

The creation of the Programa de Estudos Pós-Graduados em Educação Matemática and of the journal Educação Matemática Pesquisa at PUC-SP from the point of view of two characters central to these events

A criação do Programa de Estudos Pós-Graduados em Educação Matemática e da Revista Educação Matemática Pesquisa da PUC-SP na visão de duas personagens centrais para esses acontecimentos

La creación del Programa de Estudos Pós-Graduados em Educação Matemática y de la revista Educação Matemática Pesquisa de la PUC-SP desde el punto de vista de dos personajes centrales en estos acontecimientos

La création du Programa de Estudos Pós-Graduados em Educação Matemática et de la revue Educação Matemática Pesquisa de la PUC-SP du point de vue de deux personnages centraux de ces événements

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Resumo

O objetivo deste artigo é investigar o processo de criação da Revista Educação Matemática Pesquisa e do Programa de Estudos Pós-Graduados em Educação Matemática da PUC-SP, por meio de dados coletados a partir de entrevistas com personagens importantes neste processo que tiveram um papel decisivo nos contextos em análise: as professoras Silvia Dias Alcântara Machado e Sonia Barbosa Camargo Iglioni. Do ponto de vista metodológico, a pesquisa de natureza qualitativa realizada está inserida no campo da História Oral Temática. Nossos questionamentos às entrevistadas contemplaram os seguintes aspectos: como se deu a transição de um Programa de Matemática para um de Educação Matemática; as contribuições do Programa para o cenário da Educação Matemática brasileira; a origem da Revista Educação Matemática Pesquisa, e a motivação para a sua criação; os principais desafios, e as principais

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contribuições da Revista para a Educação Matemática, em contextos nacionais e internacionais, ao longo de seus 25 anos de existência. Como resultado desta investigação, podemos afirmar que a mudança de um Programa de Matemática para um de Educação Matemática, ocorrida em 1994, foi cuidadosamente pensada pelos que nela se engajaram, contou com a colaboração de pesquisadores de renome internacional e, por meio da criação da Revista a ele vinculada, em 1999, além de ampliar o espaço para a divulgação de pesquisas nacionais na área, oportunizou trocas internacionais - 432 instituições diferentes de 40 países estão presentes nos artigos – as quais fortaleceram o reconhecimento tanto do Programa quanto da Revista.

Palavras-chave: *Programa de Estudos Pós-Graduados em Educação Matemática da PUC-SP, Revista Educação Matemática Pesquisa, História Oral Temática, entrevistas.*

Abstract

The objective of this article is to examine the creation process of *Revista Educação Matemática Pesquisa* and of *Programa de Estudos Pós-Graduados em Educação Matemática*, through data collected from interviews with key actors in the processes, Professors Silvia Dias Alcântara Machado and Sonia Barbosa Camargo Iglioni, who played a crucial role in those contexts. From a methodological standpoint, the qualitative research study is inserted in the field of thematic oral history. The questions posed to interviewees included the following aspects: how the transition from a mathematics program into a mathematics education program occurred; the contributions of such program to Brazilian mathematics education, the origins of *Revista Educação Matemática Pesquisa*, and the underlying motivation for launching it; and the main challenges and contributions of the journal to mathematics education in its 25 years of existence, both nationally and internationally. Research results show that the conversion from a mathematics program into a mathematics education program, which took place at PUC-SP, in 1994, was carefully considered. The reorientation was also remarkable for the vital participation of experienced and internationally renowned researchers in the field. The creation of *Revista Educação Matemática Pesquisa* associated with the program, in 1999, in addition to broadening the scope of dissemination of research in mathematics education nationwide, provided opportunities for international exchanges. The publication of articles from 432 different institutions across 40 nations has consolidated the recognition of both the program and the journal itself.

