

Editorial: Constitution of environments for teacher education in mathematical modelling

Karina Alessandra Pessoa da Silva

karinasilva@utfpr.edu.br

orcid.org/0000-0002-1766-137X

Universidade Tecnológica Federal do Paraná (UTFPR), Londrina, Paraná, Brasil.

Emerson Tortola

emersonortola@utfpr.edu.br

orcid.org/0000-0002-6716-3635

Universidade Tecnológica Federal do Paraná (UTFPR), Toledo, Paraná, Brasil.

"The teacher is, naturally, an artist, but being an artist does not mean that he or she can shape the profile, can mold the students. What an educator does in teaching is to make it possible for students to become themselves."

Paulo Freire¹

The organization of the thematic edition in the field of Mathematics Education for the journal *ACTIO: Docência em Ciências*, was planned as an action of the Research Project "Learning about, Learning through, and Teaching using Mathematical Modelling: Constitution of Environments for Teacher Education", supported by CNPq through a universal call for proposals (Process 409309/2021-4).

With the aim of giving visibility to research that investigates the constitution of environments for teacher education in mathematical modelling, the research group *Modelagem Matemática no Contexto Educacional - MMCE* (<http://dgp.cnpq.br/dgp/espelhogrupo/7567270885183160>), represented by professors Karina and Emerson, invited researchers from the scientific community to share results based on theoretical and methodological issues that consider different teacher education designs in which modelling practices are planned, implemented, and/or discussed.

First, we are very happy and honored by the opportunity to edit a thematic edition in a journal of significance in the field of Teaching, especially one associated with our beloved UTFPR. We would like to thank Professors Marcelo Lambach and Mirian González for their attention and dedication throughout the evaluations and publication of the papers that make up this thematic edition.

Therefore, we would like to express our satisfaction with the responsible work that our researcher-friends in teacher education in Mathematical Modelling have been developing. We believe that the research results on teacher education in modelling presented in the papers of this thematic edition can serve as an invitation to both researchers who are committed to constituting educational environments focused on discussing, planning, and implementing modelling practices, and to experienced, novice, or curious teachers seeking to learn mathematical modelling, so they can find inspiration and connections in the published papers, joining us in disseminating modelling across different educational levels.

It is through the curiosity and the imminent search that the educational environments promote, that the teacher becomes the focal point. He is the artist who drives education and can bring Mathematical Modelling into various classroom

contexts. In this sense, we echo the great educator Paulo Freire, who believed that it is the teacher who makes it possible for students to become themselves, as stated in the excerpt from the epigraph of this editorial. Among the many tributes that emerged throughout the centenary of Paulo Freire, we consider that, for us, from the MMCE research group, this thematic edition, which addresses the constitution of educational environments, is also a modest tribute to the educator who continues to inspire teachers and researchers.

In this celebratory spirit, we would also like to honor our dear professor Dionísio Burak, who graciously granted us the privilege of an interview, which is featured in this thematic edition, and who, in 2024, celebrated his 80th birthday. Of these 80 years, 54 have been dedicated to transforming education, working to ensure that Mathematics is taught, in his own words, in a more human way, so that it makes sense and has meaning for students, with mathematical modelling being one of the pathways he found to achieve this. Congratulations, Professor Dionísio! May your words continue to inspire other teachers and researchers, just as they inspired us in this interview.

In addition to the interview granted by Professor Dr. Dionísio Burak, we also consider our artists – teachers in initial and continuing teacher education – in the constitution of this thematic edition. Thirteen papers were submitted, and after a careful peer-review process, eight were accepted for publication. The published papers come from authors in the states of Paraná, São Paulo, Mato Grosso do Sul, and Acre, revealing different environments that have been or are in the process of being constituted for teacher education in mathematical modelling. These environments include research environments, collaborative spaces within a project, extension courses, Mathematical Modelling courses, and Supervised Teaching Practice in the Degree in Mathematics. These educational environments involved participants in both initial and continuing teacher education.

The paper titled “Teacher training in mathematical modeling according to participants in different research studies” by Adan Santos Martens and Tiago Emanuel Klüber, adopting a phenomenological hermeneutic investigative approach, focuses on the testimonies of seven teachers who experienced continuing education in Modelling. Through the analytical process, the authors concluded that there is a need to develop education programs that take into account the realities of the school environment and not merely the presentation of Modelling to teachers.

