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Editorial

The Journal of the International GeoGebra Institute of São Paulo (IGISP), ISSN 2237-9657, published biannually, is an electronic publication of the GeoGebra Institute of São Paulo headquartered at the Faculty of Exact Sciences and Technology, Postgraduate Program in Mathematical Education at the Pontifical Catholic University of São Paulo (PUC-SP), Brazil.

With open access, its aim is to provide a platform for the dissemination and circulation of research and works developed using GeoGebra software, primarily in Latin America.

This edition, volume 13 number 1 of the 2024 journal, comprises some of the outcomes of the project "GeoGebra & STEAM: Implications for the Improvement of Mathematical Education in Mozambique," within the scope of a post-doctoral research in Mathematical Education conducted by Astrigilda Pires Rocha Silveira, a lecturer and researcher at the University of Cape Verde, in the cities of Maputo and Matola, Mozambique, through the Research and Innovation Centre (inED) of the Higher School of Education of the Polytechnic Institute of Porto (ESEIPP), between September 2022 and September 2023, under the supervision of José Manuel Dos Santos Dos Santos.

In addition to the research team, which included the editors of this special issue of the journal, 24 teachers and 692 students from Primary and Secondary Education of a private institution (Kitabu College) and three public schools (Munhuana Secondary School, Unit T3 Secondary School, and the Pilot Complete Primary School of Lhanguene), as well as 129 students and 12 lecturers and researchers from higher education at the Faculty of Natural and Mathematical Sciences (FCNM) of the Pedagogical University of Maputo (UP-Maputo), participated in the study. Of these institutions, only Unit T3 Secondary School is located outside the city of Maputo, situated in the city of Matola, in the Maputo Province. The realities of Unit T3 Secondary School and Lhanguene Complete Primary School, public institutions, are completely different from Kitabu College, a private institution, and Munhuana Secondary School, a public school of reference in the city of Maputo, as they have few resources, with not even electricity in the classrooms. The classrooms lack adequate working conditions and are not suitable for the size of the classes.

Therefore, this edition comprises eight articles that reflect the results of the experiences implemented in classrooms, supported by GeoGebra software, involving 17 teachers from different levels of education.

The first article entitled "*Innovation in pedagogical practice supported by GeoGebra in the context of STEAM Education and improvement of teaching and learning in Chemistry*" authored by Aldovanda Vidade and Alcinda Mafuiana seeks to verify whether the use of GeoGebra and its platforms contributes to the improvement of learning in Chemistry and the development of a secure and comprehensive conception regarding the use of educational technologies. According to the authors, the "results show that the use of GeoGebra allows for the development of a more global conception regarding the use of educational technologies and a more meaningful learning of Chemistry content."

The second article under the title *"GeoGebra as a supporting tool for meaningful learning of the linear transformation of trigonometric functions"* by Francisco Salmina, Lola Francisco, and Dauto Issufo aimed to assist students in understanding the conceptual structure of translations of trigonometric functions applied in daily life and their unique behaviours. The authors observed that by *"bringing a technological approach, such as the use of GeoGebra Software, to the teaching of Trigonometric Functions, especially linear translations, they could perceive that the proposal was of great importance, as it provided students with study opportunities that facilitated the teaching and learning process."*

The third article titled *"GeoGebra & STEAM as a strategy for meaningful learning of exponential functions"* by Fernando Cumbe aimed to dynamize teaching by relating theory to practice as a way to help students solve everyday problems and value interdisciplinarity.

The fourth article entitled *"GeoGebra as an auxiliary software in the teaching and learning process of quadratic functions"* by Bento Buene and Yula Munguambe consisted of analyzing the use of GeoGebra in the context of STEAM Education as an auxiliary tool for studying Quadratic Functions, aiming to foster learning with understanding and significance of mathematical concepts, in an active and interactive way. In the context of using GeoGebra in the classroom, with precarious conditions and devoid of technology, it was found that innovative actions provoked participative and collaborative interaction, showing an intriguing and significant interest in students in the construction of mathematical knowledge. GeoGebra led us to see that it is possible to improve the teaching and learning of Quadratic Functions by combining theory and practice in different real-life situations. Therefore, the focus of this article is on presenting the results of the work developed within the scope of the aforementioned experience.

The fifth article *"GeoGebra as a didactic resource for promoting learning of exponential and logarithmic functions"* by Salma Issufo and Agostinho Cavele resulted from the experience developed at Munhuana Secondary School, in the 10th grade, within the scope of the study of Exponential and Logarithmic Functions, supported by GeoGebra software. From the research, the authors concluded that there is a need to review Mathematics Teaching methodologies and opt for alternatives that are in the context of the current student, with emphasis on educational software and interdisciplinarity, for meaningful learning. Therefore, with this article, it is intended to present the results that GeoGebra software can bring to Mathematics classes, in the teaching of exponential and logarithmic functions.

The sixth article *"The use of GeoGebra as a didactic alternative in the teaching of first-degree functions: An experience in the Mozambican context"* signed by Edmundo Chaúque, was based on an experience that aimed to use an active method whereby students discover the concepts and principles behind an observed phenomenon with 8th Grade students (Classes A, B, and C - familiarization phase with GeoGebra) at Lhanguene - Pilot Basic School, in the study of proportionality, first-degree functions, resolution of systems of two equations with two unknowns by the graphical method (Class C), using GeoGebra Software.

"The use of GeoGebra & STEAM as a strategy for meaningful learning of Trigonometric Function Transformations" constitutes the seventh article authored by Bensone Matusse and Manuel Nhumaio and aimed to promote meaningful learning of these contents from an

interdisciplinary teaching perspective. The authors highlight that the results demonstrate that the use of GeoGebra enabled meaningful learning of the contents covered.

Finally, the eighth article, "*Comprehensive Study of Sine and Cosine Functions with the Support of GeoGebra Software*" by Moisés Namburete, Cândido Covele, Evaristo Pascoal, and Edgar Moisés aimed to understand how GeoGebra software can contribute to the comprehensive study of trigonometric sine and cosine functions through graphical analysis, based on tasks developed in a class of 50 students from the 11th Grade at Munhuana Secondary School, located in the city of Maputo. The authors emphasize the autonomy and greater involvement of students in task resolution, greater student-software interaction, appropriation of content, model construction, and parameter manipulation as the main results.

The project developed encompassed two essential thematic areas of inED, namely, teacher training and challenges for society and education, not only meeting the outlined objectives but also addressing the concerns of the research unit, namely, the connection to professional practice contexts, internationalization, the connection between research and education/training, and the development of the identity and permeability of research areas.

The work inherent in carrying out this research was a very complex and demanding process, and the results achieved were thanks to the invaluable support provided by UP-Maputo, inED, and the University of Cape Verde. The dissemination of the results achieved in the study and the illustration of the reality observed was only possible thanks to the generosity of the participants who gave their consent to the use of the data and images collected. The joint efforts of all who collaborated in this Project, the spirit of dedication, sharing, and exchange of knowledge contributed to the achievement of the stated objectives.

Therefore, it is of utmost importance to highlight the invaluable support, recognize, and value those who made every possible effort to achieve the outlined results and timely completion of the activities. With a great sense of accomplishment, we express our sincere thanks to all who, in one way or another, contributed to the completion of this work and materialization of the scientific production of this journal volume, for the sake of Mathematics Education.

Editors

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