Keywords: *graduate program in mathematics education of PUC-SP, Revista Educação Matemática Pesquisa, thematic oral history, interviews.*

Resumen

El objetivo de este artículo es investigar el proceso de creación de la revista *Educação Matemática Pesquisa* y del Programa de Estudos Pós-Graduados em *Educação Matemática da PUC-SP*, a través de datos recogidos en entrevistas con personajes relevantes en este proceso y que tuvieron un papel decisivo en los contextos analizados: las profesoras Silvia Dias Alcântara Machado y Sonia Barbosa Camargo Iglori. La investigación, de naturaleza cualitativa, se inserta, desde el punto de vista metodológico en el campo de la Historia Oral Temática. Entre nuestras preguntas a los entrevistados, se contemplaron los siguientes aspectos: cómo ocurrió la transición de un Programa de Matemática a un Programa de Educación Matemática, las contribuciones del Programa al escenario de la Educación Matemática brasileña, el origen de la revista *Educação Matemática Pesquisa*, así como la motivación para su creación, los principales desafíos y las principales contribuciones de la revista a la Educación Matemática, en los contextos nacional e internacional, a lo largo de sus 25 años de existencia. Como resultados de esta investigación, podemos afirmar que el cambio de un Programa de Matemática para un Programa de Educación Matemática, que tuvo lugar en 1994, fue cuidadosamente pensado por sus protagonistas, contó con la colaboración de investigadores de renombre internacional y, a través de la creación, en 1999, de la Revista vinculada a él, además de ampliar el espacio para la difusión de la investigación nacional en el área, proporcionó la oportunidad de intercambios internacionales - 432 instituciones diferentes de 40 países están presentes en los artículos - lo que fortaleció el reconocimiento tanto del Programa como de la Revista.

Palabras clave: *Programa de Estudos Pós-Graduados em Educação Matemática da PUC-SP, Revista Educação Matemática Pesquisa, História Oral Temática, entrevistas.*

Résumé

L'objectif de cet article est d'étudier le processus de création de la revue *Educação Matemática Pesquisa* et du Programa de Estudos Pós-Graduados em *Educação Matemática da PUC-SP*, à travers des données recueillies lors d'entretiens avec des personnages importants de ce processus et qui ont joué un rôle décisif dans les contextes analysés : les Professeurs Silvia Dias Alcântara Machado et Sonia Barbosa Camargo Iglori. La recherche, de nature qualitative, s'insère, du point de vue méthodologique, dans le domaine de l'histoire orale thématique. Parmi les questions posées aux personnes interrogées, les aspects suivants ont été envisagés : comment la transition d'un programme de mathématiques à un programme d'enseignement des mathématiques s'est produite, les contributions du programme au scénario de l'enseignement

des mathématiques au Brésil, l'origine de la revue *Educação Matemática Pesquisa*, ainsi que la motivation pour sa création, les principaux défis et les principales contributions de la revue à l'enseignement des mathématiques, dans des contextes nationaux et internationaux, tout au long de ses 25 années d'existence. Comme résultats de cette recherche, nous pouvons affirmer que le passage d'un programme de mathématiques à un programme d'enseignement des mathématiques, qui a eu lieu en 1994, a été soigneusement pensé par ceux qui y étaient engagés, qu'il a compté avec la collaboration de chercheurs de renommée internationale et que, grâce à la création, en 1999, de la revue qui lui est liée, en plus d'élargir l'espace de diffusion de la recherche nationale dans le domaine, il a fourni l'occasion d'échanges internationaux - 432 institutions différentes de 40 pays sont présentes dans les articles - ce qui a renforcé la reconnaissance à la fois du programme et de la revue.

Mots-clés: Programa de Estudos Pós-Graduados em Educação Matemática da PUC-SP, Revista Educação Matemática Pesquisa, Thematic Oral History, interviews.

Creation of the Graduate Studies Program in Mathematics Education and the Journal *Educação Matemática Pesquisa* - PUC-SP in the view of two central players in the events

When the decision to organize a commemorative edition of the 25th anniversary of the Journal *Educação Matemática Pesquisa* (EMP) was made, we proposed to the editors the idea of writing an article to explore the process of creation of the journal and of the graduate studies program in mathematics education (*Programa de Estudos Pós-Graduados em Educação Matemática -PEPGEM*) of the Pontifical Catholic University of São Paulo (PUC-SP) through data collected from interviews with relevant actors in this process.

