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Mathematics education under investigation: provocations based Florence Weber and Ludwig Wittgenstein

La educación matemática en cuestión: provocaciones desde Florence Weber y Ludwig Wittgenstein

L'enseignement des mathématiques en question : provocations de Florence Weber et Ludwig Wittgenstein

A Educação matemática em questão: provocações a partir de Florence Weber e Ludwig Wittgenstein

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Abstract

This paper aims to problematize the Sociology proposed by the French anthropologist Florence Weber to mathematical Education, taking her concept of social scene as the articulation axis, and the theorization on language games developed by the Austrian-British philosopher Ludwig Wittgenstein. The idea is to create possibilities to think about mathematical Education in a different way, develop new thoughts and give new meanings to it. This paper lists some modern elements in the making of Mathematics and shows that it was established as a form of true knowledge in Western society in different times and spaces. Afterwards, it introduces Mathematics as a language game and as a social scene. Finally, some considerations are made about a possible direction for Mathematics Education, suggesting that it should be seen in a different way, not as a hard science, but as something that transcends exact calculations and can

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be found in the ways of knowing and doing in different cultures. Thus, strategies that differ from those imposed by the school could be taken into account and enable new ways of mathematizing that may be silent.

Keywords: Social scene, Language games, Mathematics education.

Resumen

El presente artículo pretende problematizar la sociología propuesta por la francesa Florence Weber en la educación matemática, tomando como eje articulador, principalmente, su concepto de escena social, así como las teorizaciones defendidas por el Segundo Wittgenstein, la de los juegos de lenguaje. La idea es crear posibilidades para pensar la educación matemática de otra manera, creando líneas de fuga y considerando los diferentes significados que tiene en la contemporaneidad. A partir de ahí, se explican algunos elementos modernos en la construcción de las Matemáticas, mostrando cómo se establecieron como una verdadera forma de conocimiento en la sociedad occidental en diferentes épocas y espacios. Después, presenta las matemáticas como un juego de lenguaje y como un escenario social. Por último, se hacen algunas consideraciones sobre una posible orientación de la educación matemática, sugiriendo que se la considere de otra manera, no como una ciencia dura, sino como algo que trasciende los cálculos exactos y que puede encontrarse en las formas de conocer y hacer de las distintas culturas. Así, estrategias divergentes de las impuestas por la escuela podrían ser tomadas en consideración, permitiendo la creación de otras formas de matematizar que podrían ser silenciadas.

Palabras clave: Escena social, Juegos de lenguaje, Educación matemática.

Résumé

Le présent article vise à problématiser la sociologie proposée par la Française Florence Weber dans l'enseignement des mathématiques, en prenant comme axe articulateur, principalement, son concept de scène sociale, ainsi que les théorisations défendues par le second Wittgenstein, celle des jeux de langage. L'idée est de créer des possibilités de penser l'enseignement des mathématiques d'une autre manière, en créant des lignes de fuite et en considérant les différentes significations qu'il a dans la contemporanéité. Sur cette base, le présent document explique certains éléments modernes dans la fabrication des mathématiques, en montrant comment elles ont été établies comme une véritable forme de connaissance dans la société occidentale à différentes époques et dans différents espaces. Ensuite, il présente les mathématiques comme un jeu de langage et comme une scène sociale. Enfin, certaines

considérations sont faites sur une direction possible pour l'enseignement des mathématiques, suggérant qu'elles devraient être considérées d'une manière différente, non pas comme une science dure, mais comme quelque chose qui transcende les calculs exacts et qui peut être trouvé dans les manières de savoir et de faire de différentes cultures. Ainsi, les stratégies qui divergent de celles imposées par l'école pourraient être prises en considération, permettant la création d'autres manières de mathématiser qui pourraient être réduites au silence.

