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EDITORIAL

SPECIAL NUMBER: PHILOSOPHY OF MATHEMATICS

The present Special Issue of the Qualitative Research Journal (*Revista Pesquisa Qualitativa*), edited by me, Maria Aparecida Viggiani Bicudo, is a thematic dossier of philosophy of mathematics. But why has this subject proved relevant, thus becoming the subject of this issue?

We have been working for three and a half decades with philosophy of mathematics education, as well as with the Graduate Program in Mathematics Education, at *São Paulo State University*, UNESP, campus Rio Claro, São Paulo, Brazil. During this time, we have followed production regarding mathematics education in national and international events. We have noticed the great interest in questions on *how to teach mathematics*, aiming at students' learning, in different lines of research, such as psychology, as well as sociology, history, philosophy; themes about mathematics history; curriculum, among others. Since the early 1990s, there has been a movement in favor of the philosophy of mathematics education, which has strengthened reflective and critical thinking about mathematics education. Work Groups were organized at the ICME - International Congress on Mathematics Education and other events; the production regarding this theme has been significant. At present, for example, a Special Issue on Philosophy of Mathematics Education, in the Summer 2020 edition, of the Mathematics Teaching Research Journal, MTRJ, has been organized with the work of Topic Study Group 56 of the 14th International Congress of Mathematics Education.

> This special issue offers a range of partial answers to these questions, and suggested pathways to further extend research in the areas. It represents work in progress from worldwide scholars including both northern and southern hemispheres, and from the east and the west. Every continent barring Australia is represented, thus providing a truly global representation of work in progress (ERNEST, 2020, p. 3).

For Ernest (2020)

> The philosophy of mathematics education is an interdisciplinary area of research that incorporates many questions.
>
> - What are the goals and purposes of mathematics education?

> - What can we learn from deep analyses of the methods and means of teaching and learning mathematics, as well as from studying the underlying theories and philosophies?
> - What new insights are revealed by the application of deep theoretical approaches including phenomenology, hermeneutics, complexity, embodiment and critical theory within research in the philosophy of mathematics education?
> - What are the relationships between and the mutual influences of the philosophy of mathematics and mathematics education?
> - How do personal philosophies regarding mathematics and mathematics education of learners, teachers, teacher educators and researchers impact practice?
> - How are the different actors including students, teachers, researchers, theorists, philosophers and mathematicians linked professionally within the fields of mathematics education research and practice?
> - How do mathematics and the philosophy of mathematics impact the nature, structure and content of mathematics for teaching?
> - What do deep analyses of mathematics itself tell us about its structures, processes and fundamental concepts and about their relationships with its teaching and learning? (p. 2-3).

In ZDM, volume 52, there is an article on Philosophy of mathematical practice: a primer for mathematics educators. For the authors,

> Philosophers of mathematical practice aim to broaden this research agenda and to engage directly with mathematics as it is practiced by addressing questions such as:
> - What are the components of mathematical knowledge?
> - What do we do when we do mathematics?
> - What is "good" mathematics?
> - In what sense is mathematics a social practice?
> - What can the history of mathematics tell us about its nature?
> - What is the relationship between mathematics and other disciplines? (HAMAMI; MORRIS, 2020, p. 1114).

We understand that the questions raised in this second article are within the realm of the philosophy of mathematics' education. But this is not under discussion here. We emphasized them aiming to show how the community involved in mathematics education is interested in this subject.

However, throughout our teaching and research activities we have noticed a lack of work that brings more detailed and thematic thinking of philosophers regarding mathematics, specially from contemporaneous thinkers. In a course about philosophy of mathematics in the abovementioned graduate program in mathematics education, in which we work, we have brought specific topics treated by such philosophers. We noticed an engagement of all students in the debates of these themes, seeking to transcend what *is given* as mathematics education, trying to observe what is *hidden*, that is, what underlies the

debates and actions proposed or carried out in this area. We have realized that they are pouring themselves into the fundamental questions concerning mathematics, resurfacing with a firm stance in relation to the critical reflexive view of mathematics and possible ways of working with it; either in teaching or in mathematics itself and its fields of application.

Aiming to bring a reflection on this subject, we have invited researchers who are concerned with such issues to publish research, essays and discussions on mathematical topics addressed within philosophy. The focus of the *Special Number* is *Philosophy of Mathematics.* The authors invited were free to approach both the work of important philosophers, whether from the point of view of philosophy or mathematics, as well as to elect a theme and treat it philosophically.