Overall, the prominent role of the program in the consolidation of the field of mathematics education in Brazil justifies the importance of remembering the reasons that led to the creation of the program and the journal, as well as related concerns and challenges faced in the process. By historicizing these two institutions (the program and the journal) we are in fact revisiting core elements involved in the establishment of mathematics education as a research area in the country.

From a more localized perspective, the approach proposed in this article is important because it enables the understanding of the motivation of a group of professors, with solid mathematical backgrounds and consistent involvement in a mathematics graduate program, established in 1976, refocused their interest towards mathematics education and reoriented the program in which they were involved to that field of knowledge. What were the reasons that led these mathematicians be concerned with issues related to teaching and learning mathematics? How did they update their knowledge to facilitate this migration? What types of collaborations with other researchers and institutions supported these mathematicians in these processes? How did the creation of a mathematics education journal contribute to the consolidation and dissemination of the newly established program and, at the same time, expansion of the knowledge regarding advancements in the field for the scholars who started working in it?

To get answers, or at least clues to those questions, we conducted a qualitative investigation (Marconi & Lakatos, 2021). Using the thematic oral history perspective (Queiroz, 1988; Garnica, 2003, 2007), we interviewed two highly relevant figures in the context we intended to discuss: Professors Silvia Dias Alcântara Machado who provided detailed information about the program's creation process, and Sonia Barbosa Camargo Iglioni who provided a meticulous account of the creation process and the early years of activity of the EMP Journal. The data obtained from the interviews were complemented with additional information

gathered from the EMP Journal website, as explained in the next section, which describes the methodology of investigation.

Methodology: Thematic Oral History

According to Silva & Souza (2007), the research conducted falls under the category of oral history, which is recognized as a qualitative research approach that encompasses a set of methodologically sound practices in mathematics education.

Oral history was chosen as a methodology due to the impossibility of constructing "the" history of the creation of PEPGEM and EMP, by reconstructing the views of individuals (Professor Machado and Professor Igliori) who experienced situations and contexts related to it, without discrediting official data (Garnica, 2004a, 2004b).

As Garnica (2003) points out, it should be noted that, when choosing oral history, one assumes an understanding of history as a version, therefore not the history of what actually occurred, but a "history of interpretations" (Silva & Souza, 2007).

We employed thematic oral history, a subfield of oral history, for the investigation detailed in this article. Meihy (1996) defined it as an investigation that begins from a certain, pre-established subject, with the intention of obtaining information related to a specific topic, in this case, the creation of the program and the journal associated to it.

According to Garnica (2003), the first step in research that uses oral history as methodology is to establish a guiding question that will direct the data collection. We made two assumptions for the guiding questions in this study. Regarding the first, which deals with the creation of the program, we tried to investigate the following areas:

- the early interest of the faculty at PUC-SP, who originally conducted investigations in mathematics, in mathematics education.
- the transition from the original graduate program in mathematics to another in mathematics education.
- the significant events in the transition and the people involved.
- the contributions of the program to the Brazilian mathematics education scenario.

The creation of the EMP Journal, in 1999, is the second area of interest which contemplated:

- the motivation for the creation of the journal.
- the main challenges of such creation.
- the selection process of the first articles.

- the editorial priorities regarding what to publish in the inaugural issues of the Journal.
- the main contributions of the Journal to Brazilian mathematics education and the international scenario in the past 25 years.

The search for interviewees, which should always be focused on the concern of listening to individuals who experienced the event under study, is the second methodological procedure in investigations oriented by oral history. In the case of the present study, we chose *a priori* Professor Machado, who was directly involved in the transition from the mathematics program to the mathematics education program, Professor Iglioni who was directly responsible for the creation of EMP.