Resumo

O presente artigo objetiva problematizar a sociologia proposta pela francesa Florence Weber em consonância com a Educação Matemática, tomando como eixo articulador, principalmente, seu conceito de cena social, bem como as teorizações defendidas pelo Segundo Wittgenstein, a de jogos de linguagem. A ideia é criar possibilidades para pensar a Educação Matemática de outro modo, criando linhas de fuga e considerando os diferentes significados que ela possui na contemporaneidade. A partir disso, o presente artigo explicita alguns elementos Modernos na fabricação da Matemática, mostrando como ela foi se instituindo como uma forma de conhecimento verdadeira na sociedade ocidental em diferentes tempos e espaços. Posteriormente, apresenta a matemática como um jogo de linguagem e como cena social. Por fim, são tecidas algumas considerações a respeito de um possível rumo para a educação matemática, sugerindo que ela passe a ser visualizada de outro modo, não como uma ciência dura, mas como algo que transcende os cálculos exatos e pode ser encontrado nos modos de saber e fazer de diferentes culturas. Assim, poderiam ser levadas em consideração estratégias que divergem das impostas pela escola, possibilitando a criação de outros modos de matematizar que podem estar silenciados.

Palavras-chave: Cena social, Jogos de linguagem, Educação matemática**.**

Mathematics Education under investigation: provocations based Florence Weber and Ludwig Wittgenstein

Influenced by several factors, efforts have been made to understand relations between Mathematics we learn in school and Mathematics we use in everyday life. We tend to project a view that school Mathematics is basically made up of knowledge that comes from its elementary part and from what could be "brought to school," such as everyday practices that involve mathematical thinking. However, studies have been carried out to show similarities between Mathematics we learn in school and everyday Mathematics (Giongo, 2008; Wanderer, 2007; Knijnik, 2004). We highlight the need to consider other ways of operating with Mathematics by introducing studies conducted by the French anthropologist Florence Weber and the Austrian-British philosopher Ludwig Wittgenstein to problematize ways which culturally define what Mathematics is.

Thus, we aim at problematizing the Sociology proposed by Weber, by using her concept of social scene as the articulation axis, and the theorization defended by Ludwig Wittgenstein. The idea is to create possibilities of comprehending it in a different way, developing new thoughts and considering its different meanings in contemporaneity, instead of proposing the solution and finding the truth about ME.

The next item introduces both theories proposed by Weber and Wittgenstein by referring to some studies that allow us to draw lines to think about ME in other ways. Afterwards, some modern elements that help to construct what is considered Mathematics these days are described. Then, Mathematics is emphasized as a language game and a social scene. Finally, some considerations are made about ME in the future.

Modern Elements in Mathematics Construction

The Enlightenment was one of the pillars of modernity. When knowledge was unified, it led to the production of a 'subject of reason' by virtue of valorization of mathematical knowledge in modern society. Michel Foucault (1999) points out that the influence of this thought made classical rationalism be defined by the desire to make nature quantifiable, mechanical and calculable; as a result, it annulled differences, universalized similarities and produced a 'correct' way of understanding Mathematics. In modern society, Mathematics engendered a discursive production permeated by valorization of exactness, certainty, perfection, rigor, predictability, universality and indubitability (Descartes, 1983, p.38).

Descartes (1983), the founder of modern Philosophy, defines Mathematics as a model of interpretation of universal validity and states that knowledge is constituted of the heritage of our reason, making an amalgamation of logical and psychological issues. In its strict sense, mathesis is the "[...] science of equalities, therefore, of attributions and judgments, the science of truth." (Foucault, 1999, p. 102). The principle of scientific knowledge aimed to eliminate everything that was not quantifiable and to define some knowledge as superior by bringing up discourses that disciplined society and normalized subjects.

Mainly for the European and the Western people, the Western society held all truth whereas the other civilizations were backwars, had no wisdom and whose knowledge was restricted to myths and superstitions. Mathematics was seen as the standard of truth that should not - and could not - be questioned. It produced truth associated with scientific knowledge and moved universal knowledge that provided and classified what is not equal, a fact that persists in contemporary times.

