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Editorial

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The mathematics education journal Educação Matemática Pesquisa publishes a new issue! This year we are editing volume 22, sharing with our readers the results of scientific research carried out in the field of mathematics education. The articles published in this second issue of volume 22 disclose results from scientific investigations of researchers from different regions of Brazil and other countries, revealing a plurality of national and international research groups and institutions.

We believe that the scientific debate that will be fostered by these articles will contribute to the construction of new knowledge in mathematics education. The articles published in this issue offer a plurality of theoretical and methodological references that also strengthen scientific research in our area.

Volume 22.2 brings 27 articles that deal with the state of knowledge and mapping, history of mathematics education, problem-solving, ethnomathematics, mathematical modeling, assessment, teacher education, inclusion, and textbooks, encompassing different educational levels.

Below, we briefly introduce the texts that are part of this issue.

The first article is *Assessment in Practices with Mathematical Modeling in Mathematics Education: A Proposal of an Assessment Tool*, by Gabriele Granada Veleda and Dionísio Burak. The text presents a discussion about assessment in mathematical modeling through an instrument that allows the teacher to evaluate students' actions, interactions, and learning. The authors discussed the analysis carried out by two basic education teachers that used the instrument in their regular classes. As conclusions, the authors point out that the limitations can be overcome by using the instrument frequently.

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The article *Research as a Possibility to Make Meaning of Mathematical Concepts Addressed in Numerical Calculus*, written by Cintia Terezinha Barbosa Peixoto and Isabel Cristina Machado de Lara, presents a case study about a pedagogical proposal carried out by students of Numerical Calculus, based on Wittgenstein. It aims to identify the students' perception of the meaning of mathematical concepts they studied in Numerical Calculus. It also shows that the conditions of sense and meaning can occur when the student knows different uses of those concepts.

The third article, *Elementary and High School Teachers' Practices during the Resolution of Counting Problems,* is by Paulo Jorge Magalhães Teixeira. The article aims to study a type of continuing education of mathematics teachers that seeks to select and direct learning situations to develop the combinatorial reasoning of basic education students through the proposition of counting problems. The researchers used the design experiment methodology in educational research because it allows flexibility to adapt the initial design proposed, in a cyclical back and forth movement.

Fabiane Fischer Figueiredo and Claudia Lisete Oliveira Groenwald's article is entitled *The Design and (re)Formulation and Problem Solving with the Use of Digital Technologies in Mathematics Teachers' Initial Education*. It presents results of a qualitative investigation in which future mathematics teachers worked in a group, collaboratively, used digital technologies, discussed, and reflected when making decisions about a guiding problem.

The fifth article, *Limits of Real Functions of one Variable in Textbooks: Mathematical and Didactic Organizations,* is by Leonardo Augusto de Lemos Batista and Edelweis Jose Tavares Barbosa. It investigates how situations involving the content limits of real functions are presented in two Calculus textbooks, published with forty years of difference, using Yves Chevallard's anthropological theory of the didactic. The authors conclude that, despite didactic praxeologies similarities, the mathematical organizations differ in terms of the representativeness of the subtypes of tasks explored and the variety of techniques developed.

Rayssa Melo de Oliveira, Marcilia Chagas Barreto, and Gleiciane Ferreira Farias prepared the article entitled *Elements Acquired in Continuing Education in a Mathematics Teacher's Classroom Practice*. The study sought to investigate the practice

of a teacher who teaches mathematics after experiencing a training process that used elements of the theory of conceptual fields, related to multiplicative structures. The authors concluded that, although they identified didactic gaps in the mathematics teaching of and disregard of the contributions of the error to the learning, the formative process brought practical and theoretical advances to teachers' practices.

The seventh article, *School and Society: A Two-Way Street*, is written by Lênio Fernandes Levy. The work has a theoretical-bibliographic characteristic and is supported by critical-reproductive theories, including Pierre Bourdieu's. The author argues that school is or can be an influence on society and that school is not - and/or has the possibility of not being - a mere representative of hegemonic interests.

Intending to identify elements of the conceptual field of the Pythagorean theorem present in a teaching and learning process, we have the article *The Invariants Formation of the Pythagorean Theorem Conceptual Field in a Teaching Experience in Basic School*, by Pedro A.P. Borges, Anderson Piva, Bruna Miecoanski, and Mônica M. Sordi. In their conclusion, the authors deliberated on the network structure of the concepts and the inter-complementary relations between meaning, concept, and representation in the conceptualization process.

