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Educação Matemática Pesquisa publishes a new issue for over 20 years we have shared with our readers the outcomes of scientific research in the field of mathematics education. The articles published in this volume disseminate findings from scientific research works from different regions of Brazil and abroad, revealing a plurality of national and international research groups and institutions.

We understand that the scientific debate favoured by sharing these articles contributes to the construction of knowledge in the field of mathematics education. Furthermore, the articles published in this issue present a plurality of theoretical and methodological references that strengthen scientific research in our area.

Volume 21.2 presents 25 articles on the state of the art, conceptions, technologies, digital games, problem solving, calculus, geometry, teacher education and training, indigenous education, professional identity, communities of practice and curriculum materials. It also presents an interview with Prof. Gerald Goldin of Rutgers University of New Jersey, USA.

Below, we present briefly the texts that are part of this issue of our journal.

The first article, entitled *Tendências em Tecnologias Digitais no Ensino da Matemática Reveladas no EBRAPEM* (Trends in Digital Technologies in Mathematics Teaching Revealed at EBRAPEM), by Carla Denize Ott Felcher, Ana Cristina Medina Pinto and Vanderlei Folmer, presents and analyses the trends in digital technologies in mathematics teaching, pointed out in the XVIII, XIX, XX and XXI editions of the Encontro Brasileiro de Estudantes de Pós-Graduação em Educação Matemática (Brazilian Encounter of Post-Graduate Students in Mathematics Education - EBRAPEM). The article, combining state of the art and meta-analysis, studies 141 works published in the annals of 2014-2017. The results indicate the predominance of master's research works, focused mainly on students of basic education. Furthermore, studies involving GeoGebra and, as a trend, those using videos and digital technologies, were highlighted.

The article *O Enunciado “É Importante Formar Sujeitos Críticos e Reflexivos” nas Tramas Discursivas da Modelagem Matemática: Uma Problematização* (The Utterance “It Is Important to Form Critical and Reflexive Subjects” in the Discursive Plots of Mathematical Modelling: A Problematization), written by Maria Carolina Machado Magnus, Ademir Donizeti Caldeira and

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Claudia Glavam Duarte, discusses discourses that were constituted as almost unquestionable truths in mathematical modelling. For this, the researchers use Michel Foucault's thoughts as theoretical and methodological framework. As one result, the authors conclude that mathematical modelling is not only intended to teach mathematics but a space for the production of subjectivities and identities.

The third article is entitled *Dificuldades para o Uso da Informática no Ensino: Percepção dos Professores de Matemática após 40 Anos da Inserção Digital no Contexto Educacional Brasileiro* (Difficulties for Using IT in Teaching: Perception of Mathematics Teachers after 40 Years of Digital Insertion in the Brazilian Educational Scenario), by Maria Clara Santos do Amaral Cardoso and Aleandra da Silva Figueira-Sampaio. The aim of this paper is to identify difficulties faced by teachers of the public middle school (Ensino Fundamental II) to adopt ITs in their teaching practice. The authors observed deficiencies in teacher training and laboratory infrastructure and how insecure teachers feel regarding teaching practices with the use of information technology.

The article *Educação Financeira: Entendimentos de Inflação em uma Turma de 9º Ano do Ensino Fundamental* (Financial Education: Understanding Inflation in a 9th-Grade Middle School Class), authored by Suziane Dias Almansa and Rita De Cássia Pistóia Mariani, analyses non-mathematical understandings mobilized by 9th-grade students in developing tasks on the notion of inflation. The analyses focused on four categories: general and correlated understandings of inflation, cost inflation, demand inflation, and inertial inflation.