According to Bampi (1999), mathematical knowledge was conceived as immutable, as knowledge that apprehended the whole and enlightened individuals, as long as it were learned properly. In other words, this knowledge is characteristic of modernity, of modern Science – considered neoplatonic – based on the Enlightenment: "[…] mathematical knowledge gained importance as essential and immutable truth: the way of light, which allows the passage from the first to the second world" (Bampi, 1999, p. 58-59).

As a result, in Western rationality, knowledge of modernity prevails, since it was legitimized by the role played by science and technology from the 17th century on, in Europe. Philosophers who characterized the Enlightenment, such as Kant, Descartes and Bacon, acknowledged scientic development as possibility of progress, regarded the scientific method and attributed the character of inevitable science to Mathematics in this process. However, at the beginning of the 20th century, due to the emergence of Human Sciences and the theory of evolution, for example, a new model of rationality was established by contemporary science (CONDÉ, 2004b). The new model of rationality aims at deconstructing the idea of ultimate fundamentals (truth) in knowledge construction, enabling new possibilities of knowledge and opposing to the idea of universal scientific rationality synthetized by Newton's mechanics and revalidated by Kant's philosophy (Condé, 2004b).

Based on Lytoad, Veiga-Neto (1996) shows the need to detach from Enlightenment narratives and focus on contemporaneous analyses in Education. Condé (2004) also poinst out that, from the Century of Lights on, modern reason was not able to ensure solutions to human problems, such as religion, politics and epistemology. He recommends that we should use

Wittgenstein's thoughts to reflect upon contemporaneous rationality in a different way, instead of recovering the ideals of modern reason (Condé, 2004).

Regarding Wittgenstein, in this paper, we used the theory proposed by the later Wittgenstein. In *Tractarus*, he aimed at responding what language is while, in *Investigations*, he asks how language works. When he moves from one to another, his studies render him the term later Wittgenstein. In this phase, he addresses languages, i. e., a variety of uses and a plurality of functions or roles understood as *language games*, rather than the language addressed by the Early Wittgenstein. The later Wittgenstein abandons any essentialist concept of language since the meaning of a word is its use. As a result, there is the possibility of constituting a model of scientific rationality based on ideas developed by the later Wittgenstein (2004) who meets the new epistemological requirements of contemporaneity. The model is described in the next item.

Mathematics as a language game

Based on the Linguistic Turn[4], ME may be examined in a different way. One of the main factors that led to it was the fact that the later Wittgenstein (1988) proposed the incorporation of the temporal dimension into rationalism and gave new meaning to language, which was no longer understood as a resource for the revelation of the real world, but as an instrument of discursive constitution of what we understand as reality.

It enables a change of epistemological and sociological scopes. For example, epistemology could be called a finitistic epistemology, in which possibilities constructed by traditional epistemology would become problematic, since ideas of objectivism, essence, reality and the problematic itself would no longer make sense. Language gains the pragmatic status of actions and produces a crisis in the functional-structuralist sociological dimension of science (Lima, 1994; Palácios, 1994). On the other hand, it enables to think about rationality no longer from an a priori and deterministic order, but from a model of open and decentralized rationality in which it would no longer have a privileged place.

[4] Here we establish the concept of the Linguistic Turn as a break in the center of analysis of a historical social epistemology that perceived language as mere representation of objects. Now, from the Linguistic Turn, as Popkewitz (2011,) says, attention is directed to patterns of thought and reason, assumed as social practices that construct the world. "Other mode" has a reversal of meaning in relation to "other mode". We argue that the former expression seeks not to rest on an ultimate foundation, seeking the possibility of a total break with all codes, laws, institutions, habits, including those of philosophers themselves. We clarify with the example of Christianity, which makes use of the term "another world" abolishing the idea of "another world", giving the sense that any transformation in this world will have - as the only way - by purpose, to give access to another world.