The ninth article, *A Study Scenerio Involving the Teaching of Mathematics Through Problem Solving in Journals*, is by Kaique N. Martins, and Jamille Vilas Bôas. The study aimed to understand thematic focuses on some qualified journals that use approach the teaching of mathematics through problem-solving. The authors point out that there are different perspectives, discussed and addressed in basic and in higher education.

The article entitled *The Dialogue with Visually Impaired Students as a Formative Tool for an Inclusive Mathematics Teaching* is written by Tiago Pereira and Fábio Alexandre Borges. The authors present a discussion on aspects that were identified on inclusive schooling for visually impaired students, focusing on school mathematics. As categories, they pointed out the different school content and activities taught to visually impaired and sighted students; lack of knowledge of the visually impaired students' educational needs; teachers' negligence/omissions when teaching visually impaired

students, also regarding their learning; and isolated attempts of teaching support as a reflection of the lack of broader collective school work.

Jonisario Littig, Karoliny Mendes Costa, and Luciano Lessa Lorenzoni are the authors of the article entitled *Communication and Learning in a Landscape for Investigation: An Analysis from a Learning Environment*. The authors present as conclusions that students were led to reflect on the relationship between the problem investigated and the application of concepts learned and/or in the process of construction, seeking to develop their autonomy to enhance discussions and build learning.

The twelfth article, *Readings of Practices as a way of Thinking about Mathematics Education in Teacher Continuing Education*, is authored by Lidiane Conceição Monferino and Luciane Ferreira Mocrosky. The authors intended to study mathematical literacy practices of teachers from a public school system, adopting a phenomenological approach. They concluded that mathematics teaching intentional actions and the attention with mathematical literacy are encouraged through an emphasis on readings of practices as a formative phenomenon.

The article *Fostering Financial Education to Bilingual Deaf Students Based on the Ethnomathematics Perspective and Deaf Culture*, by Rodrigo Carlos Pinheiro and Milton Rosa, discusses the contributions of ethnomathematics to promote financial education to deaf bilingual students. They conclude that conducting mathematics classes from the ethnomathematics perspective and a bilingual education approach were essential for the development of mathematics teaching for deaf students.

The fourteenth article is entitled *Mathematics Teaching Organization: The Role of the Study Group in the Meaning of the Subjects*, authored by Everaldo Gomes Leandro, Maria do Carmo de Sousa, and José Antônio Araújo Andrade. It is a case study based on the cultural-historical theory and aimed to present the role that a study and research group played in the meaning-making process by the involved. In the conclusions, the authors point out that the constitution of collective spaces to discuss the organization of mathematics teaching contributes to overcome the individual competence of the individuals and to think teachers' and future teachers' education as a shared activity.

Lidiane C. Zeferino and Vanessa D. Moretti are the authors of the article called *Development of the Theoretical Thinking of Early Years Teachers about Fractions*. The

text presents an analysis of the development of aspects of the professor's theoretical thinking about fractions, especially the mediation of continuous quantities and the equivalence of fractions, adopting the teaching guiding activity (TGA) as a reference. Through the analysis of the data collected, the authors concluded that the participants' theoretical thinking overcame empirical thinking.

The sixteenth article, authored by Eliane Maria de Oliveira Araman and Lucas Ferreira Gomes, is called *Professional Development and History of Mathematics: An Example Based on Non-Euclidean Geometries*. The authors analyze some learning dynamics identified in a group of basic education mathematics teachers who participated in a continuing education course focused on some basic notions of non-Euclidean geometries. In their considerations, the authors argue that teachers developed their knowledge on the mathematical concepts studied, and point to the possibility of using the history of mathematics as a contribution to reflections on teaching practice.

The article *The Development of Algebraic Thinking: The Role of Semantic Congruence in Students' Elaboration of Additive Problems* is written by Celia Finck Brandt, Méricles Thadeu Moretti, Carine Scheifer, Fátima Aparecida Queiroz Dionizio, and Ettiène Cordeiro Guérios. The text brings a discussion about the role of semantic congruence in additive problems elaborated by students of the final years of elementary school, in the light of Raymond Duval's ideas. As a conclusion, the authors argue that to elaborate problems, we must take into account the phenomenon of semantic congruence that is directly reflected in the designation of algebraic relations arising from the forwarding of solutions to problems.

The eighteenth article is entitled *Pedagogical Combination between Statistical Literacy and Graphic Understanding* and is authored by Rúbia Juliana Gomes Fernandes and Guataçara dos Santos Junior. The text presents the contributions of mathematics teachers' continuing education activity that articulated statistical literacy and graphic understanding for the final years of elementary school. The authors conclude that the type of training offered favored the process of acquiring, structuring, and developing knowledge related to statistical education.

