
A Derridean Critical Contribution to Social Theories in Mathematics Education Research

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In “Whither social theory?”, Pais and Valero (2014, p. 246) considered that social theories in mathematics education research leave “mathematics untouched and outside the possibility of being deconstructed”. In this paper, I discuss this claim from a philosophical point of view. My theoretical reference is the work of Derrida.

A New Question for Social Theory in Mathematics Education?

In “Whither social theory?” (Pais & Valero, 2014), one can read two fundamental critiques to social theory in mathematics education: (a) that not taking “research itself as a social structure that provides ways of thinking and doing the teaching and learning of mathematics in schools” (p. 244), researchers disavow “a critical reading of their own role and of the research they produce in the problems they identify” (p. 244); and (b):

... there is a strong limitation in the use of sociological theory when researchers still behave as uncritical ambassadors of mathematics. To leave mathematics untouched and outside of the possibility of being criticized and deconstructed is creating a limit to our understanding. (p. 246)

Both critiques indeed make together the kernel of my doctoral thesis (Batarce, 2011). They appear in Chapter 2 under the title “The limits of mathematics educators’ critiques to mathematicians”. Also, part of my effort in the same chapter is to show how the two critiques

are linked. The issues have also been partially framed in Mattos and Batarce (2010).

I have presented the second critique from a Derridean perspective and therefore in a very philosophical way. After the paper of Pais and Valero's, my considerations might be of interest to a critical philosophy of social theory in mathematics education. My claim is that mathematics education research's adherence to "mathematics" is much deeper rooted than one seems to realize and it is, after all, an adherence to a metaphysical tradition of knowledge.

The Meaning of Mathematics: An Old Question in Mathematics Education Research

If one were to review every paper, chapter, or book in the mathematics education literature that includes any reference to discussions about the meaning of "mathematics", one would probably gain a good understanding of the production of mathematics education research as a whole. If one wanted to look at this question through the historical developmental lens of mathematics education research then the reviewer would have a wealth of historical material to follow. Names and classical texts such as Freudenthal (1978), Davis and Hersh (1980) and Ernest (1993) became pertinent and influential, in part, through their approach to this theme. Could not the same be said in respect of developments such as ethnomathematics, for example, where challenging the concept of "mathematics" appears to be at the heart of the program?

In recent years, the theme of the meaning of mathematics still influences a wide range of trends in mathematics education research. A good example of this is "the professional formation of teachers" as it was named in the Symposium on the occasion of the 100th Anniversary of ICMI in 2008. Drawing on Shulman's notion of pedagogical content knowledge, Deborah Ball became a leader amongst those who ultimately attempted to delineate a "pure" content knowledge for mathematics teaching that differed from that afforded by mathematicians' mathematics.

Coincidentally, the theme of PME (2006) was "Mathematics at the Centre".

The theme of this year's PME conference is Mathematics at the Centre. This theme is chosen with the intention of going back to the roots... at the heart of every effort to make mathematics teaching comprehensive, useful, interesting and thrilling must be mathematics itself and this is not to be neglected... We believe ... that many of us share this concern for mathematics (Novotná, 2006, p. 1_liv)

But this theme appears to have caused discomfort inside the Conference itself. Romulo Lins (2006) led a plenary panel with the theme "A Centre and a Mathematics" and his words certainly did not completely mirror those of the welcoming Conference address. He asked whether mathematics was at the core of our root system or whether it had been relocated to the centre of mathematics education, hence becoming our last line of defence.

...having being absent from PMEs for a while, I couldn't help but consider the possibility that, given the theme of this 2006 conference, "Mathematics in the centre", this might be our last trench: mathematics. After 17 years—and I am not counting what might have happened before I join PME community—the inner centre seemed to have been moved to "mathematics" (p. 1/67)

The Word "Mathematics"

But after long meditations, one may consider that, mathematics, first of all, is nothing more than a word. Or, it cannot be anything if there is not the word. Here and there, mathematics education researchers have scratched this conclusion.

In the same PME paper quoted above, Lins visibly mistrusts the word "mathematics".

... the very word "mathematics" is something that, in our western or westernised cultures, floats above all of us, better, it fills, in a sense, some cultural "air" we are immersed in, something whose presence does not depend on the mention of any specific content or area. (p. 1/68)

This strange power of confusing the senses appropriated by the word “mathematics” would become more apparent when the constituent parts are read within the term “mathematics education”. It is almost as if “mathematics” failed to refer to the body that is “mathematics” at all!