The fifth article, entitled *Formulação de Problemas de Comparação Multiplicativa: Uma Proposta para o Ensino de Multiplicação e Divisão no Campo Conceitual Multiplicativo* (Formulation of Multiplicative Comparison Problems: A Proposal for Teaching Multiplication and Division in the Multiplicative Conceptual Field), is written by Renan Oliveira Altoé and Rony Cláudio de Oliveira Freitas. The article presents a proposal of problem formulation, which may contribute to the multiplication and division studies, in multiplicative comparison, of the multiplicative conceptual field. The research was conducted following methodological assumptions of the didactic engineering.

The article entitled *Atividades de Educação Financeira a Partir da Perspectiva dos Ambientes de Aprendizagem de Skovsmose* (Financial Education Activities from the Perspective of Skovsmose Learning Environments), written by Laís Thalita Bezerra dos Santos and Cristiane Azevêdo dos Santos Pessoa, analyses financial education activities in mathematics textbooks of the early years of the elementary school approved by the National Textbook Program - PNLD (2016), considering as reference the learning environments discussed by Ole Skovsmose. As a result, the

authors argue that more activities discussing financial education from a critical perspective are needed.

The seventh article, by Eduardo Rafael Zimdars and Regina Helena Munhoz, is entitled *Estudo da Continuidade em um Contexto de Assimilação Solidária* (Study of Continuity in a Context of Solidary Assimilation). It scrutinises possible influences of the pedagogy of solidary assimilation on the teaching and learning process of continuity in a Calculus I class. The study indicates that the development of autonomy in learning makes students co-responsible for the whole process.

The research work *O Papel da Planilha na Mudança de Registros em uma Atividade de Cálculo Numérico* (The Role of the Spreadsheet in Changing Registers in a Numerical Calculation Activity) is by Magnus Cesar Ody and Lori Viali. It presents a study involving the spreadsheet to promote computational literacy and numerical calculation concepts. The theoretical basis was Duval's registers of semiotic representation and the concepts of computational literacy by Baker and Sugden. The authors point out that the spreadsheet allowed a broader conversion process, despite the initial difficulties one faces when using it.

The ninth article is entitled *Uso Interativo de Planilha Eletrônica para o Ensino de Estatística: O Caso do Valor de p* (Interactive Use of an Electronic Spreadsheet for Teaching Statistics: The Case of the p value) and is authored by Fernando Frei. It evaluates the effects of using an interactive electronic spreadsheet to simulate events for the learning of the inferential statistical concept of the p value, which reveals that the probability of the effect observed between treatments is due to a natural variation of the sample, not to factors being researched. The author concludes that the simulation helped the activities to become more exciting, making learning more effective.

The theoretical paper *A Dimensão Sociopolítica da Matemática: em Foco os Processos Formativos do Professor Indígena* (The Sociopolitical Dimension of Mathematics: Focusing on the Formative Processes of the Indigenous Teacher), written by Lucí TM dos Santos Bernardi and Bruna Larissa Cecco, discuss the process of Kaingang teacher initial education in the intercultural indigenous degree course in mathematics and natural sciences. The authors seek to problematize the indigenous student in the course, considering the scenario of their culture and a mathematics education for empowerment.

The eleventh article, authored by Marc Bailleul and Laurence Leroyer, is entitled *Enseigner/Apprendre... À partir de Quoi? Genèse d'un Modèle* (Teaching/Learning...From What? Genetics of a Model). The authors present the evolution of a model they have developed in the last ten years and used in their daily practice as teachers/teacher trainers, involving a teaching and learning activity carried out from a support.

The article *Ensino e Aprendizagem do Teorema Fundamental do Cálculo: Algumas Reflexões a Partir de uma Revisão Sistemática de Literatura (Teaching and Learning of the Fundamental Theorem of Calculus: Some Reflections from a Systematic Review of Literature)* is authored by Juliana França Viol Paulin and Alessandro Jacques Ribeiro. It presents a systematic review of literature on studies that address the fundamental theorem of calculus. The authors state to have found evidence of the importance of the concept of function for the understanding of concepts related to the fundamental theorem of calculus and for the teaching and learning of calculus.