The interviews were held at PEPGEM - PUC-SP, and lasted approximately 90 minutes each, and were audio-recorded with the consent of both professors. As Gaertner and Baraldi (2008), and Portelli (2012) point out (i) the interviewees' memory is selective both in what is remembered and what is forgotten and silenced; (ii) the interviewees can create multiple versions of the past they are reporting and transmit them orally according to current needs; (iii) they can group events which, even though for them have similar meanings, may have occurred in a different chronological order; and (iv) the meanings attributed to past actions and choices are consequences of the meaning given to them by the interviewees at the time they are recalling them. The researchers were aware of that throughout the interview and analysis processes.

The interviews were completed and transcribed using software and textualized by the authors. In order to guide the analyses that would later be conducted, the authors removed grammar errors from the text, filled in gaps to make reading more fluent, rearranged the interviewees' discursive flow thematically or chronologically, and, as necessary, added subheadings to highlight the subtopics that emerged in the interviews.

Textualizations were completed and analyzed. Garnica (2007) claims that this is a method to provide meanings in which the researchers appropriate the text and, starting from it, weave an interpretation, incorporating their own meanings, even if conjured in association with the interviewees, and obtain a narrative plot of their own. In short, analyzing interviews from the standpoint of oral history is "to retrace scenarios, outline them in light of the present, dialogue with data, perceive trends in what changes and what remains." (Garnica, 2003, p. 34).

Whenever necessary and when doing so would enrich the results obtained, the analyses of the interviews were supplemented with information from research conducted by other authors, from the PEPGEM - PUC-SP website³, and from the EMP Journal website⁴.

³ <https://revistas.pucsp.br/index.php/emp> - Accessed May 28, 2023.

⁴ <https://www.pucsp.br/pos-graduacao/mestrado-e-doutorado/educacao-matematica> - Accessed May 28, 2023..

After describing the methodology and methodological procedures employed, we proceed to a brief characterization of the scholars interviewed.

Brief Characterization of the Interviewees

Professor Sonia Barbosa Camargo Iglioni graduated in mathematics at PUC-SP in 1967. She received her master's degree in mathematics from PUC-SP in 1979, under the supervision of Prof. Dr. João Alésio de Caroli, and her Ph.D., in the same area and same institution, in 1986; her thesis focused on functional analysis under the supervision of Prof. Dr. Domingos Pisaneli. From 1995 to 1996, with the support of *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* (CAPES), she did a post-doctoral internship in France, at the Université Paris VII, which focused on investigations regarding the didactics of analysis, under the supervision of Prof. Dr. Michèle Artigue.

Professor Iglioni is a tenured professor at the College of Exact Sciences and Technology at PUC-SP as well as of PEPGEM at the same university. She was the coordinator of the program from 1995 to 2005, and from 2011 to 2013, when the professional master's and Ph.D. programs in mathematics education were implemented.

She was responsible for the creation of the journals *Educação Matemática Pesquisa*, in 1999, and *Ensino de Matemática em Debate*, in 2014. She participated in the creation of Working Group 19, in mathematics education, of *Associação Nacional de Pós-Graduação e Pesquisa em Educação* -ANPEd (National Association of Graduate Studies and Research in Education) and was its first coordinator. She is a member of Working Group 04, in mathematics education in higher education of the *Sociedade Brasileira de Educação Matemática* – SBEM (Brazilian Society of Mathematics Education). She has conducted research particularly on the topic of teaching calculus and is the leader of the research group in mathematics, both elementary and advanced, certified by PUC-SP by the CNPq, *Conselho Nacional de Desenvolvimento Científico e Tecnológico* (National Council for Scientific and Technological Development).

She completed her second postdoctoral internship, with the support of CAPES, between January and July 2018, at the French Institute of Education of the *École Normale Supérieure de Lyon*, under the supervision of Prof. Dr. Luc Trouche, when she conducted research regarding the theory of the documentary approach to didactics.