When Susie’s paper mentions a keen interest in what she calls “subject cultures”, I think she is precisely acknowledging that there is a sense in which “mathematics” in “mathematics education” does not need to mean a reference to specific topics and the teaching and learning of those topics, although it may, of course, be meant in this way. (p. 1/68)

But none presented the question as straightforwardly and clearly as Anna Sfard (1998) did. She appears also to have grasped a question, which seems to be fundamental as a basis for mathematics education’s critiques of mathematicians: “If a mathematics educator studies mathematics is it the same object for him or her as it is for a mathematician who studies mathematics?” (p. 491).

Not by chance, that same issue, the reduction of “mathematics” to a word will upset Sfard’s analysis of an irreducible difference between mathematicians and mathematics educators. She was aware that the issue lies in the question:

To what meaning of the word “mathematics” do people subscribe when they identify themselves as researchers in the field of mathematics education? (Sfard, 1998, p. 495)

If, on the one hand, she seems to cast doubt on the possibility of concealing this difference with respect to the concept of “mathematics”:

Moreover, it seems that trying to fill in the gap in an attempt to make the two mathematics into one would be pointless. (p. 505)

... she appears, at the same time, to trust in an objectivity of “it”, beyond differences, as a word:

It seems that the first step necessary ... is to clarify what the word “mathematics” means to them [mathematics educators] in relation to what it means to mathematicians. (p. 492)

... and everything is based on the premise that the word “mathematics” is not a unit. Could it be possible to write an irreducible difference of meanings but yet maintain identical features of their referents? Perhaps, but only with a trick of writing: the use of hyphens.

That the Typical-Mathematician’s-mathematics and the mathematics-education-mathematics come to be worlds apart seems undeniable. (p. 505)

Wittman attempted another example, where instead of hyphens, he played with capital letters:

I suggest the use of capital letters to describe MATHEMATICS as mathematical work in the broadest sense; this includes mathematics developed and used in science (Wittmann, 1998, p. 90)

One may suggest that the existence of a plurality of meaning for “mathematics” supports, in general, the arguments of mathematics educators against mathematicians. That is, the possibility of many facets of mathematics, as promulgated by Sfard in her chapter “The many faces of mathematics: Do mathematicians and researchers in mathematics education speak about the same thing?” (1998); the difference between academic mathematics and street mathematics, as developed by Terezinha Nunes; the form of mathematics in different cultures and D’Ambrosio’s program on ethnomathematics; Alan Bishop’s on anthropology; the postmodern approaches and the concept of mathematics constructed through discourses; the different epistemology of mathematics in Paul Ernest; or even the most traditional psychology of mathematics education and Begle’s concept of mathematical behaviour. It follows that the essence of the meaning of mathematics is held in mathematics education itself. Conversely, the very difference between the word “mathematics” and its meanings, in its plurality, is bound to a tradition of metaphysics, which appears to limit the effectiveness of the critiques of mathematics education practitioners.

But to these metaphysico-theological roots many other hidden sediments cling. The semiological or, more specifically, linguistic “science” cannot therefore hold on to the difference between

signifier and signified—the very idea of the sign—without the difference between sensible and intelligible, certainly, but also not without retaining, more profoundly and more implicitly, and by the same token the reference to a signified able to “take place” in its intelligibility, before its “fall,” before any expulsion into the exteriority of the sensible here below. As the face of pure intelligibility, it refers to an absolute logos to which it is immediately united. This absolute logos was an infinite creative subjectivity in medieval theology: the intelligible face of the sign remains turned toward the word and the face of God. (Derrida, 1976, p. 13)

In fact, one might suggest that a criticism of mathematicians’ idealism of mathematics will only be accomplished through the elimination of those sediments referred by Derrida. In this paper, I do not intend to exam this suggestion in depth. Rather, I intend only to provide the bases whereby a critique might be developed. In order to do so, I shall now return to Derrida and his discussions about word, writing, signifier and signified

Mathematicians and Mathematics Educators as Unities of Consciousness

The first question to be raised following the previous sections is: “What is a ‘word?’” But this question does not have a straightforward answer and rather than being a simple enquiry, the question itself may entail a response. It is in this way that Derrida refers to Saussure’s project:

The form of the question to which he [Saussure] responded thus entailed the response. It was a matter of knowing what sort of word is the object of linguistics and what the relationships are between the atomic unities that are the written and the spoken word. Now the word (*vox*) is already a unity of sense and sound, of concept and voice, or, to speak a more rigorously Saussurian language, of the signified and the signifier. This last terminology was moreover first proposed in the domain of spoken language

alone, of linguistic in the narrow sense and not in the domain of semiology (“I propose to retain the word sign [signe] to designate the whole and to replace concept and sound-image respectively by signified [signifié] and signifier [signifiant]” p. 99 [p.67]). The word is thus already a constituted unity, an effect of “the somewhat mysterious fact ... that ‘thought-sound’ implies divisions” (p. 156) [p. 112]. Even if the word is in its turn articulated, even if it implies other divisions, as long as one poses the question of the relationships between speech and writing in the light of the indivisible units of the “thought-sound,” there will always be the ready response. Writing will be “phonetic,” it will be the outside, the exterior representation of language and this “thought-sound.” It must necessarily operate from already constituted units of signification, in the formation of which it has played no part. (Derrida, 1976, italics in the original, p. 31)

As recognised by Derrida, Saussure’s project entails a notion of a word or sign which “primordially” refers to the spoken-word. That is, the signifier has a phonetic nature. The following passage from Saussure, as quoted by Derrida, illustrates this: “The linguistic object is not defined by the combination of the written word and the spoken word: *the spoken form alone constitutes the object.*” (Saussure in Derrida (1976), p. 31, Derrida’s italics). This “privilege” of voice over writing, which is at the very heart of Derrida’s critique, is not only a result of Saussure’s project but it also refers more overarchingly to the concept of sign in the western tradition, a tradition that has always placed the concept of phonè above that of writing:

Language and writing are two distinct systems of signs; the second exists for the sole purpose of representing the first. (Saussure in Derrida, Derrida’s italics p. 30)

It is this very fact that writing is considered to be subordinate to language that Derrida will explore when confronting Grammatology and Linguistics. He will challenge the notion of presence as an aspect imperative to the constitution of a science of language, with the concept of writing. While the presence of the speaker seems to be essential to speech, writing disseminates without the presence of its author. The notion of presence which Derrida confronts is the idea of

consciousness and authorship as a full diktat of meaning. The absence, as an essential feature of writing, challenges this full diktat of meaning. Let us, at this point, revisit the question as it appeared framed by Anna Sfard.

It seems that the first step necessary ... is to clarify what the word “mathematics” means to them [mathematics educators] in relation to what it means to mathematicians. (p. 492)

For Sfard, the two subjects, mathematicians and mathematics educators, appear to be the guarantors to the meanings of the word “mathematics” in each case. The differences of meanings are posterior to the subjects already represented. Their presence represents therefore the consciousness (of a community or the like) of a completed meaning (we might say “understanding”) in each case for the word “mathematics”.

The scenario in which Sfard’s arguments appears to emerge would be a particular time when mathematicians and mathematics educators have not yet confronted their divergent meanings for the word “mathematics”. Each cohort, as independent subjects with their own history, consciousness, and knowledge has independently constructed their own meaning for this word. Sfard’s arguments appear exactly at the time when these opposing meanings could be fruitfully and vigorously explored and debated to eliminate the almost inevitable misconceptions arising from such autonomous positions behind held.

But, what about if mathematics educators’ concept of mathematics gains its actual meaning already and only in relation to mathematicians’ meaning of mathematics and vice versa? That is, if each meaning for mathematics was constituted exactly and only at the point of their differences? And the subjects mathematicians and mathematics educators (the consciousness, history and so on of each) are constituted not beforehand the meaning that each one assigns to “mathematics” but on the contrary, the subjects are constituted in their relation to the meanings of mathematics. From this point of view there cannot be a third and impartial position which, looking from above, could see the differences and establish fairly (above the two positions) the correct relation and alliance between the two. Instead, in principle, the differences and the constitution of the subjects (mathematicians and mathematics educators) was the outcome of their differences.

What is Written Here, “Mathematics”?