We invited fifteen professors whose studies are dedicated to the philosophy of mathematics and, at first, all agreed to write articles. However, later, due to personal problems, not all were able to send them. The twelve articles received were analyzed by peers, by two reviewers who work with specific subjects in this area, and by the technical editor who reviewed the format. The opinions received were then sent to the respective authors, along with a deadline, determined by us, for resubmission of the articles. Among those, only one did not fit the requirements for the number, so the author decided to withdraw it. As a result of such evaluation, we obtained the eleven articles published in this special issue.

We believe that this is an important publication for those dedicated to understanding mathematical ideas: professional mathematicians, philosophers, mathematical educators and other professionals and interested parties.

The articles included herein are about Hegel, Husserl, Pierce, Zygmunt Janiszewski; ethics; imagination; epistemology; culture; enactivism; the meaning of *problem* in mathematical thinking; and demonstration in geometry. They are written in English, due to the understanding that the reach of the production covers a cultural and geographical area that transcends Latin America.

The articles were written by researchers of different nationalities working in varied institutions. Andrei Simionescu-Panait, Associated Professor at the Polytechnic University of Bucharest, Bucharest, Romania; Andrés Chaves, Universidad de Nariño, Pasto, Colombia and Luis Carlos Arboleda, Universidad del Valle, Cali, Colombia; Roberto Ribeiro Baldino, DrSc IMPA, UERGS, Guaíba, RS, Brazil; José Carlos Cifuentes, professor at Federal University of Parana, Curitiba, Brazil and Lucimar Donizete Gusmão, professor at State University of Maringá – UEM, Maringá, Paraná, Brazil; Juan Eduardo Nápoles Valdes, professor at Facultad de Ciencias Exactas y Naturales y Agrimensura, Corrientes, y Facultad Regional Resistencia, Universidad Tecnológica Nacional, Resistencia, Argentina; Maria Aparecida Viggiani Bicudo, of São Paulo State University (UNESP), Rio Claro, São Paulo, Brazil; Michael Otte, PhD in Mathematics from the University of Goettingen and Munster University (Germany), and visiting foreign professor at the Federal University of Mato Grosso (UFMT); Saddo Ag Almouloud, PhD in Mathematics and applications of the University of Rennes I - France and Federal University of Pará (Belém), Pará – Brazil; Ole Skovsmose, of Aalborg University, Denmark and São Paulo State University (UNESP), Brazil; Ubiratan D'Ambrosio, Campinas State University, Brazil; Antonio Vicente Marafioti Garnica, Leandro Josué de Souza and Maria Ednéia Martins Salandim of the São Paulo State University (UNESP), Bauru, Brazil.

The articles were organized in two topics:

Philosophers, conceptions of mathematics, indications for working with mathematics

- *Hegel, Peirce and us* by Michael Otte;
- *Hegel and the mathematics community: a left-side history* by Roberto Ribeiro Baldino;
- *The origin of number and the origin of geometry: issues raised, and conceptions assumed by Edmund Husserl* by Maria Aparecida Viggiani Bicudo;
- *Are constructivism and enactivism two opposite philosophies on learning mathematics?* by Andrei Simionescu-Panait;
- *On the centenary of Zygmunt Janiszewski (1888-1920): ideals of Mathematical practice and Continuum Theory* by Luis Carlos Arboleda and Andrés Chaves;

- *On C. S. Peirce´s primary arithmetic* by Antonio Vicente Marafioti Garnica, Leandro Josué de Souza and Maria Ednéia Martins Slandim.

Significant themes regarding the philosophy of mathematics

- *Mathematics and Ethics* by Ole Skovsmose;
- *Epistemology and rationality of intuition and imagination in the field of mathematics* by José Carlos Cifuentes and Lucimar Donizete Gusmão;
- *Some reflections on the problems and their role in the development of mathematics* by Juan Eduardo Nápoles Valdes;
- *Demonstration in Geometry: Historical and philosophical perspectives* by Saddo Ag Almouloud;
- *An essay on Philosophy of Mathematics and Culture* by Ubiratan D'Ambrosio.

References

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HAMAMI, Y.; MORRIS, R.L. Philosophy of mathematical practice: a primer for mathematics educators. **ZDM Mathematics Education**, [S.I.], v. 52, p. 1113–1126, 2020.

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