In 1964, Professor Silvia Dias Alcântara Machado earned her degree social services from PUC-SP. In 1975, she completed a whole new undergraduate course in mathematics at

the same institution. In 1981, she earned her master's degree in mathematics from the graduate studies program of PUC-SP. In 1986, the same university awarded her a Ph.D. in the same field. She also holds a *Diplôme d'Études Approfondies* (DEA) in algebra from the *Université de Montpellier*, France.

She participated directly in the creation of PEPGEM at PUC-SP, of which she was a professor and coordinator, as detailed in the following section. In that program she founded, in 2003, the Research Group in Algebraic Education (GPEA), certified by CNPq through PUC-SP, which she chaired until her retirement in 2018. Throughout her academic career, she conducted research mainly in the following areas: algebraic education, generalization of patterns, linear algebra and elementary number theory.

Professor Machado played an important role in the establishment of the ANPED Working Group 19, which she also coordinated. Regarding its constitution process, in a testimony given at the Federal Rural University of Rio de Janeiro in order to record the history of WG 19, she pointed out the following:

We, the members of the graduate studies program in mathematics education (specifically Professors Benedito Antonio da Silva, Maria Cristina de Souza Albuquerque Maranhão, Sandra Maria Pinto Magina, Saddo Ag Almouloud, Silvia Dias Alcântara Machado, Sonia Barbosa Camargo Iglioni and Tania Maria Mendonça Campos) and researchers from other institutions such as, Regina Flemming Damm from the Federal University of Santa Catarina and José Luiz Magalhães de Freitas from the Federal University of Mato Grosso do Sul, conclude that it would be important to form a study group (SG) in mathematics education. This would establish a platform for ANPED members to debate research in mathematics education, as well as give those involved the opportunity to participate in the decisions regarding education-related matters in general. In 1997, led by Professor Sonia Iglioni, who was the coordinator of the graduate studies program in mathematics education at that time, this group of scholars created the mathematics education study group. I took over the coordination after the 1999 ANPED meeting, when the study group became a work group⁵.

After characterizing the interviewees involved in this research, the next section will detail the transition from PUC-SP's Graduate Program in Mathematics to PEPGEM, mostly based on data collected through the testimony of Professor Silva.

⁵ http://www.ufrj.br/emanped/paginas/depoimentos/pdf/silvia_dias_alcantara_machado.pdf - Accessed 27 May 2023.

A turning point: from a Mathematics Graduate Program to a Mathematics Education Program

When asked about how the faculty of the PUC-SP became interested in the area of mathematics education considering they originally conducted research in mathematics, Professor Machado explained that, at a certain point during her work in the graduate program in mathematics, when Professor Tania Maria Mendonça Campos was the director of what is now called the College of Exact Sciences and Technology at PUC-SP (formerly the Center of Mathematical, Physical and Technological Sciences), the faculty of the graduate program became frustrated with how students struggled with the mathematics program. Despite coming to graduate school, most of them were oblivious as to what mathematics really was: they craved formulas, they memorized them, however, when asked what the formulas represented, they could not answer. From a conceptual point of view they had trouble with mathematics.

That concerned the faculty of the program because these graduate students were already licensed teachers, they were teaching and pursuing improvement through a graduation course. The faculty of the program considered this a grave scenario, as it involved students who were interested in earning master's and doctoral degrees in mathematics but had completely erroneous perceptions about the science and of what it meant to master the subject. These students considered themselves proficient in mathematics because they could solve problems whose resolution they had observed. However, they lacked the curiosity to begin with a problem that they were unsure how to solve and search for the solution and comprehend such solution.

One of the scholars who worked in the mathematics undergraduate program at PUC-SP at that time, Dr. Ubiratan D'Ambrósio, had already pointed out issues concerning mathematics education, but this topic was still unclear to the program's faculty. However, Professor Campos became good friends with Professor D'Ambrósio and came to appreciate his ideas about mathematics education, sharing them with Professor Machado, and they both gradually became involved in the area. According to Bertoni (2004), back in 1986, a one-day event was organized at PUC-SP, where participants decided to organize the 1st. National Meeting on mathematics education (I ENEM), which took place from February 2 to 6, 1987, also at PUC-SP, with the presentation of 136 papers. Professor Campos coordinated the group that organized the event and Professor Machado was part of the organizing committee.