According to the later Wittgenstein (2004), language may be understood as a model of rationality that ignores[5] modern reason, since the use of a word in different contexts enables the meaning of a certain expression. Thus, it counterpoints the Western processes of legitimation and rationality, i. e., new ways of conceiving ME may gain space in school and the academic world and break the dominant paradigm that assumes the reductionist conception of subjects in face of the diversity of their cultures and singularities. Mathematics, in this sense, may be seen as a language game, a concept that provides bases to examine the rationality model of modernity to which it is subject to. From this perspective, the Wittgensteinian thought offers important elements to deconstruct some 'truth' to which subjects are submitted.

It means that language must be understood from the point of view of its functioning, rather than as a close definition. According to the philosopher (Wittgenstein, 2004, p. 38), "[...] the meaning of a word is its use in language". In his writings, Wittgenstein (2004) highlights that different rules used in language make up a game. These rules, which emerge from a form and life, make Wittgenstein (2004) point out that the real meaning of words is found in their use, in the language game established among subjects. He states that, outside the language game, the word has no meaning and attributes to language a particular character that presents meaning through its use.

Wittgenstein (2004, p. 23) adds that language games are related to forms of life since representing a language is representing a form of life. When speaking a language, the subject is carrying out an activity, a certain way of life. Hence, the connection between language and way of life, immersed in a situation in the world.

When the philosopher refers to language as part of a way of life, he highlights that language involves more than mere speech. Therefore, when he mentions the expression "language games", Wittgenstein (2004) refers to the multiplicity of uses of language, which are aspects of the subjects' way of life, the medium in which the language game is immersed. He emphasizes that we should not question what language is, but how it works. There is not only one language, but an "[...] immense variety of uses, a plurality of functions or roles that we could understand as language games" (Condé, 1998, p.86).

Wittgenstein denies the existence of a universal language and, thus, we may question, consequently, the existence of universal Mathematics, since Mathematics is a language, that is, Wittgenstein's thought (2004) becomes productive when he questions the idea of universal Mathematics. By allowing the possibility of thinking about different Mathematics – generated

[5] We use the term *ignore* because we understand that using other words, such as overcome, reconcile and resolve, would convey the idea of preserving a basis.

in different ways of life – they may be understood as language games; since they have certain kinship and are not totally incommunicable with each other, they have family resemblances.

It should be highlighted, however, that a word has a certain meaning according to its popular acceptance and the use people make of it in a given culture. The word is a power relation, because when different cultures coexist as a group, their own language games are established. According to Larrosa (2002), when subjects give meaning to an event, they use words to analyze how to act towards it, towards others and towards the world in which they live. When considering language, discourse and words, we must be attentive to the meaning we give them, for they are not empty activities. When we use words, what is at stake is the way how we correlate words and things (Larossa, 2002).

The fact that there is no universal language means that analyzing the meaning of the word without its use in language leads to mistaken understanding (Wittgenstein, 2004). Although it is apparently free, the language game is governed by rules that distinguish the correct or incorrect use of words in various contexts (Condé, 2004a). The rule is a social invention; it changes depending on the way of life of a given culture, which may legitimize several patterns of behavior. There is no common ground to all games, but similarities, kinship, called family resemblances by Wittgenstein (2004). Concerning kinship, Condé (2004a, p. 5) states that language games are related to each other in various ways; it is because of the kinship or family resemblance that they are called language games. The use of the word, by establishing rules of use, forms a language game that signifies it in different contexts.

In relation to Mathematics, Knijnik (2004, 2007), based on the articulation of Foucault's and the later Wittgenstein's thoughts, conceives ME, mainly Ethnomathematics, as a 'toolbox' that enables the study of "[...] Eurocentric discourses that institute academic and school Mathematics, analyzing their truth; discuss issues of cultural difference in ME, considering the power relations that institute it and examine the language games that constitute the different Mathematics and their family resemblances" (Knijnik, 2007, p. 65). The author considers academic Mathematics a discourse and highlights the possibility of analyzing its links with power-knowledge relations and with the constitution of regimes of truth.

