jacques Rousseau, from the eighteenth century, reinforce the pedagogic necessity to focus on school environment.

First and foremost, it is necessary to follow the order of *things* and ensure that the teaching of tools cannot be understood without things. Therefore, **the rules should be also explained through the use of examples and models learned from things and, from them, the teachings should be designed.** (RATKE, 2008, p. 129, bolded emphases added)

> **Words, therefore, should be always taught and learned in a concerted action with the correspondent things** [...] and what are words if not the covering and the sheath of things? [...] **we are shaping men, and we want to**

> **shape them in the shortest amount of time possible: this will happen if words always walk *pari passu* with things, and things with words** (COMENIUS, 2006, p.223, bolded emphases added)
>
> In any study performed, **without the idea of represented things, the correspondent signs are nothing**. Even so, we keep on restricting the child to these signs, without ever being able to make her understand none of the things that they represent. (ROUSSEAU, 2004, p. 123, bolded emphases added)

Thus, progressing through the centuries, the analysis, under different perspectives, of the connection to be established between "words and things", (realia)[2] came into being in the discussions of educational slant. From the viewpoint of these authors, for a learning process to be effective, it must necessarily establish a "link between words and things: Everything should derive from the sensitive and the known", asserted Comenius (2006, p. 9). So, for these authors, the representative function of language expresses a one-to-one correspondence between the world and language. If the relationship between words and things were not established in the educational scope, words would be nothing but empty sounds, expressions without any meaning. The world would function, then, as a physical, motionless basis, whose essence would be expressed by language. On the educational field, the very avoidance of the emptying of meanings would be a priori for the learning process. This way, regarding the specificities of Ratke's (2008), Comenius's (2006) and Rousseau's (2004) formulations, the sensitive "reality" or the apprehension of its movements can serve as a fundamental contribution for the management of education and for the student's learning process. Thus, it is possible to infer the existence of a pedagogical concern, as early as the thirteenth and seventeenth centuries, with the disassociation between school space and its surroundings. Such concern extended over and re/shaped in the twentieth century with John Dewey.

Dewey (1959) problematizes one of the characteristics that he considers inherent to school institution: its superficiality. For him, such characteristic may easily encourage the development of "distant[s] and dead[s] – abstract[s] and bookish[s]" pedagogical practices (Ibidem, p. 9). This happens, according to the author, because the level of complexity of our culture demands that much of what one learns, should be closely bounded to abstract symbols that, for their condition, are distant from the interaction with facts and objects. Such "natural tendency" must be carefully attenuated through the implementation and qualified training of "more fundamental and effective modes of

[2] According to The *Nova Fronteira* Etymological Dictionary of Portuguese Language (CUNHA, 1999, p.665), the entry reality, in Portuguese language, dates back to the sixteenth century. Associated to the word *real*, which refers to "what truly exists, [...] from the low latin *realis*, from *res rei*, thing". As to Hoff and Cardoso (s/d, p.13), the expression *realia* is connected to "[...] (real things): the teaching from the student's reality. *Realia* took on a more specific sense, as a set of disciplines which one taught after reading, writing, calculating and the Christian doctrine, from the third grade, corresponding to history, geography and natural sciences. Finally, it was also considered as being a methodological discipline". Lúcio Kreutz (1996), in performing a study of the pedagogical methods practiced in the beginning of the Republic, by the German immigrants in Rio Grande do Sul, in their schools, has identified that the "lesson of things" indicated a new methodological posture of school at that time. It represented, according to the researcher, a methodological perspective that aimed at overcoming the lesson of words. "The whole school process, especially, the didactic material, should be designed from within the students' reality and help them to actively take part in their social context. One of the terms more used to signalize this methodological perspective was lessons of things (realia)" (Ibidem, p. 76) [Emphasis of the author]. So, the act of making pedagogical use of the things that surrounded the student's "reality", was designed by the "latin term *realia* [that] meant real, objective things." (Ibidem, p.81).

teaching". Contents which are detached from real life and, therefore, deprived of practical usefulness, considered as "useless remainders of bygone times", led the teacher to lose a precious time, since the program to be developed was very extensive. The search for a formalization that ignores the social needs is one of the criticisms of Dewey's philosophy regarding education.