The paper titled “Development of a modeling activity in a collaborative training space” by Ana Paula dos Santos Malheiros, Lahis Braga Souza, and Régis Forner presents an excerpt from a project in which a Collaborative Space for Teacher Education in Modelling was established, where scholarship teachers developed a Modelling activity. Aiming to present the process of activity development by teachers in continuing education, the authors, through moments of listening, dialogue, and collaboration, concluded that modelling can contribute to an understanding of the world and to the constitution of a liberating, emancipatory, and transformative education.

With the aim of highlighting the formative aspects manifested by future Mathematics teachers through their experience with Mathematical Modelling in Supervised Internship, the authors Wellington Piveta Oliveira, Laís Maria Costa Pires de Oliveira, Ludiely da Silva de Oliveira, and Ana Karuline Palhares de Souza, in the paper titled “Training aspects in an environment for teacher education: the

supervised internship with mathematical modelling”, elucidate the articulation of three guiding axes: theoretical, didactic, and pedagogical. The authors emphasize that these axes are not mutually exclusive. They give meaning and create a favorable environment for teacher education in Mathematical Modelling during Supervised Internship.

The context of a course on Mathematical Modelling in Early Childhood Education, offered to 30 students in a secondary-level teacher education program, constituted the environment presented in the paper “Mathematical modelling and early childhood education: perceptions of primary teacher training programme students, participating in a complementary training” by Cibelli Batista Belo and Tania Teresinha Bruns Zimer. Through the subcategory Understanding of Mathematical Modelling, the authors concluded that the educational course enabled participants to learn about a new teaching approach and recognize its potential and effectiveness for children’s development.

The paper “The specialized knowledge of the (future) teacher manifested in a mathematical modeling activity” by Élide Maiara Vellozo de Castro, Edineia Zarpelon, and Janecler Aparecida Amorin Colombo investigates the specialized knowledge of three students manifested in a mathematical modelling activity developed within the scope of an extension course. The authors highlighted that, at times, the mathematical modelling activity required specialized knowledge from teachers in initial teacher education, while at other times, the knowledge inferred the developments for the activity.

The mathematical modelling course in a Degree in Mathematics was the environment established by the authors Larissa Cristina Rotta Galdioli, Michele Regiane Dias Veronez, and Paulo Henrique Rodrigues as a promoter of professional development. Thus, the paper titled “Mathematical modeling as a context for the professional development of prospective mathematics teachers” presents as findings that pre-service teachers recognized that learning about modelling enables them to create reflective and participatory learning environments and understood that teacher education is a continuous process of reflection and adaptation, integrating specific and pedagogical knowledge.

Taking into consideration the Mathematical Modelling and Supervised Internship courses in a Degree in Mathematics, the authors Letícia Barcaro Celeste Omodei and Lourdes Maria Werle de Almeida, in the paper “Teacher education and authenticity in mathematical modeling activities”, focused on investigating authenticity in modelling activities in mathematics teacher education. Based on a structure for initial teacher education, supported by the axes of learning about modelling, learning through modelling, and teaching using modelling, the study highlighted the potential for incorporating authenticity into modelling activities in the classroom.

In the paper “Educational activities in mathematical modeling promoting experiences in basic education: practices and reflections”, the authors Bárbara Nivalda Palharini Alvim Sousa and Aislan da Silva Nunes present findings based on teachers’ reflections about the experiences lived during a Mathematical Modelling education course. Over the course of 40 hours, the participants developed, planned, and implemented modelling activities in Basic Education classrooms. The authors concluded that, among the reflections, the teachers’ lack of familiarity with activities of this nature and with the mathematical content that emerges from them may create

some difficulties in their implementation.

We consider, based on the publications that are part of this thematic edition, that there is a community of researchers and teachers concerned with the presence of Mathematical Modelling in the classroom and who are mobilizing to provide guidance to teacher education so that experiences can be lived. Thus, we hope that more researchers will feel invited to constitute environments for mathematical modelling education, so we can continue strengthening ourselves in the field of practices and research.

Findamos a escrita deste editorial, agradecendo e parabenizando os autores, bem como convidando a todos à leitura dos artigos.

We conclude the writing of this editorial by thanking and congratulating the authors, as well as inviting everyone to read the papers.

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Correspondence:

Karina Alessandra Pessoa da Silva

Av. dos Pioneiros, 3131 - Bloco L – Sala 15 - Jardim Morumbi, CEP 86036-370 - Londrina - PR, Brasil.

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