Knijnik, Wanderer and Giongo (2010) conducted a study of ME whose theme was the orality of three rural groups. They concluded that language games that constitute the orality of their ways of life have 'strong' family resemblance, unlike family similarities between language games that institute school Mathematics and those that are marked by orality, which have weak family resemblance. Giongo (2008)[5] also studied family resemblances.

In the educational field, Knijnik (2004) assures that knowledge produced by minority groups is usually devalued in the educational scenario because it is considered inferior from an epistemological point of view, "[...] because it is not constituted in the production of those who, in Western society, are considered those who can/should/are capable of producing science" (Knijnik, 2004, p. 22). However, the author does not mean to glorify popular culture, but to question legitimated discourses.

Emmanuel Lizcano (2004) proposes a change in how Mathematics is understood and points out that subjects are used to placing themselves in academic Mathematics and "[...] consider it the solid ground and from there, look at popular practices, mainly, at popular ways of counting, measuring, calculating [...]" (Lizcano, 2004, p. 125). Based on this Mathematics, subjects look at various other local practices. However, they take their own Mathematics as the reference and the more advanced one. Lizcano (2004) points out that others' mathematical practices are either legitimized or delegitimized, depending on their greater or lesser resemblance to Mathematics we learn in academic institutions. The author provokes us by asking: what if we looked at Mathematics based on popular practices instead of looking at populares practices based on "our Mathematics"?

Social practices, together with ongoing discourses, make us what we are and constitute us individually. Mathematics has specific narratives about the knowledge that is considered true and constructs legitimate ways of reasoning, either including or excluding certain knowledge. The next item focuses on the meaning attributed by Weber to the social scene and its articulation with ME.

Mathematics as a social scene

Practices used by many social groups tend to be disregarded. If students do not present a specific or "adequate" type of reasoning from the teacher's point of view, they often become the target of corrective pedagogical interventions. Thus, dominance over what is right and what is not right in class appears as a power device since it determines access to only one type of knowledge (Foucault, 2014).

Weber (2002) carried out studies of the diversity of native people's reasoning and French families' economic practices and reconsidered the role of who may know and do Mathematics. The author finds that native people's reasoning is not always explicit, since such groups have a plurality of reference systems, rules and goals and use distinct rationalities that only make sense in what she calls the social scene. The plurality of systems of measurement

and calculation adapted to different uses leads to the conclusion, after articulating several studies conducted in different social scenes, that adopted units of measurement depend on the context of practice and that interaction gives meaning to the transaction that always occurs in a given scenario.

According to Weber (2002), we are so used to the legal and institutional system of transactions that we end up forgetting all the other ways of doing business. Weber (2002, p. 162-163) points out that such a fact is strange to our eyes, because "[...] far from the legal guarantees offered by contracts and commercial law, which are accompanied by written evidence and signatures, they take us to the universe in which the word given by the group is sufficient." Assurance, trust and other values lead to different negotiations through values that subjects consider essential in their community, such as credibility and trust established among its members.

Studies conducted by Kroetz (2015) with settlers of German descent in an area called *Encosta da Serra*, in Rio Grande do Sul (RS), Brazil, show that they belong to a certain social scenario where agriculture, manual labor, product exchange and work exchange with neighbors predominate and that measurement and oral calculation systems involved in the activities are employed. We have selected some excerpts of interviews made by Kroetz (2015). *P: How did you control what you got? EC: I controlled everything, but I didn't need to write anything down; I knew all by heart. P: Didn't you need to write anything down on a sheet of paper? EC: Nothing; I remembered things. EB: We knew how to calculate by heart, to sell, to buy; we knew it by heart; Dad taught us everything. P: And how did you know that things had the same value [product exchange]? EB: Ah, guessing, right? In my mind […]. EA: […] if I subtract and one is missing, I borrow one; we learn it in school. But I always had my counts ready in my mind before going to the grocery. EA: We were very quiet in school, one behind the other, straight, almost stationary, we could only look at the board and copy. EB: Teachers wrote on the board and that's it; we had to copy.*