The thirteenth article, by José Milton Lopes Pinheiro, Maria Aparecida Viggiani Bicudo and Adlai Ralph Detoni, is entitled *Um Olhar Fenomenológico à Geometria Dinâmica (A Phenomenological Look at Dynamic Geometry)*. The aim of the work is to understand the meaning of the word movement present in dynamic geometry from a phenomenological perspective. The authors discuss moving and building and their implications, highlighting the perception of movement, configurations and deconfigurations, variations and invariants, emphasising that these actions involve “moving-perceiving-knowing”.

The article *Uso de Jogos Digitais em Práticas Pedagógicas Realizadas em Distintos Contextos Escolares (Use of Digital Games in Pedagogical Practices Carried out in Different School Contexts)* is written by Marcia Regina Kaminski, Rhuan Guilherme Tardo Ribeiro, Maine Aline Junkerfeurbom, Marcos Lübeck and Clodis Boscarioli. It analyses the use of two digital games in a 5th-grade mathematics class from an urban school and with a 6th-grade class from an indigenous school, both in western Paraná. The authors found that educational digital games encouraged students from both contexts, even considering their diverse cultures.

The fifteenth article is authored by Gabriele De Sousa Lins Mutti, Cristiane Elise Reich Matioli, Luciana Del Castanhel Peron and Tiago Emanuel Klüber, titled *Logicismo, Intuicionismo e Formalismo: Uma Análise de Documentos das Licenciaturas em Matemática das Universidades Públicas Paranaenses (Logicism, Intuitionism and Formalism: An Analysis of Documents of the Mathematics Degrees of Public Universities of Paraná)*. The authors analyse documents that guide the mathematics degrees of public universities of Paraná, aiming to understand influences that these documents can exert on the pedagogical practices and on the concepts of mathematics and teaching of mathematics teachers. One of the results is the need to allow the future teacher to value the student as a subject capable of elaborating strategies for the construction of mathematical concepts.

The article *Como Professores Iniciantes Percebem o que Fazem na Sala de Aula de Matemática (How Teachers in the Beginning of their Careers Realize What They Do in the Math Classroom)* was written by Daiana Estrela Ferreira Barbosa and Pedro Lucio Barboza. The authors discuss how early-career math teachers perceive their pedagogical doing in the classroom. The study

indicates gaps in initial training courses, the need to rethink teaching and difficulties in the relationship with more experienced teachers.

The seventeenth article, *Aprendendo a Ensinar na Formação Inicial de Professores de Matemática: Uma Análise das Concepções Discentes* (Learning to Teach in the Initial Formation of Mathematics Teachers: An Analysis of Students' Conceptions), is authored by Elizabete Volkman, Ana Lucia Pereira and Simone Luccas. It analyses conceptions of mathematics degree students on their preparation for teaching. The authors considered three categories of analysis: teacher education does not prepare for the exercise of teaching; there is no articulation between pedagogical and specific disciplines; and there is a dispute between fields of knowledge.

The article *Uma Análise Bbernstieniana sobre as Regras Discursivas Expressas em um Material Curricular Educativo* (A Bernsteinian Analysis of the Discursive Rules Expressed in an Educational Curriculum) was written by Reinaldo Feio Lima and Andréia Maria Pereira de Oliveira. It seeks to identify and characterise the framing principle in an educational curriculum material, considering constructs of Basil Bernstein's theory of language codes. The analyses were presented in relation to two rules: "selection, sequencing and rhythm" and "evaluation criteria".

The nineteenth article, written by Juliane Colling and Adriana Richit, is entitled *Conhecimentos Pedagógico, Tecnológico e do Conteúdo na Formação Inicial do Professor de Matemática* (Pedagogical, Technological and Content Knowledge in the Initial Formation of the Mathematics Teacher). The text aims to highlight and understand perspectives of articulation of the use of digital technologies in the context of training activities in a mathematics degree course. The results indicate that pedagogical, technological and content knowledge in training activities can contribute to changes in professional practices in basic education.

