RIPEM
International Journal for Research in Mathematics Education

Mathematics Education and Wittengenstein: a relationship from years ago

Educação Matemática e Wittengenstein: uma relação de anos

https://doi.org/10.37001/ripem.v12i2.2987

Book review: Peters, Michael. (2020). *Wittgenstein, Education and the Problem of Rationality*. Singapore: Springer Nature.

Maurício Rosa
https://orcid.org/0000-0001-9682-4343
Universidade Federal do Rio Grande do Sul
mauriciomatematica@gmail.com

The International Journal for Research in Mathematics Education (RIPEM), in its volume 4, of 2014, number 2, discussed Mathematics Education through a Wittgensteinian perspective. RIPEM, then, eight years ago brought contributions from this important theorist to the *mise-en-scène* of our research field. The editorial of this issue of RIPEM already identified Wittgenstein's important collaboration in terms of the use of language in Mathematics Education, as Almeida & Flores (2014, p.1) reveal to us:

> 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 do 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 cannot 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 fact shows that the Wittgensteinian perspective of language in mathematics is not new. Especially, in the first years of the 21st century, it occupied the investigative scenario of Brazilian Mathematics Education, serving as a theoretical contribution to a large number of research. Cristiane Gottschalk, who is in the extra edition of RIPEM, that is, volume 12, number 2, of 2022 and who was also in the 2014 edition, already in 2004, dealt with the nature of mathematical knowledge from the perspective of Wittgenstein. In her 2004 article, she points out some misconceptions that a referential conception of mathematical language entails in school teaching. It seeks to clarify the confusions we are led to when we believe that "[...] mathematical propositions can describe empirical reality, or even abstract entities; that reflect the transcendent functioning of the mind or that are the product of a consensual intersubjectivity" (Gottschalk, 2004, p. 305). In other words, it discusses against the philosophical perspective that provokes mistakes in believing in a mathematics that can be "discovered", in the same sense as occur in the empirical sciences, which means the presupposition of a pre-existing mathematical reality to be found.

Also, Antônio Miguel in 2010, together with Denise Vilela and Anna Moura, wrote about strategies that could make viable and give visibility to a transgressive perspective of school educational action, which is based on a deconstructive political ethics and that is developed through practices of cultural problematization. That is, to put mathematics in suspicion as a school subject, as well as to deconstruct the very conception of school education that assumes as a premise the transmission or individual appropriation of disciplinary knowledge. The authors were inspired by the trail suggested by Wittgenstein that learning is learning to see in different ways, and they produce an initial meaning for the practice of deconstructing school education. Thus, Miguel & Vilela & Moura (2010, p.198) reveal that Wittgenstein's conception of learning is "[...] a symbolic-discursive conception of learning as enlightenment". Nevertheless, Antonio Miguel is another researcher who writes for this issue of RIPEM (v.12, n.2, 2022) and who was also in issue number 2 of 2014.

Both Cristiane Gottschalk and Antonio Miguel are examples of Brazilian researchers who are dedicated to studying Wittgenstein to support their research in Mathematics Education, among many others. Therefore, this Extra Edition of RIPEM (v. 12, n. 2, 2022) returns to this important theorist properly. However, this time, with something new. We inaugurated in this journal the peer review of a book, in addition to bringing the articles in a continuous flow. In this case, we deal with the review of the book by Michael Peters entitled "*Wittgenstein, Education and the Problem of Rationality".*

This book was published in 2020 and discusses a historicist and non-foundationalist notion of rationality, through Wittgenstein's interpretation. The book discusses a universal conception as opposed to a constitutive conception and the meaning for educational theory. Under a twist, rationality is understood both historically and culturally, aiming to replace the universal conception of rationality.

Therefore, Brazilian researchers read the book and wrote about it. In a second moment, the author of the book, Michael Peters, read the criticisms and ideas developed by these researchers from reading his work and wrote a response to each of the articles. Consequently, we had six scientific discussion articles about the book "*Wittgenstein, Education and the Problem of Rationality*".

Firstly, we have the article by Mauro Lúcio Leitão Condé entitled "*Wittgenstein and the Continental Turn*", which reveals that the book establishes a Wittgensteinian reading of educational philosophical problems and presents a complex architecture, in addition to being a kaleidoscope of authors from different fields and philosophical traditions. In his response,

Michael Peters writes "*A Viennese Wittgenstein? A response to Mauro Lúcio Leitão Condé*" in order to reveal that his process of reading Wittgenstein or any philosopher, opposing ideas through others, is part of the language game of philosophy and often brings benefits in terms of understanding.

Subsequently, the article by Cristiane Gottschalk, on Petters' book, is entitled "*Unfounded Foundations, Grammatical Relativism and Wittgenstein, the Educator*" and deals with a critical review of the book, focusing on Wittgenstein's supposed relativism and anti-foundationalism, in his status as the main representative of analytic philosophy and in the absence of discussion, in the book, of the publication of Wittgenstein's spelling dictionary in 1926. The author argues that the phase of Wittgenstein's life in this period as an educator was intrinsically linked to the philosopher, leading to him to an intermediate position between relativism and dogmatism. Michael Peters then writes "*Wittgenstein's Antifoundationalism: a response to Cristiane Maria Cornelia Gottschalk*" to assert that one is always indebted to those who take their work seriously and engage in serious disputes over readings and arguments. For Petters, Cristiane Gottschalk advances in three aspects of disagreement: (i) the appropriation of Wittgenstein's philosophy by analytic philosophers of education; (ii) the status of Wittgenstein's spelling dictionary; and (iii) Wittgenstein's anti-foundationalism. Thus, he discusses and presents his arguments on the three arguments in his text.