Other important factor in this process of reflection about the change from the graduate program in mathematics to a graduate program in mathematics education was Professor Campos' participation in important international events in the field. In 1988, she attended the

6th edition of the International Congress on Mathematical Education (ICME-6), in Hungary, and in 1989 the Annual Conference of the International Group for the Psychology of Mathematics Education held in France. However, Professor Campos was not the only one in the program interested in the area at that time. As Bianchini & Machado (2016) pointed out, since the first ENEM, some faculty at the mathematics department of PUC-SP began to get involved with the Brazilian mathematics education movement.

Professors Campos and Machado led this movement within the institution and based on their reflections, they decided they should take on the mission, with the coordination of the program, of rethinking it and changing its focus. At that time, the two professors, who were already actively participating in events, colloquiums and conferences in the area of mathematics, started to share their concerns with renowned mathematicians present at these occasions, such as Elon Lages Lima and Pedro Alberto Morettin. They found the idea of changing the orientation of the graduate program in mathematics at PUC-SP, steering it towards mathematics education, interesting and pertinent. But how was this idea perceived by the faculty working in the program at that time?

At the time, the faculty was comprised of Carlos Alberto Garcia Callioli, Peter Almay, Alésio João de Caroli, Erika Brigitta Ledergerber-Ruoff, Paul Gottfried Ledergerber, Fernando Furquim de Almeida, Carisa Abud da Silva, and Edison Farah, the latter being highly respected by the entire faculty.

As time went on, some of them either passed away, retired or resigned, and the faculty was reconfigured, receiving, not necessarily in the order presented herein, professors Machado and Iglioni (who up to that point had worked only at undergraduate level), Ubiratan D'Ambrosio, Benedito Antonio da Silva, Tania Maria Mendonça Campos, Anna Franchi, Mineko Yamashita, Leila Zardo Puga, Ana Paula Jahn, Sandra Maria Pinto Magina, Celina Aparecida Almeida Abar, Saddo Ag Almouloud, Cileda de Queiroz e Silva Coutinho, Wagner Rodrigues Valente, Janete Bolite Frant, Barbara Lutaif Bianchini, Ana Lucia Manrique, Maria José Ferreira da Silva, Celia Maria Carolino Pires, Maria Cristina de Souza Albuquerque Maranhão, Maria Célia Leme da Silva, Siobhan Victoria Healy (Lulu Healy), Ruy César Pietropaolo, Vera Helena Giusti de Souza, Sonia Pitta Coelho, Maria Cristina Araújo de Oliveira, Michael Ote, Vincenzo Bongiovanni, Antonio Carlos Brolezzi, Armando Traldi Jr, Fumikazu Saito, Gerson Pastre de Oliveira, Marisa da Silva Dias, Gabriel Loureiro de Lima and Celso Ribeiro Campos.

Let us focus our attention on the faculty at that transitional moment, between the late 1980s and the early 1990s. Professor Farah welcomed the discussions about mathematics

education taking place under the leadership of Professors Campos and Machado and supported the election of Professor Machado to coordinate the program, which until then was the responsibility of Professor Carisa Abud da Silva (who chose to remain neutral in the debate) so that the discussion could be broadened and institutionalized.

