

A view on Mathematics Education from the perspective of Wittgenstein.

During the twentieth century, a discussion emphasizing the change of the role assigned to language was established. In addition to the inauguration of a language science – Linguistics - other fields, Philosophy in special, began to advocate that language should not be seen as a simple means to translate or express thoughts. Yet, it must be conceived as an instrument for the constitution of ideas themselves, being language the very condition for our thought. Philosophers contributed in a relevant manner to this movement of change, known as *Linguistic Turn*. Among them, we can mention Wittgenstein.

Austrian philosopher, Ludwig J. J. Wittgenstein (1889-1951), whose intellectual trajectory was marked by a work published during his life and other posthumous works, reveals concerns and occupations with the philosophy of language in general, and more specifically, with the mathematical language.

Wittgenstein's writings indicate – and many of his interpreters dedicate exactly to this aspect of his trajectory – that, between his work *Tractatus Logico-Philosophicus*, published within his life, and the posthumous *Philosophical Investigations*, there is a profound change in his conceptions regarding the philosophy of language.

Initially inspired by the works of Friedrich Ludwig Gottlob (1848-1925), a German mathematician, logical and philosopher, the Wittgenstein found in the *Tractatus* puts himself in a place where language is a denotation whose function is to represent the world, revealing an essentialist and referential conception of language, which indicate that saying something is to describe something. Nevertheless, in the early 1930s, Wittgenstein begins to notice that language can not be reduced to a mere instrument of description and representation. So it is that, in *Philosophical Investigations*, he argues that language establishes processes of action and transformation, gaining expression as an object of knowledge.

In this second phase, Wittgenstein understands that word meanings are not definitely fixed in the things. The meanings of words are their use within the language, and they are likely to variation. Such perspective undertakes the point of view that meanings are constituted and transformed while used in different contexts. In this sense, they may vary according to the *language-game* they participate in, or else according to the discursive universe in practice.

Particularly in his reflections on the foundations of mathematics, Wittgenstein suggests us to see mathematical propositions as *rules* to be followed, associated to procedures and techniques of a conventional nature, considering our *forms of life*.

This Wittgensteinian perspective of language on mathematics has been discussed by professors/researchers in the field of Mathematics Education in Brazil, especially from the first decade of the twenty-first century.

Considering the conceptions and discussions that permeate the Brazilian research under this theme, we invited authors to publish articles for this thematic issue: *A view on Mathematics Education from the perspective of Wittgenstein*. In this perspective, The International Journal for Research in Mathematics Education - RIPEM publishes its second special edition.

This edition is composed by eight articles that furnish us with knowledge, perspectives and instigations on Wittgenstein's philosophy within the Mathematical Education.

The article *Is the mathematics education a problem for the school or is the school a problem for the mathematics education?* was written by Antonio Miguel. The author establishes a dialog between the unsystematic and post-epistemological manner in which Ludwig Wittgenstein talks about language, meaning, mathematics and learning, and the investigative studies on cognition and situated learning, conducted by Jean Lave. Stating that there is not only a single way for mathematics to be present in the school, he proposes that a positive way in which the Wittgensteinian perspective helps is to take it seriously the understanding that the non-transference of learning processes consists in broadening the meanings of the word *mathematics*, opening it to forms of life who are different from those of the professional mathematicians.

Cristiane Gottschalk's article draws an argumentation line that, to a certain extent, opposes the different new school tendencies that have emphasized educational practices centered on the pupil's activity. In the text *Educational implications of some of Wittgenstein's remarks on mathematics: proposition, inference and proof*, the author relies on some of Wittgenstein's remarks over the nature of mathematics, particularly those published in *Philosophical Remarks*. Starting from the idea that mathematical propositions have a normative function, she defends that learning mathematics involves essentially training, a process in which the student forms an accepted rationality among many other effective and possible ones.

Teaching and learning mathematics from the perspective of the philosophy of language, especially Wittgenstein's, is the approach in some of the articles in this thematic edition.

Accordingly, the article *Mathematics and Language: perspectives of Wittgenstein's philosophy for Math Education*, by Marisa R. A. Silveira, considers that the interpretation of mathematical rules, linked to the contexts where they are inserted, can find many senses, because we do not find the logical necessity that is part of the self-movement of mathematics in the application of mathematics in empirical situations. Considering that language, mathematics and knowledge form a triad for the student's intellectual enrichment; the author concludes that Mathematics Education is improved when we teach students how to communicate using mathematical knowledge.

Aligned to that is the article *Contributions of the Linguistic Turn to mathematics undergraduate courses: A proposal for supervised training*, by Denise S. Vilela. The author discusses the activities of planning and administration in the supervised training period in mathematics undergraduate courses, based upon the thinking style in Wittgenstein's *Philosophical Investigations*, as well as its non-referential compression of language.

Still, the article *Reverberations of Wittgenstein's philosophy on Mathematical Education*, by Claudia G. Duarte and Leonidas R. Taschetto, problematizes the idea - defended by some - that teaching mathematics in schools must take into account student's reality in the classroom, starting from it as a way to attribute meaning to school mathematics. According to the authors, the language-games in school mathematics and those from social practices are distinct, even if they have family resemblances between themselves. Moving from the language game of a certain form of life into the language-game of another form of life does not guarantee that the meaning is kept.

There are, however, approaches, still dealing with the importance of using real problem situations in school mathematical content, these do not do so with the *transference-of-meaning* perspective to which the authors refer in the previous article.

One of these articles, *Looking at the Students' practice in mathematical modeling activities under a Wittgensteinian perspective*, is the article written by Lourdes M. W. Almeida. In this text, the author intends to highlight the fact that modeling activities are not intended to provide meaning, in the classroom, to objects or concepts that exist in the students' life outside the classroom. Rather than that, she aims to indicate that different meanings are associated to different language-games, which may arise from modeling activities.

In another article, *Some implications of Wittgenstein's idea on the use for learning mathematics through mathematical modeling*, written by Elizabeth G. Souza and Jonei C. Barbosa, the authors reports on a piece of research whose aim was to identify and characterise ways of understanding the process of learning mathematics, from a Wittgensteinian perspective, through mathematical modeling in a school environment. Analysing the discourse of students and a teacher, the authors concluded that learning mathematics through mathematical modeling is characterised by the identification of similarities between the uses for which the words are mobilized in the school environment, and the uses of words suggested by problem situations addressed in mathematics modelling.

Finally, the article *Highly able mathematics learners from a pragmatic perspective of language*, by Karin R. Jelinek and Samuel E.L. Bello, aimed to analyze language games in forms of life of children regarded as high-ability learners, evidencing thus the games that have been valued in school processes of selection and education enhancement.

By organizing this thematic issue, our objective was to gather a group of scholars whose research regarding the wittgensteinian perspective have resound in Mathematical Education, to a certain extent, contributing therefore to the visibility of Wittgenstein's ideas in this context.

Unanimity regarding the understanding of the repercussion to Wittgenstein's ideas on teaching and learning Mathematics was not expected. Contrarily to that, the approaches and perspectives may be different but, underlying each of these, there is concern and commitment by each of the authors regarding the student's mathematical knowing in different school levels.

We shall thank each one of the authors for their invaluable contribution to this special edition. They brought to RIPEM's universe some significant repercussions of Wittgenstein's ideas to Mathematics Education.

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