Kroetz concluded that language games used in agriculture were different from the ones imposed by the school. One of the differences that he found was the fact that writing predominated in school while orality prevailed in the subjects' experiences. Throughout their tasks, the settlers did not write anything down, knew everything *by heart*, as they said, and showed that orality was a practical way of solving their everyday issues. However, in school, they said that Mathematics was just meaningful on paper.

Besides being part of a social scene that only makes sense in their way of life, it is characterized by rules of the agricultural world and has no meaning in other social scenes.

Mastering writing also meant maintaining a regime of truth; in this case, to learn official, true Mathematics, which would reinforce effects of the power and make them believe that if they did not know how to write, they would not be able to know Mathematics.

Weber (2002, p. 160) provokes by asking, "what is the use of 'scientific' measure to explain behavior if it is not used, that is, perceived, by persons involved in the process?" In subjects' lives, in commercial transactions, in agriculture and in all adopted strategies, the need to mathematize was different and went far beyond what the school insisted on charging them often in a strict way and with the use of disciplinary techniques, such as surveillance and punishment (Foucault, 1987). Moreover, oral practices surpassed the functionality of written records; certainly, it made no sense resorting to science, to the exact and formal calculation, since it was not productive in their experiences.

Kroetz (2015) showed that their practices and strategies in their way of life, which is mainly agricultural, are quite different from the complexity and abstraction of formal calculations introduced by the academia. Conversations, tactics and ways of organizing work and life took place in natural moments of observation and conversation between the researcher and the interviewees. It was a scenario where rules, financial transactions, weighing, estimations, money circulation and several other practices, occurred in their personal relations, in their life cycles, in their family networks and dimensions of social life. The following excerpts are examples. *EA: After butchering, we had to salt the meat to keep it longer; there was no refrigerator. The lard was used for making soap; we also added soda. P: Did you need much soda? EA: Kind of, for every 20 kg of lard, we used about 4 kg of soda. P: what if I had only 2.5 kg of soda, how much lard would I need? EA: About 1 2kg ang 500 g. P: How do you know that? EA: If I need 4 kg of soda to 20 kg of lard, so, for 1 kg of soda, I need 5 kg of lard, right? P: Yes. EA: So, if for 1 kg of soda, I need 5 kg of lard, for 2 kg of soda, I need 10 kg of lard. And I do the rest later. P: Which rest? EA: The broken numbers. If for 1 kg of soda, I need 5 kg of lard, for half a kilo, I need 2.5 kg of lard, don't I? So, adding to 10, it makes 12.5 kg.*

Interviewees' narratives showed that they do not have rules in their ways of life, which are not controlled by ultimate fundamentals, since there is no universal truth in agriculture. The settlers' perceptions about businesses related to investments, losses and risks, for example, differed from the ordinary neoliberal issues of current banking, financing and investments. Losing the crop, for example, meant being able to rely on a support network of neighbors, it also meant losing part of their savings. As they depended on farming for survival, some issues, such as profit, were already embedded in these relations. Expanding the crop, investing in corn

and then in beans, selling potatoes but not corn, for example, were negotiation strategies to include, their children in this domestic and solidary economy in the future (Kroetz, 2015).