Continuing, João José R. L. de Almeida, Antonio Miguel, Carolina Tamayo and Elizabeth Gomes Souza present the article "*Quid Est Ergo Rationalitas? Review of Michael Peters' Wittgenstein, Education and the Problem of Rationality*", in which they evidence their analysis of Peters' book through a conversation between four characters: Oninitibeci, Iniwataale, Iniwatadigini, and Gobaagadi. The names of these characters correspond, respectively, to the numbers one, two, three and four ("our hand") in the Kadiwéu language, spoken by an indigenous group in the state of Mato Grosso do Sul, in Brazil. The characters have practice in teaching mathematics or philosophy and often discuss educational issues in the light of Wittgenstein's texts, which allows the analysis of Peters' book, sometimes agreeing and sometimes disagreeing with each other. Thus, from this debate, emerges the conclusion of the importance of the book and its decisive contribution to the decolonial discussions, about Wittgenstein and his role in the philosophy of education. Michael Peters responds to them with the text "*Rationality is the activity of the most robust imagination (with apologies to Wallace Stevens): João José R. L. de Almeida, Antonio Miguel, Carolina Tamayo, Elizabeth Gomes Souza*", in which he reveals that the review by the authors "[...] sparkles like a bright navigation star at night". That is, Peters presents his admiration for the collective review and affirms his interest in writings of this type. He refers to the Kadiweu indigenous language of Brazil and affirms that it is a real innovation that signals the Wittgensteinian depth and one of the broad consequences of taking his thought to Really. Nevertheless, he is impressed with the writing of the article because, as he says, "[…] it is like a quartet put to music with spontaneous voices, though independent from one another, drawing out some of the consequences of my interpretation of Wittgenstein for decolonial discourse". Peters' admiration is revealed as he is impressed by the complexity and cultural artifact that presents itself as something more than a review, expanding the genre and focusing the content on important pedagogical issues between internal agreements and disagreements. Peters, then, dialogues with the four authors to discuss the criticisms presented.

Thus, in this edition, the RIPEM journal inaugurates this format of scientific discussion, with a high degree of scientific quality, promoting new questions, new criticisms and new debates through these articles, committing to ethics and to individual and collective respect. Therefore, we are pleased to present this debate.

Consequently, we move on to the continuous flow articles that make up this issue. The first general article is by Jennifer Cribbs - Oklahoma State University, Janet Tassell - Western Kentucky University, Zahra Hazari - Florida International University, Philip M. Sadler - Harvard University and Gerhard Sonnert - Harvard University. These North American researchers carry out a survey of 131 university students analyzing changes in mathematical identity over time, as well as experiences with mathematics that may be related to the development of mathematical identity. Open-ended responses were also analyzed using a phenomenological approach to examine experiences and beliefs about mathematics. The results indicate that the mathematical identity, reported by the students, is a stable measure over time. For most participants, it is possible to become a "math person" while also believing that mathematics is an innate ability.

The second general article and eighth article of this issue, we have the article by Marcelo Almeida Bairral from UFRRJ and Alexandre Rodrigues de Assis from SEEDUC/RJ. Their research investigates high school students' understanding of isometry (symmetry, rotation and translation) using a dynamic geometry touchscreen (DGEwT) environment. The analysis was based mainly on geometric reasoning, applying ideas of reflective symmetry, using procedures based on straight lines and performing simultaneous touches on the screen. In this way, they reveal that the students achieved the composition of the rotation and translation movement in a natural and synchronous way. The study highlighted the relevance of isometrics in the school curriculum and teacher training.

The ninth article of this issue, authored by Renata Teófilo de Sousa, Francisco Régis Vieira Alves and Italândia Ferreira de Azevedo, all from the Federal Institute of Education, Science and Technology of Ceará. It deals with the epistemic conceptions of mathematics teachers in initial eduaction based on their actions and strategies to solve a problem situation involving parables. The methodology used in this study was Didactic Engineering, in its four phases - preliminary analyses, conception and a priori analysis, experimentation and a posteriori analysis and validation - in which students built the structure of a car headlight using the content of parabolas in a geometric perspective with GeoGebra software. The results indicate the need to understand the parabola beyond a curve that represents the graph of a quadratic function, in order to have a greater study of the properties and applications of the parabola.

The RIPEM journal opens space for the innovation of academic discussion, maintaining the publication of scientific articles focused on research in Mathematics Education. So, we are happy and await criticisms of this issue, suggestions, and new proposals for editions of the "Book Rewiew" and/or other dossiers.

Referências

Almeida, L. M. W. de, & Flores, C. R. (2018). Editorial: A view on Mathematics Education from the perspective of Wittgenstein. Revista Internacional De Pesquisa Em Educação Matemática, 4(2). Recuperado de http://sbem.iuri0094.hospedagemdesites.ws/revista/index.php/ripem/article/view/1150

Gottschalk, C. (2004). A Natureza do Conhecimento Matemático sob a Perspectiva de Wittgenstein: algumas implicações educacionais. *Cad. Hist. Fil. Ci*., Campinas, Série 3, 14 (2), 305-334, jul.-dez. https://www.researchgate.net/profile/Cristiane-Gottschalk/publication/267833439_A_Natureza_do_Conhecimento_Matematico_sob_a_Perspectiva_de_Wittgenstein_algumas_implicacoes_educacionais/links/5759465608ae9a9c954ebbef/A-Natureza-do-Conhecimento-Matematico-sob-a-Perspectiva-de-Wittgenstein-algumas-implicacoes-educacionais.pdf

Miguel, A. & Vilela, D. S. & Moura, A. R. L. de (2010). Desconstruindo a matemática escolar sob uma perspectiva pós-metafísica de educação. *Zetétike*. Unicamp (FE), 18, Número Temático. https://www.redalyc.org/pdf/2912/291221859002.pdf