

## EDITORIAL

This thematic issue features articles that attest to a substantial qualitative advancement in the treatment of themes pertaining to the Philosophy of Mathematics Education. An initial exploration into these subject uncovers a framework that facilitates a robust spectrum of investigation—namely, the Philosophy of Mathematics Education. This field emphasizes the need for a clear interpretation of the discipline being taught—Mathematics—while also addressing epistemological and anthropological concerns related to the qualifications for teaching and educational practices.

Philosophy of Mathematics Education is not merely a subject of application but a domain of philosophical study, conceptualized as a *regional ontology* that aims to comprehend the educational phenomena in its interface with mathematics and human education. In discussing this area of study as a regional ontology, we are not limited to the Husserlian phenomenological viewpoint but rather addressing a more expansive interpretation of ontology as the philosophical endeavor to elucidate the modes of being associated with educational-mathematical reality. This region witnesses the convergence of several philosophical traditions in their quest to comprehend Mathematics as both a domain of knowledge and a realm of human experience.

This reflection is brought up in the first article published, written by one of our guest authors – Professor Angela Ales Bello – who, based on Husserl's work, highlights how mathematics is configured both in the pre-categorical and categorical planes. Ales Bello focuses on the matter of mathematics instruction in elementary, high school, and college settings, urging educators to contemplate the Husserlian interpretation of mathematics in order to correlate teaching with students' learning capacities. She asserts that this implies an understanding of gnoseological and anthropological matters related to individual development. Furthermore, she introduces ways that can enhance the acquisition of mathematical knowledge, which, in her view, necessitates specific abstract reasoning abilities.

The second guest author – Professor Anna Maria Pezzella – offers readers a phenomenological analysis of the educational event in this edition, drawing upon the writings of E. Husserl, E. Stein, and P. Bertolini. She highlights the efficacy of phenomenological philosophy in pedagogical science, as it elucidates regional ontologies aimed at revealing the *proprium* of a discipline, delineating its inherent qualities. She elucidates that, regarding education, the pertinent factors are: the relationship, the project,



the contingency, the possibilities, the values, and the human person. She underscores empathy (intropathy) and epoché as essential modalities of presence in the educational encounter, recognizing that both receptiveness to the learner's experiences and the suspension of judgment by the educator are prerequisites for facilitating the act of educating.

Upon analyzing the foundational ideas of the various articles approved for publication, we discerned that the comprehensive concept articulated by our guest authors persists across the thematic nuclei uniting the other articles, thereby forming a structure that delineates a regional ontology. After reviewing the articles and contemplating our comprehension, we established four converging nuclei of topics, senses, and meanings, articulated in a framework that generates a coherent discourse on facets of the Philosophy of Mathematics Education: *Thinking about mathematics* and its conceptualization; *Thinking about the modes of implementation of mathematics education*; *Thinking about the modes of learning and of becoming mathematically formed*; *Specific Themes in Mathematics and Mathematics Education*.

*The thinking that emerges in the thematic nuclei* of this volume reflects a cohesive and diverse movement that embraces various philosophical traditions. As a way of philosophizing, it interrogates statements and endeavors to comprehend the significance of manifestations in mathematics education. Thinking, here, means both conceptual analysis and existential interpretation; it means moving between logical rigor and hermeneutic openness, between the critique of practices and the reflection on the foundations of teaching and learning.

*Thinking about mathematics and its conceptualization*: This nucleus comprises articles that examine various philosophical interpretations of mathematics—whether as a logical structure, formal language, symbolic form, human construction, or intuition—aiming to elucidate how these conceptions impact the teaching and learning of mathematics. Four articles examine these ideas: "Pure Logic and a Phenomenological Constitution of Algebraic Structures: Apophantic, Ontology and Theory of Multiplicities in Edmund Husserl" by Juliano Bortolete; "The Founding Ideas of Gödel's Incompleteness Theorem: A Phenomenological Analysis" by Rosemeire de Fátima Batistela and Ana Maria Mota Pereira Silva; "Philosophy of Mathematics and Phenomenological Philosophy of Mathematics: Exposing Understandings" by Rosângela Ramon and Tiago Emanuel Klüber; and "Philosophy of Mathematical Education and a



Tetrahedral Legacy in Malba Tahan – Eminent Brazilian Teacher" by Ivan Fortunato and Milagros Elena Rodríguez.