In Habermas’s (1987) critique of Derrida we read:

[For Derrida] writing makes what is said independent from the mind of the author, from the breath of the audience, as well as from the presence of the objects under discussion. The medium of writing lends the text a stony autonomy in relation to all living context. It extinguishes the concrete connections with individual subjects and determines situations, and yet the text still retains its readability. Writing guarantees that a text can always repeatedly be read in arbitrarily changing contexts. What fascinates Derrida is this thought of absolute readability. (p. 166)

Setting aside the fact that Habermas appears to overlook the possibility that Derrida’s project attempts to affect the meaning of “be said”, he is correct in affirming that Derrida insists on the necessity for the concept of writing not to be attached to an individual subject or any determined situation. This very motive appears constantly in Derrida and is the very theme developed in “Signature Event Context”:

...a written sign carries with it a force that breaks with its context, that is, with the collectivity of presences organizing the moment of its inscription. This breaking force [force de rupture] is not an accidental predicate but the very structure of the written text. (Derrida, 1988, p. 9)

Notably, Žižek, however, interprets Derrida completely to the contrary of what Habermas says. While Habermas critiques Derrida for his ideas of writing—for it “extinguishes the concrete connections with individual subjects [what one says or intends to say, to use Žižek’s words] and determined situations, and yet the text still retains its readability [effectively written]”. Žižek, on the other hand, suggests that, in Derrida’s work, it would be possible to measure the coincidence or not of what one intends to say and what is effectively said. That is for him the very distinction between Derrida and Lacan; in Derrida, he states that the text is tied:

...every text, however metaphysical, always produces gaps which

announce breaches in the metaphysical circle: the points at which textual process subverts what its “author” intended to say (Zizek, 1989, p. 154).

Indeed, if one considers that Derrida is constantly reminding us that “Writing is read; it is not the site, ‘in the last instance,’ of a hermeneutic deciphering, the decoding of a meaning or truth” (Derrida, 1988, p. 21) one can see that Habermas’s point is much closer to Derrida than Zizek’s. Consequently, one can posit that the conclusion which Zizek arrives at regarding the distinction between Lacan and Derrida is incorrect:

In Seminar XI he [Lacan] begins one of his sentences: ‘But this is precisely what I want to say and what I am saying – because what I want to say is what I am saying...’ In a post-structuralist reading, such phrases prove that Lacan still wants to retain the position of Master: ‘saying what I want to say’ lays claim to a coincidence between what we intend to say and what we are effectively saying—is not this coincidence which defines the illusion of the Master? Is Lacan not proceeding as if his own text is exempt from the gap between what is said and what he intended to say? Is he not claiming that he can dominate the signifying effect of his text? In Lacanian perspective it is, on the contrary, precisely such ‘impossible’ utterance—utterance following the logic of the paradox ‘I am lying’—which keep the fundamental gap of the signifying process open and in this way prevent us from assuming a metalanguage position. (Zizek, 1989, p. 156)

In fact, contrary to Zizek’s analysis, Derrida’s line of thought does not challenge “the coincidence between what we intend to say and what we are effectively saying” but as Habermas realised, Derrida takes it much further:

Inasmuch as Derrida replaces grammar as the science of language with grammatology as the science of writing, he intends to make the basic insight of structuralism even more pointed. (Habermas, 1987, p. 166)

Derrida (1976) brought attention to this point himself in “Of

Grammatology”:

It has sometimes been contested that speech clothed thought. Husserl, Saussure, Lavelle have all questioned it. But has it ever been doubted that writing was the clothing of speech? For Saussure it is even a garment of perversion and debauchery, a dress of corruption and disguise, a festival mask that must be exorcised, that is to say warded off, by the good word: ‘Writing veils the appearance of language; it is not a guise for language but a disguise’ (p. 51) [p.30] (Derrida, 1976, p. 35)

It is in the very sense of an “impossible” utterance, as suggested by Zizek when referring to Lacan, that one can recall Derrida’s “absolute readability” as claimed by Habermas. In Derrida, the “impossible” utterance would be translated into “what one is reading is not actually what is written”, or in paraphrasing Zizek: “the text is lying”. That interpretation is impossible for Derrida. If Lacan claims that “what I want to say is what I am saying”, Derrida would retort: “what one reads is what is written”.

One should recall that, independently of Derrida’s concept of writing, the common perception of writing actually allows for a notion of absolute readability. It is the common notion of writing that says that, although different meanings may be granted for a text, the printed text itself never deviates. In other words, if one person reads a text and gives “it” to another person to read, both can be free to disagree about its meaning but they will be in no doubt that it is absolutely the same text. This line of reasoning follows Saussure’s distinction between signified and signifier, as I have mentioned in the previous sections.