The involvement of Professors Campos and Machado with issues relating to mathematics education allowed them to learn about the work of eminent French researchers in the field and realize that they discussed issues regarding teaching and learning mathematics with great authority and depth as they had a solid foundation in mathematics. They then started to communicate with these researchers and to utilize their investigations. Later on, some of them, such as Guy Brousseau, Gérard Vergnaud, Michèle Artigue, Régine Douady, and Colette Laborde visited Brazil and their interactions with Brazilian teachers were

fundamental to promote and deepen the studies of French didactics of mathematics, which resulted in the first CAPES-COFECUB international cooperation in the field of mathematics education in 1990, coordinated by Tania Maria Mendonça Campos (PUC-SP, São Paulo), in Brazil, with the cooperation of Paulo Figueiredo Lima (Universidade Federal de Pernambuco - UFPE, Recife) and João Bosco Pitombeira (PUC-Rio, Rio de Janeiro). The French coordinators were Régine Douady and Michèle Artigue (University Paris 7) with the cooperation of Colette Laborde (Joseph Fourier University, Grenoble) and Michel Henry (University of Besançon). The project aimed to involve participants in the following: training human resources to work at all three educational levels, as well as at the graduate level, conducting research focused on classroom practices, supporting educational policies; creating, consolidating and articulating centers of excellence in the field of mathematics didactics; and developing scientific production in the field. The specific objectives of the project were strengthening the master's in mathematics education of the Center for Exact and Technological Sciences at PUC - São Paulo, then being developed; the creation of the master's in science and mathematics program of PUC - Rio de Janeiro; and the creation of the master's in mathematics education at UFPE (Campos & Trgalová, 2016, p. 63).

The inception of the new concentration area in didactics of mathematics in 1990, while still falling under the purview of the graduate program in mathematics, marked the first significant change seen during this pivotal period of the graduate studies program at PUC-SP, as noted in the program's website. Another important moment was the participation of Professors Machado and Campos in the 7th ICME, in Canada, in 1992.

However, according to Professor Machado, the most important contribution to the transition from a mathematics program to a mathematics education program was the CAPES-COFECUB agreement celebrated between Brazil and France. That change took place in 1994, when the program was renamed as the Graduate Program in Mathematics Education which was dedicated to the teaching of mathematics.

The cooperation between Brazil and France supported by CAPES (Coordination for the Improvement of Higher Education Personnel), in Brazil, and by the French Ministry of Foreign Affairs and International Development, and the Ministry of National Education, Higher Education and Research, through the French Committee for University Evaluation and Scientific Collaboration with Brazil (COFECUB), enabled the development of several research projects in didactics of mathematics (Campos & Trgalová, 2016).

Within the scope of this partnership, both Brazilian and foreign researchers, particularly from France, cooperated to build the curricular structure of the newly created program. In addition, the following researchers visited and conducted activities at PUC-SP: Gérard Vergnaud, Guy Brousseau, Règine Douady, Marc Rogalski, Marie-Jeanne Perrin-Glorian, Isabelle Bloch, Denise Grenier, Najla Acioly Régnier, Jean-Claude Régnier, Régis Gras, Maxime Bailleul, Nicolas Balacheff, Jean-Luc Dorier, Jean-Baptiste Lagrange and Michèle Artigue. Likewise, through the agreement, Brazilian researchers visited, conducted activities, and graduated from French universities, which contributed to the development of joint research and training of young researchers in both countries.

From 1994 to 1997, the program underwent a consolidation period that culminated with the accreditation of the academic master's degree by CAPES, in 1997. At the time Professor Iglioni was in charge of the coordination of the program.

In 1998, the program was restructured and renamed as in Mathematics Education Graduate Studies Program. In 2000, as a result of the experience accumulated by the faculty in the area, a request for authorization of a doctoral program in mathematics education and a professional master's in mathematics education was submitted to CAPES, which was granted in 2002.

In Professor Machado's view, the main contribution of PEPGEM of PUC-SP to the Brazilian scenario in the first years of its operation was disseminating the references of French mathematics didactics in Brazil. Moreover, in her opinion, the fact that the program originated in a mathematics program also had a major impact from the very first productions, since, similarly to France, the work developed sought to combine knowledge of mathematics education with a solid mathematical foundation.