Heniane P. Aleixo and Thaís P. Grützmann are the authors of the article entitled *Classification in the Process of Construction of Number: A Study with a Student with*

Congenital Deafblindness. The text sought to describe and analyze activities developed by a student with congenital deafblindness about the concept of classification in the process of constructing the concept of number. The authors conclude that it is necessary to encourage teachers and researchers to expand their studies by relating the mathematics education field to that of deafblindness.

The twentieth article, *What do Mathematics Degree Professors say about their Practices and Perceptions in Precalculus?* is authored by Fabiana C. de Andrade, Ana Teresa by C. C. de Oliveira, and Agnaldo da C. Esquincalha. The work aimed to understand the teachers' views on the objectives of the Pre-Calculus classes and to analyze the main characteristics of those classes in mathematics degree courses. The authors infer that collaboration and communication between peers, along with interest in mathematics education, were promising elements to encourage discussions about teaching, offering different possibilities for Pre-Calculus in undergraduate courses.

The article entitled *Convergences between Textbook and the Quadratic Function Teaching: A Look from the Semiotic Representation Registry perspective* is by Andreza S. da Silva and Rosinalda A. de M. Teles. It studies the relationship between the textbook approach and the mathematics teacher's practice on quadratic function, based on the semiotic representation registry theory. The authors indicate that the textbook and the teacher's practice are congruent with the variability of the representations and the graph construction through the point-to-point procedure. They also point out that conversions are highly emphasized, but do not help the student to coordinate two registers of representation, which can cause difficulties in learning.

The twenty-second article authored by Maria Cristina Rosa, Denize da S. Souza, and Nailys M.S. Santos is entitled *Continuing Education of Mathematics Teachers and the Geometry Teaching: An Overview of Research in Recent Years*. The text presents the results of a mapping, considering the years 2003 and 2019, of the mathematics teachers' continuing education and of geometry teaching. The authors concluded that there are two emerging didactic-pedagogical trends, the experimental geometry, and computational geometry.

By Glauciane Vieira and Cristiane Pessoa, we have the article *Financial Education around the World: How are National Strategies Organized?* The objective of

the study, according to the authors, is to explore how different countries organize their national financial education programs and strategies. They conclude that there is a worldwide tendency to establish financial education as public policy at different levels, stages, and modalities of education to re-educate individuals to use their money. They also point out that there is a diversity of methodologies to address the theme and highlight the importance of critical and reflective school financial education.

The twenty-fourth article is entitled *Analysis of Techniques Mobilized by Mathematics Degree Students when Solving Visual Tasks* and is authored by Natália Alcazar de Matos, Valdeni Soliani Franco, and Mariana Moran. The text presents an analysis of the techniques used by mathematics degree students when solving visual mathematical tasks, seeking to identify the presence of visualization skills - interpretation of figurative information (IFI) and visual processing (VP), described by Alan J. Bishop. The authors conclude that all students showed evidence of having the IFI skill; nevertheless, not all of them proved to have the VP skill.

The article entitled *What Research on Problem Solving in the Initial Teacher Education of Mathematics says: A Look into the Methodological Weaknesses* is by Luiz Otavio Rodrigues Mendes, Ana Lucia Pereira, and Marcelo Carlos de Proença. The text presents the results of a mapping on weaknesses that emerge from the development of the problem-solving approach during mathematics teachers' initial education. The authors conclude that the gaps identified were related to the lack of knowledge of basic education mathematical content, difficulties communicating ideas with mathematical content, difficulties understanding problems, and difficulties related to the time spent carrying out activities and developing the teaching approach.

The twenty-sixth article, *Mathematical Practices Inscribed in School Notebooks: The Case of Fractions*, is by Francine Fragoso de Miranda Silva, Rosilene Beatriz Machado, and Cláudia Regina Flores. The text aims to identify and analyze mathematical practices focused on fractions, registered in school notebooks from the 1930s and 1940s of a school in the state of Santa Catarina. The authors conclude that the mathematical practices developed at the school followed the official programs of the time, with quick and concise solutions and focused on their daily tasks. Also, they indicated that the

approach to fractions was apart from the relationship between number and measure, getting closer to the notion of part-whole.

And, finally, the article by Cecilio Fonseca, José Manuel Casas, Ixchel Dzohara Gutiérrez-Rodríguez, and Xabier García-Martínez is entitled *Study and research course in the building of good teaching practices in the engineering studies*. Based on the anthropological theory of the didactic, the study aimed to articulate models of pedagogical practices in a Linear Algebra program offered to the first year of engineering schools. The authors sought to present the logic of mathematical activity always based on problem situations, understanding teaching as a process of researching and assigning new responsibilities to mathematics, to the teacher, and the students.