Strategies, measures and practices adopted in the agricultural world depended almost exclusively on orality. One of the ordinary forms of calculation found by Weber (2002) in a study with horticulturists in France was orality, budgets whose calculations were made by heart. Such oral calculation strategies, for Knijnik (2004, p. 233), are "[...] interdicted in school in the name of written algorithms. Orality represents a cognitive operation adapted to the practical needs of subjects, whose techniques of measurement and calculation owe nothing to the formal system (Weber, 2002). Thus, the abstract conception of calculation is abandoned and native categories of classification and incorporation are verified. Souza (2008, p. 235) points out that, in the school environment, the use of writing also works as a mechanism of legitimation of school mathematical practices, by imposing itself as the only way to mathematize.

In addition to orality and writing, Weber (2002, p. 168) introduces the concept of economic calculus, conceiving it as a way of life, since practical rationality does not always use explicit reasoning, lists of numbers or numerical notes. Many of these ways of mathematizing are unconscious, are made by rules and operate through behavior and strategies. Some reasoning is even automatic, and, as a result, it makes no sense to resort to numerical calculation if there is an effective way of economic calculation to minimize expenses and estimate budgets, for example.

Weber's writings (2002) contribute to the problematization that has been carried out in relation to the supremacy of writing and help to understand that there are other ways of mathematizing and that they depend on a context, a social scene that only makes sense for those who are inserted in it. Some cultural groups, for example, use neither writing nor counting or numerical calculation, but use techniques of ordering and classifying categories that allow the inference of certain expenses. However, such techniques and practices are not legitimized because they do not use the rules of academic Mathematics and are often not even seen as Mathematics.

This practical bias of Mathematics has numerical and strategic meanings, as Weber (2011) points out. It orientates business, buys inputs, reinvests in other crops, as mentioned before. Such experiences are not experienced by a single individual, but by a network of people who are linked to each other (Disconsi, 2020).

Economic practices adopted by native people are embedded with opinions, exchanges and information sharing. Weber (2002) calls them self-control practices, since they manifest

themselves in subjects' lives in various ways, through rationalities common to people who adopt logic, estimates, implicit calculations and use orality to make calculations.

Therefore, based on our previous note, both mathematical practices are tensioned, since one of them is produced in the urgency of life, in a certain social scene and/or language game that requires activation of orality. The other Mathematics, academic and written Mathematics, meets the demands of the formality of rigor. Such situations may be evidenced when settlers highlight that to make lard, to take care of the business of selling potatoes, and to plant, for example, they need to mathematize in another way, because such situations go beyond school teaching, which is usually based on written Mathematics that is sometimes decontextualized from real situations (Kroetz, 2015).

Final considerations

In contemporary times, several studies have proposed to transpose some practices experienced by different cultural groups in class. Taking Weber's and Wittgenstein's theoretical contributions as our basis, we would like to point out some relevant aspects.

It is noticeable in daily school life and curriculum programs that written pedagogical practices are more common than oral ones. Different ways of organizing data, relating objects, measuring and estimating, for example, are not considered valid. If we analyze current ME, it is easily perceived that there is no room for oral practices in the school environment, a fact that shows that what is written always has more value than what is said.

According to Souza (2008), the discourse of a single possible Mathematics is put into circulation by many subjects that participate in the field of education, such as students, parents, teachers, public authorities, managers and the community in general. Constant use of writing in schools makes it be seen as the only way to teach. Formal, abstract and written Mathematics, commonly marked by written practices and armed Mathematics, does not take into consideration certain knowledge that uses orality.

Thus, we suggest that Mathematics should be viewed differently, as something that transcends exact calculations and may be found in the ways of knowing and doing of different cultures, rather than as a hard science. Strategies that diverge from those imposed by school could be taken into consideration to enable the creation of other ways of mathematizing that may be silent.

By showing the existence of different ways of mathematizing, such as organizations, techniques and estimates of different cultural groups, we highlight the need to reflect on

calculus not only as something formal, an abstract conception, because there are categories of classification and incorporation that make sense in some social scenes. Conceiving Mathematics as capable of being produced in different social scenes may constitute one of the directions of ME since written, formal and mechanical practices, for example, have still being used in schools and produce subjectivities that legitimize only one way of mathematizing.

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