Thus, school, instead of adopting an attitude of imposition, of direct transmission of knowledge, should understand that its efficacy lies on the possibility of harmony with the social environment – and the practices thereupon inserted – in which the child lives. The warning given by the philosopher is that

> […] when schools move away from the efficient educational conditions of the out-of-school environment, they necessarily substitute a social spirit for a bookish and pseudointellectual one. [...] By keeping an individual isolated [from out-of-school activities], we shall be able to assure him both the motor activity and the sensorial excitation: but we cannot make him understand, through this procedure, the meaning of things within the life one is part of. (DEWEY, 1959, p.42)

In this respect, Dewey supports the positivity of the dialogue among everyday life activities as a source of experiences for school activities. Such positivity takes place in two aspects. On the one hand, it allows for the visibility of school concepts in out-of-school situations, what confers meaning to them; on the other hand, the situation, the context provides a channeling for thought. This dialogue to which Dewey alludes, is empowered by Mathematics Education since

> [...] in the case of the so-called disciplinary or predominantly logical studies, there is the danger of isolating the intellectual activity from the things of ordinary life. The teacher and the student have a tendency, by mutual agreement, to open up a gap between the logical thought as something abstract and remote; and the specific and concrete demands of everyday life events. The abstract thought tends to move apart so much from its concrete use, that it loses all the connection with the practical and moral procedure. (DEWEY, 1979, p.68-69)

According to this approach, the "methodological strategy" of bringing "the mathematical activities closer to reality", spans the centuries and renovates itself. However, it is an object of first need for the educational experiences and becomes a daily prescription for the teacher, who should teach the mathematical contents in harmony with "real life". Therefore, the desire for "reality", that is, the claim for the "intensity and the brightness of real" (LARROSA, 2008, p.186), the search for harmony and the alignment with "reality" is translated, among other things, by the need to establish connections between school mathematics and "real life". It would be as if school mathematics, after setting itself apart from the social world – due to the demands of formalism and abstraction, which characterize it – needed to return to "real life", that is, became real. In other words, the act of injecting "bits" of "reality" into school daily routine, would put an end to the suspicion that the contents developed in school, could be "a sort of reality without reality" (LARROSA, 2008, p. 185).

Nonetheless, the process for the construction of "school reality" in harmony with the "brightness of real" is rendered impossible, for, according to Larrosa (2008), the real bears the characteristics of non-intentionality:

> The intentions over the real, including the best intentions, also set us apart from the real, also derealize and waste it, since they construct it according to our goals, converting it into raw-material for a transformation, or possible modification. (Ibidem, p. 188)

This way, constructed according to the educational goals, "reality" is, for this author, turned into a "clone of itself" (LARROSA, 2008, p. 188), a sort of parody of "reality".

Nonetheless, we find it relevant, based upon Wittgenstein's tools, to question: Which theoretical views would corroborate the assertion that working with the student's "reality" in mathematics classes "would confer meaning" to school mathematics?

As we have previously mentioned, the second Wittgenstein's thought provides us with tools for the rehearsal of an answer to these inquiries. First of all, it is necessary to notice that such assertion could lead us to think that language games which make up school mathematics would be "depleted" of meaning. By contrast, the set of mathematics of "reality", that is, the non-scholar ones, precisely these ones, would be soaked and saturated with meanings, waiting, "out there", to be transferred into the school form of life. A "natural" operation of transference would, then, enter onto stage, since the meanings present in out-of-school mathematics, would be sent to school mathematics.

Although, according to Wittgenstein's perspective, by us supported, we understand that there is not such a thing as "depletion/saturation" of meanings. All the language games – being social practices – have meanings within the form of life that embraces them. Considered as a set of language games, school mathematics presents a specific grammar, characterized by a set of rules. So understood, school mathematics does not present an incompleteness that is cured through its touch with "reality", for, according to the philosopher:

> Reality is not a property still absent in what one anticipates and has access to it when our expectation is fulfilled. Neither is reality like the daylight, from which things need to acquire their color, when they are, so to speak, colorless, in the dark. (WITTGENSTEIN, 2003, p.102)