It was in this sense that the two mathematics; the mathematicians’ mathematics and the mathematics educators’ mathematics, although they may differ in terms of meaning, are always identical in phonetic terms. That is, this same force, when it frees itself from the concept of the word “mathematics,” ultimately depends upon the idea of the “shape” of a word or the phonetic component of that word—Saussure’s concept of “signifier”. It is in this very locus that, I suggest, there remains a pure, a priori, and firm core of mathematics for mathematics educators.

Following Habermas’s tenet in the notion of absolute readability one could ask: “Does not Derrida’s concept of writing imply that

mathematics is always mathematics?” I shall answer this by saying both “Yes” and “No”. Here Žižek’s position regarding Lacan is very welcome and, as I have suggested, in Derrida it is more pointed than Lacan’s “I am saying what I want to say”. If what I am reading (interpreting and understanding) in a book is exactly the content of the book (absolute readability for Derrida) it means that if I read it again tomorrow and read “there” another “meaning”, as this “new” meaning it is always what is indeed written in the book (absolute readability in Derrida’s sense) and it implies that the same book in the most extreme, radical, and literal way possible is always really another book. It is as if the book with its printed mark and identifiers was always literally “re-written”. What Žižek has postulated about Lacan rings even more true with Derrida. That is, the fact that for Derrida writing is read, or what Habermas calls Derrida’s “absolute readability”, maintains “the fundamental gap of the signifying process open [and] in this way [it] prevent[s] us from assuming a metalanguage position”. Derrida’s formula here is that “fundamentally nothing escapes the movement of the signifier”.

Using Derridean concepts, since the difference between the “two” mathematics is readable, it is also therefore written. It is not the interpretation of writing but it is the writing itself. In other words, as long as one continues reading it, it is indeed written there. However this difference does not imply the impossibility of equality. One may argue that both “mathematics” are identical but it depends a priori on the existence of two separate connotations rather than just one. The very point is that the difference is always situated prior to any notion of equality.

The simple implication which one can observe here is that the unity of mathematics’ meaning never existed. Whenever one writes “it” again, one writes another thing. Whenever one reads “it” again, one reads another thing. At this point let me bring again Lins’s statement that “ ‘mathematics’ in ‘mathematics education’ does not need to mean a reference to specific topics” (Lins, 2006, p. 1/68). If one can read a non-reference it is because it is written.

It is at this point that any commensurability a priori between the mathematics of mathematicians and mathematics educators’ mathematics must be totally eradicated. The mathematics of mathematics educators’ is not more or less cultural or social a priori than the mathematics of mathematicians. Whilst the “logic of the word” highlights

certain commensurability; the sameness as the principal of repetition; the sameness in the different occurrences of the same word, Derrida introduces a new logic for writing; the logic of dissemination. For Derrida, writing is never the representation of a truthful event located in time and space or the code of true meaning, and this capability of not being anchored to a meaning, an event or whatever, is the essence of dissemination. In fact, it is against the logic of a “word” and all that it presupposes (form, shape, unit, noun, appellations etc.) that Derrida writes:

Nonphonetic writing breaks the noun apart ... The noun and the word, those unities of the breath and concept, are effaced within pure writing (Derrida, 1976, p. 26)

The meaning of “mathematics” and the word “mathematics” (even the quotation marks are unhelpful here) are not crucially different for Derrida, since meaning is always situated in the position of a signifier. The meaning “mathematics” has no value before or after its “written form”—either mathematics or mathematics (education). However, if, on the one hand, Derrida’s concept of writing may accomplish the very object of mathematics education’s critiques of mathematicians, on the other hand it also challenges the purity of a concept of mathematics education and therefore the rationale of a project enclosed within the supposed boundaries of a pure domain of research. It is this paradox that, perhaps, persuades the reader of the appropriateness of the scope and consequences of this paper.

No community, no science, no research domain, no political position, whether in their ontological or epistemological boundaries buried in cultural spaces, dominates “mathematics” if this is to be understood as writing using the Derridean concept of writing. For the same reason, Derrida’s concept of writing does not attempt to correct those ontological unities and discover another essential meaning to mathematics education. By contrast, it attempts to disable all of them before or after they are written. The meaning of “mathematics” is neither affixed after nor before the text “mathematics (education)”. That is the simple statement which Derrida encourages us to accept.

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