The article entitled *Uma Análise de Projetos Criados no Scratch com Base em Critérios Construtivistas e Ergonômicos* (An Analysis of Projects Created in Scratch Based on Constructivist and Ergonomic Criteria) is by Flavia Sucheck Mateus Da Rocha, Marco Aurélio Kalinke, Marcelo Souza Motta and Luciane Ferreira Mocroski. The text presents an analysis of projects developed in Scratch by teachers participating in an extension course. The authors found out that it is not possible to ensure the presence of constructivist resources in the construction of the investigated projects, and that the presence of programming in these projects with ergonomics was partial.

The twenty-first article is authored by Elias Santiago de Assis and is entitled *A Confeção de Histórias em Quadrinhos como Mecanismo de Aprendizagem de Geometria* (The Production of Comics as a Geometry Learning Mechanism). The author aims to investigate how the production of comics can contribute for the geometry learning of the future mathematics teachers. The study

indicates that the comic strip involves the production of a didactic material and makes the future teachers expose gains and weaknesses regarding the learning of geometry.

The article “*Eu Perguntei se o Cinco Não Tem Metade*”: *Ações de uma Professora dos Primeiros Anos que Apoiam o Raciocínio Matemático* (“I Asked if Five Does Not Have Half”: Actions of an Early Years Teacher Who Support Mathematical Reasoning) was written by Eliane Maria De Oliveira Araman, Maria de Lurdes Serrazina and João Pedro da Ponte. The authors sought to identify and categorise a teacher's actions during the discussion of an exploratory task performed in a public school on the outskirts of Lisbon. The outcomes show that the teacher's actions favoured the processes of pattern identification, conjecture formulation, justification and generalisation.

The twenty-third article, *Resolução de Problemas e o Software GeoGebra: Um Caminho para a Compreensão das Funções Seno e Cosseno* (Problem Solving and GeoGebra Software: A Path to Understanding Sine and Cosine Functions), is authored by Juliana Meneghelli and Janaína Poffo Possamai. The authors aimed to evaluate implications of using GeoGebra software in a problem-solving approach, analysing an activity carried out with a 2nd- grade high school class.

The article *Ações de uma Formadora no Desenvolvimento da Agência Profissional de Professoras em uma Comunidade de Prática* (Actions of a Teacher Trainer in the Development of the Professional Agency of Women Teachers in a Community of Practice) was written by Laís Maria Costa Pires de Oliveira and Márcia Cristina De Costa Trindade Cyrino. It analyses how actions of a teacher trainer supported the development of the professional agency of women teachers participating in a community of practice. The analysis evidenced that the proximity between the trainer and the teachers influenced the professional identities, fostering and strengthening their professional agency.

And last, we present the article *Investigação Matemática: Possíveis Articulações com a História da Matemática, TIC e Resolução de Problemas* (Mathematical Investigation: Possible Articulations with the History of Mathematics, ITC and Problem Solving) authored by Paulo Wichnoski and Tiago Emanuel Klüber. The research work aims to establish a meta-understanding of mathematical investigation in didactic-pedagogical productions and final articles of teachers participating in the Paraná Educational Development Program - PDE, followed by a phenomenological hermeneutics, that is, a movement of understanding-interpretation, mediated by intentionality and subjectivity.

We also publish in this issue the interview (in Portuguese and English) by researcher Gerald A. Goldin, in which he presents a trajectory in mathematics education dating back to the early 1970s. His works position him as an influential researcher, contributing with

research on systems of representation and on affect in mathematics teaching and learning. The interest of Felipe Augusto De Mesquita Comelli and Ana Lúcia Manrique in the dialogue with Goldin was to register his considerations on the affective domain, with emphasis on meta-affect, as well as collect his thoughts on the current and future paths for research in the area.