

Mathematics Education in Brazil

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Mathematics Education in Brazil

Panorama of Current Research

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Preface

This book aims to present a panorama of research in mathematics education developed in Brazil to the international academic community. It is the result of a collaboration of members of the Brazilian Society of Mathematics Education (SBEM—Sociedade Brasileira de Educação Matemática).

Since its founding in January 1988, the Brazilian Society of Mathematics Education (SBEM) has been organised to discuss issues related to teaching and learning in mathematics, with a view to contributing to the consolidation of mathematics education as an area of knowledge. Mathematics education in Brazil is still relatively a new field of research, which arose initially from concerns that emerged from the programme of expansion of mathematics teaching in the beginning of the 1950s. These concerns led to the first National Congress of Mathematics Teaching, followed by the creation of what became known as the Circles of Mathematics Teachers and the Brazilian Association of Mathematics Teachers and Researchers.

The creation of SBEM began to be structured in 1985, during the 6th Inter-American Conference on Mathematics Education (VI CIAEM), held in Guadalajara, Mexico, and the organisation came into being in its own right following the realisation of the first National Meeting of Mathematics Education (I ENEM) in the city of São Paulo in 1987. From its conception, SBEM has played an important role in the development of Brazilian mathematics education. As a scientific association, it expanded its area of activity, with the creation of regional directories in almost all states of the federation, and has been instrumental in the organisation of 12 National Meetings, six International Seminars on Research in Mathematics Education (SIPEM) and dozens of regional meetings. SBEM maintains two journals, *Mathematics Education in Journal (EMR)* and the *International Journal for Research in Mathematics Education (RIPEM)*.

At the beginning of the twenty-first century, conscious of the growing number of researchers in mathematics education across Brazil, together with the size and diversity of the country, SBEM recognised a need to create mechanisms that would both enable collaborations between researchers throughout Brazil to be built and sustained and open channels through which to communicate the country's ongoing research concerns beyond its borders. This motivated the conception of what has

become a triannual event, the International Seminar of Research in Mathematics (Seminário Internacional de Pesquisa em Educação Matemática—SIPEM), an event which serves to congregate the Brazilian mathematics education research community together with international collaborators and to simultaneously showcase, review and plan national research efforts.

The first SIPEM took place in 2000. The aims of the seminar were (and continue to be) fivefold: (1) to encourage exchange between local and regional groups, based in different states of Brazil and in different countries and dedicated to researching the area of mathematics education; (2) to disseminate Brazilian research to the community of mathematics educators within and beyond Brazil; (3) to provide a forum for meetings between researchers in mathematics education, opening possibilities to share, collaborate and plan research; (4) to promote the formation of integrated Brazilian-based research groups that work together on problems of national interest, with collaboration from foreign researchers (5) to support advances in research in mathematics education.

Six editions of SIPEM have now taken place. A total of 319 registered researchers participated in SIPEM IV, where 169 scientific papers were presented and discussed. During the event, plenaries, lectures and panels were also conducted, a number of new books related to the area of mathematics education were launched and meetings for discussions of topics involving education were organised.

The organisation of the conference around the national working groups has proved successful in forging research collaborations around particular themes. Members of the groups have worked both at and between the events on a variety of joint projects, including the organisation of books and special editions of research journals. Not surprisingly, in great part, these projects and the outcomes associated with them have been disseminated more widely within Brazil than beyond, not least because they have tended to be published in Portuguese. The idea of publishing a book aimed more specifically at the international community emerged during SIPEM VI. This book is a result of the discussions that began there, and its main focus is on the research of the 13 national working groups of the SBEM that participated in SIPEM VI.

These working groups are organised around the following themes: Mathematics Education in the Early Years and Primary Education (Y1–Y5); Mathematics Education in the Middle School (Y6–Y9); Mathematics Education in the High School (Y10–Y12); Mathematics Education at the University Level; History of Mathematics, Culture and Mathematics Education; Digital Technologies and Distance Education; Teacher Education; Assessment and Mathematics Education; Cognitive and Linguistic Processes in Mathematics Education; Mathematical Modelling; Philosophy of Mathematics Education; Teaching Probability and Statistics; and Difference, Inclusion and Mathematics Education. Twelve of these thirteen groups have participated in all the editions of SIPEM, while for the thirteenth group SIPEM VI occasioned its first participation. The seminars are organised around the working groups, with refereed papers forming the basis of the working group discussions during the event and the planning of the joint research activities that occur in the interim years between seminars. In this way, the papers presented at the triennial research seminars can be considered as a representative sample of the concerns of the Brazilian mathematics education community at a particular moment in time.

The 6th International Seminar of Research in Mathematics Education (SIPEM VI) took place from the 15th to the 19th of November 2015, and the contributions presented at this event provide the means we have chosen in this book to reflect upon the current concerns of the Brazilian mathematics education community and how the themes addressed within the national working groups have developed over time. The book contains a total of 14 chapters. Following an invited chapter from Professor Ubiratan D’Ambrósio, an internationally renowned researcher in the field and a founding member of the Brazilian Mathematics Education community, are chapters corresponding to each of the 13 working groups who met during SIPEM VI.

In his chapter, D’Ambrosio discusses how mathematics education—in Brazil and other parts of the world—should be thought in a new way, i.e. centred on humanity. He defends the idea that mathematics, which he sees as the most universal mode of thought, is intrinsically related to the future of humankind, and thus, mathematicians and mathematics educators are responsible for developing concepts and techniques that contribute to the survival, rather than destruction, of civilisation. Mathematics, he says, should enable, not endanger, the pursuit of human well-being and full citizenship, as well as offering means for understanding, explaining and transforming reality. It is fitting that most of the challenges posed in D’Ambrosio’s chapter resurface in the remaining 13 chapters of the book in forms that are specific to the different areas of interest that currently characterise the field of mathematics education in Brazil. Indeed, tracing the ideas he raises through the rest of the book is one of the ways that readers might gain a sense of some of the characteristic flavours of Brazilian research, as well as the ways in which these flavourings vary in their intensity, impact and amplitude.

The chapters prepared by members of the 13 SBEM working group have a similar structure, with each chapter emphasising the major themes and research questions, theoretical and methodological approaches and emerging results, along with considerations of the tensions and issues that characterise research in the particular area of interest. In this way, the aim is that the book presents a panorama of research in the area of mathematics education in Brazil at a particular moment in time. Its chapters reflect the diversity of research themes of the national working groups, contemplating questions related to the teaching and learning of mathematics at all education levels—from early years to university mathematics—and encompassing issues of history, philosophy, language and cognition, digital technology, inclusion, assessment, teacher education, mathematical modelling and statistics education. We hope that the book will convey not only a sense of some of the special flavours of Brazilian research in mathematics education, but also the vibrancy and dynamism of our community, as well as offering an overview of recent research tendencies and results from research programmes, much of which was previously available only in Portuguese.

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