Editorial

The Journal of the International GeoGebra Institute of São Paulo (IGISP), ISSN 2237-9657, of biannual regularity, is an electronic publication of the GeoGebra Institute of São Paulo based at the Faculty of Exact Sciences and Technology, Program of Post-Graduate Studies in Mathematics Education of the Pontifical Catholic University of São Paulo (PUC-SP), Brazil.

Free of charge, it aims to offer a space for the dissemination and circulation of researches and works developed with the use of the software GeoGebra, mainly in Latin America.

The third issue of the volume 12, 2023, presents six articles and four proposals for action seeking to encompass the different possibilities and paths with the GeoGebra can be investigated.

In the first article "*A superior level geometry experience to explore, model, and validate*" the authors María Cecilia Papini, Mauro Natale, Ana Paula Madrid, Silvana Soria and Mariela Balcarce share a sequence of geometry problems to work with GeoGebra in higher education, developed by a group of professors and researchers, mathematics teachers, and seeks to bring theoretical-methodological contributions to the teaching-learning of geometric concepts and GeoGebra in higher education classrooms.

The second article "*Pythagorean theorem using the GeoGebra and GeoGebra Classroom software*" of the authors Iliane Moreira, Isaura Martins, Rui Bernardo Andrade and Sanier Sena is part of the Trainer Training Project and pilot training of Mathematics teachers, GeoGebra & STEAM, in Cape Verde. Based on the GeoGebra software and the "GeoGebra Classroom" platform, it was intended to demonstrate and explore the Pythagorean Theorem seeking to contribute to the opening of new paths for success in the teaching of mathematics, through the use of a modern tool and an online collaboration platform, which make it possible to work on mathematics in an interactive, dynamic and complete way.

"*Study of the quadrilaterals as geometric concepts with GeoGebra* is the third article and the author José António Fernandes aims to study the process of building several quadrilaterals with GeoGebra, analyzing the elements of the concepts (name, essential attributes, non-essential attributes, positive examples, negative examples, and rule) corresponding to these quadrilaterals.

In the fourth article, "*Deaf students and the use of GeoGebra software in mathematics: possibilities for understanding 2nd degree equations*" the authors Cléa Furtado da Silveira, Suzana Mendonça Abreu and Denise Nascimento Silveira have as their theme deaf students and the use of the GeoGebra software for the understanding of the 2nd degree equations through the analysis of the graphic

representations of the equations, in order to understand their concepts and application.

Renato Gamba Torres and Jorge Cássio Costa Nóbriga are the authors of the fifth article "*Dynamic spatial geometry book on the GeoGebra platform for teaching pyramid and prisms*" and present part of a research that aimed to analyze the didactic potential of a dynamic Geometry book developed on the GeoGebra platform for the learning and teaching process of prisms and pyramids.

In the sixth article *"History, similarities, and differences between Parabola and Catenary: a study supported by GeoGebra"* the authors Renata Teófilo de Sousa, Francisco Régis Vieira Alves and Lucas Cunha Bastos aim to carry out a study on Parabola and the Catenary of curves, presenting their similarities and differences with the contribution of the GeoGebra software.

The first work of the "Proposals for Action" section presents "*The sphere and the pyramid: a dynamic construction proposal using Cavalieri's Principle*" of the authors Edson Agustini, Érika Maria Chioca Lopes and Giselle Moraes Resende Pereira present a proposal for an activity involving GeoGebra and the Cavalieri Principle, which is a mathematical result that allows comparing areas of cross-sections and deducing volumes of solids.

Lucas Santos Teixeira, Luis Andrés Castillo Bracho and Ivonne Coromoto Sánchez Sánchez are the authors of the second proposal *"A preparation for calculus exploring the transformations of a cubic function using GeoGebra"* and aims to describe a proposal for teaching transformations in a family of cubic functions defined by $g(x) = a(x - h)^3 + k$, by means of GeoGebra.

Rhômulo Oliveira Menezes presents the third proposal *"Mathematical Modeling in the Teaching of Geometry: a problem-situation using GeoGebra"* and aims to present a problem-situation of Mathematical Modeling aimed at the teaching of Geometry in GeoGebra, highlighting the mathematical skills developed by the students and the geometric concepts addressed.

Finally, the fourth work *"The exploration of triangle properties in GeoGebra Discovery by elementary school students"* by the author Alexandre Matias Russo uses an experimental version of the GeoGebra software, under development, called GeoGebra Discovery. It presents two activities analyzed through van Hiele's (1984) levels of comprehension and development of geometric thinking.

The works presented here highlight the possibility of interdisciplinarity and transdisciplinarity in the context of Mathematics Education.

We express our gratitude to all who contributed to the realization of this volume of the issue and to the academic research of Mathematics Education.

Celina A. A. P. Abar - Editor