Besides, Wittgenstein considers that "grammar rules cannot be justified by showing that their implementation is responsible for making a representation agree with reality, because this justification would have, itself, to describe what is represented". (WITTGENSTEIN, 2003, p. 141). But, if were captured by a "will of reality", we would be led to insist about the possibility of transferring the meanings of the games practiced in the non-scholar forms of life, into the language games of school mathematics; such insistence, however, would not be successful: the "passage" from one form of life into another, does not guarantee the permanence of meaning; on the contrary, it suggests its transformation, because "on the other side", the one who "receives it", represents another form of life (VEIGA-NETO, 2004). In other words, meaning does not have an essence, which could be encompassed by any use, made by the utterance. In the same token, Condé (2004) explains us that

> A language game which is fully satisfactory within a specific situation, may be not so in another, for with the appearance of new elements, things change, and the uses that at that moment worked, may not be satisfactory in the new situation (Ibidem, p. 89)

Accordingly, the meanings produced by a language game, which is fully satisfactory within an out-of-school environment, could not work well, when transferred into a school environment.

As mentioned by Knijnik et. al. (2012), there are different forms of rationality "taking place in the Mathematics Education practiced in and out of school, since school mathematics has as a distinguished characteristics, transcendence; and the out-of-school practices, are characterized by immanence " (Ibidem, p.18). That is, the out-of-school practices are strongly attached to the forms of life that practice them, in other words, the subject. Thus, the act of taking for granted that mathematical rationality may operate outside the scope of school and is intertwined with the form of life that preserves it, presupposes the evaluation of the difficulties of its inclusion in the school sphere. Putting it in another way, the educational implications derived from the inclusion of social practices originated from different forms of life, would not be so self-explanatory, because the kinds of knowledge herein incorporated would be subject to transformations in their meanings, concerning mainly the uses given to them in another context.

4. Conclusion

This text, written from the insertion in philosophical territories, aimed at giving visibility to the implications of Wittgenstein's work regarding the Mathematical Education field. Generally speaking, we would like to emphasize the theoretical tools provided by the Austrian philosopher, which allow us to problematize metanarratives that seem to represent themselves as unquestionable for this field. Therefore, from the first moment, we have suspected of the supposed and claimed character for universality aspired by mathematical knowledge "capable of measuring and classifying any other mathematics as more or less advanced concerning its greater or lesser similarity with those we learned in the academic institutions" (LIZCANO apud KNIJNIK et alli, 2012, p. 2). One could, this way, infer that the character of universality of mathematics would be attached to a transcendental posture, because one would understand it as belonging to the world of ideas. "According to this viewpoint, knowledge would be waiting to be discovered – Fiat lux – and any culture, obviously that at any given period of evolution, would have conditions to access such knowledge" (DUARTE, 2011, p.76). As Knijnik et ali (2012) says: "The "Second" Wittgenstein does not conceive of language with the traces of universality, perfection and order, as if it pre-existed to human actions".

The questioning of this premise and of other truths "naturalized" in the Mathematical Education field has been problematized by Wittgenstein's work, specifically by the "last Wittgenstein".

In this respect, on the second part of this text, we place under suspicion the widely spread idea, among those who deal with the teaching of mathematics, that "reality" would enable the attribution of meaning to the contents worked in the classroom, specifically the mathematical contents. The importance of attributing meaning to school concepts, from their advent in "reality", could have a double effect: on the one hand, it would render school attractive, on the other hand, it would awaken the student's interest for the learning process of school mathematics. Making use of the tools derived from the second Wittgenstein's work, we problematize the possibility of such enterprise, arguing that language games of school mathematics and those which constitute the

social practices, in spite of having family similarities between them, are distinct and the "passage" from one language game, pertaining to a certain form of life, into another, would not guarantee the permanence of meaning; on the contrary, it suggests its transformation. We end the writing of this text understanding that other questions could have been explored based upon Wittgenstein's thought. We did not have, in any way, the pretense of exhausting the discussion herein initiated. Conversely, our trajectory, in this text, was aligned with the desire to produce new meanings for the lived experiences, "let go of the fresh air of other possibilities" (TADEU; CORAZZA; ZORDAN, 2004, p.22) and, by so doing, give rise to different forms of thinking, which generate other pedagogical possibilities for the area of Education, specifically for School Mathematics Education.

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