*Thinking about the modes of implementation of mathematics education:* this is reflected in various articles through a philosophical examination of teaching practices, encompassing their ethical, epistemological, and formative aspects. In the articulation of diverse philosophical approaches—phenomenological, critical, analytical, hermeneutical, and cognate traditions—a *regional ontology* takes shape: the proper domain of meaning wherein philosophical reflection intersects with the act of mathematically educating. The articles converge on the following themes: "Beyond the Order of Curricular Discourse: Contingency, Teaching Ethics, and the Practice of Care in Mathematics Education" by Cassiana Lopes Stephan and Márcio Antônio Silva; "Difficulties with Mathematics Teaching: Focusing on the Context of Hospital Education" by Érika Czigel and Fabiane Mondini; "Senses and Meanings Made Explicit by Students in the Classroom and Research in Mathematics Education" by Luana Fernandes and Marli Regina dos Santos; "Environmental Issues in the Study of Algebraic Themes: A Possibility of a Phenomenological Approach" by Tânia Baier, Eduardo Zimdars, and Noelly Susana Goedert de Souza; and "A Philosophical Therapy on the Concept of Number" by Carlos Evaldo dos Santos Silva, Daniana de Costa, and Elivaldo Serrão Custódio.

*Thinking about the modes of learning and of becoming mathematically formed:* this collection comprises essays that address learners, the conditions facilitating mathematical understanding, and the interconnections among reason, embodiment, language, and culture. This perspective aims to comprehend the developmental process in its entirety. The articles addressing these topics are: "Mathematical Explorations with Augmented Reality" by Rosa Monteiro Paulo, Carolina Cordeiro Batista, and Anderson Luís Pereira; "A Qualitative-Phenomenological Investigation in a Laboratory Activity of Mathematics Education" by Adlai Ralph Detoni and Raniane Lucimar Almeida de Aquino; and "Paradox-Type Problem Solving and Mathematics Education: Pedagogical Intervention with High School Students" by Roberta Labres Flugseder and Suelen Assunção Santos.

*Specific Themes in Mathematics and Mathematics Education:* This nucleus encompasses articles pertaining to teaching algebra, geometry, and logic, as well as teachers' conduct in the classroom. These works emphasize specific areas of mathematics, aiming to comprehend the philosophical ramifications of mathematics education—specifically, the sort of rationality employed, the cognitive and cultural norms



at play, and the modes of signification involved. This nucleus includes the articles: "Agency realism and mathematical education: a configuration", by Lucas Ferreira Gomes and João Ricardo Viola dos Santos; "Initial notes on 'stacked time': actions of teachers within fatigue society", by Rafael Montoito and Andréia Dalcin; "Experience and the relationship between the self and the other and its implications for the constitution of the teacher as a being within mathematical investigation", by Paulo Wichnoski; "Crossings between phenomenology and Critical Mathematics Education", by Morane Almeida de Oliveira, Paulo José dos Santos Pereira and Rossival Cruz da Silva; "Schleiermacher's universal hermeneutics: fundaments of the art of interpreting texts", by Joel Gonçalves dos Santos and Laís Cristina Pereira da Silva; and "Their bodies and their marks: the narration of (black) women-teachers-researchers", by Tatiane da Silva Alves and Thays Alves de Oliveira.

We believe that this edition's texts extend beyond mere reflection on Mathematics Education. They establish a philosophical domain that asserts its autonomy. By articulating the plurality of philosophical approaches—phenomenological, critical, analytical, hermeneutical, and other related currents—*a regional ontology is delineated: the distinctive domain of meaning in which philosophical thinking encounters the mathematical educative act.*

In addition to establishing a specific area of investigation, the texts presented here emphasize the conceptual precision necessary for qualitative research, drawing from organized epistemological frameworks across various philosophical viewpoints. They move past simple description to engage in critical and reflective analysis. The theoretical assumptions that underpin the research approach illuminate the meanings that arise from the research process, providing a distinct perspective. A space for collaboration emerges, offering potential avenues for grasping the intricate realities and circumstances inherent in Mathematics Education, which require thoughtful reflection.

This thematic edition facilitates dialogue based on the research conducted. This invitation encourages further debate, facilitating an understanding of the methodologies employed in Philosophy of Mathematics Education research. It also promotes discussions on qualitative research across various contexts, highlighting potential interfaces with education, policies, and societies. This edition enhances the field of research in Mathematics Education by highlighting the various lines that inform the discussions surrounding its diverse approaches to problem-solving, systematization, perspectives, understandings, and analyses.



In conclusion, we express our profound condolences for the loss of Marcio Antonio Silva, a distinguished and esteemed researcher in the field, during the preparation of this issue. His collaboration with Cassiana received approval prior to his passing. May his legacy echo through time!

*"Our true essence is defined by what the impossible compels us to achieve."*

Gaston Bachelard

Guest editors

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