From the start, the program was well accepted by its target audience, who, as previously, continued to be comprised of mathematics teachers, but who now came to PUC-SP knowing that they would not only study mathematics, but would also reflect in depth on issues related to teaching and learning mathematics. Therefore, it is important to note that during the development of the curriculum, care was taken to maintain a consistent formation in

mathematics throughout the courses of the program, but with a clearly defined objective: the teachers' role in assisting students acquiring knowledge of mathematical content.

But how did EMP Journal associated with the program come into existence? This is the topic discussed in the following section, with data gathered from the testimony of Professor Iglori and information obtained by a thorough analysis of every edition of the journal available in its website in digital form.

Creation, consolidation and contributions of the EMP Journal linked to PEPGEM

When questioned about the motivation to create the EMP Journal, Professor Iglori recalled that, in 1995, when she took over the coordination of the program, with Professor Benedito Antonio da Silva as her alternate. She stepped down from the coordination for some time, as she had received a research internship grant in France, under the supervision of Professor Michèle Artigue. Upon returning to Brazil, in 1996, the faculty was engaged in obtaining the accreditation the graduate program from CAPES.

As a result of that effort, concerns arose regarding the publications of the program's faculty: there was not yet a significant number of journals devoted to mathematics education in the country, as the number of programs exclusively dedicated to this area of concentration was also small, and articles on the subject submitted for evaluation in periodicals concerning Education or Mathematics were often not accepted. Therefore, they decided to attempt to create a vehicle for scientific dissemination that could accommodate the community of mathematics educators being trained in the country, including the faculty of the program. This account by Professor Iglori is supported by the opening line of the editorial of the first volume of the journal:

The field of mathematics education has been growing significantly in Brazil; however, has not yet found a corresponding space for popularization. As a result of this realization the Graduate Program in Mathematics Education of PUC-SP took the initiative of providing the academic community with a new journal: *Educação Matemática Pesquisa* (Iglori, 1999, np).

Having decided to launch the journal and in order to get inspiration and develop a format for the journal they endeavored to create, the team examined existing journals with publications in the area of mathematics education, such as, for example, *Boletim de Educação Matemática* (BOLEMA), associated with *Universidade Estadual Paulista* (UNESP), created in 1985, and *Zetetiké*, created in 1993 at the *Universidade Estadual de Campinas* (UNICAMP). With the

journal finally launched in 1999 (i.e., two years after the accreditation of the master's course in mathematics education), the initial challenge was to get partners with a background in mathematics, education and other areas that constitute mathematics education to analyze the articles submitted for publication. To ensure the quality of the texts, many times the faculty of the program assessed the articles themselves in detail. Technological issues were also an obstacle at that time, since the publications were exclusively printed by the University's publishing house, EDUC, relying on expensive work for revision, editing, organization, formatting, etc., a process that consumed significant time from the program's coordinator and vice-coordinator.

One aspect to be pointed out, which was highlighted by Professor Iglioni in her interview is that, although the faculty had initially based their research mainly on French mathematics didactics, the editorial of the first volume reflects the concern that the journal would not be exclusively associated with that theoretical framework:

Striving to contribute to the debate and enrichment of scientific research in this area, *Educação Matemática Pesquisa* aims basically at accepting work that is in some way related to the topics of the lines of research. Mathematics within the curriculum and teacher training; epistemology and didactics of mathematics. These are lines of research that guide the Graduate Program in Mathematics Education at PUC-SP. However, this intention is by no means restrictive. On the contrary, it seeks to maintain the scientific dialogue between mathematics education and other fields of knowledge, such as epistemology, educational psychology, philosophy and the history of sciences and disciplinary history, to which it is related. *Educação Matemática Pesquisa* is not committed to a particular theoretical or cultural framework. Thus, the choices or calls for submissions for each issue can embrace plurality, since it is believed that the exchange of ideas is a basic condition for the development of any area of knowledge (Iglioni, 1999, np.).

When asked how the first submissions occurred, whether they were through invitations or spontaneous, Professor Iglioni said that, at the beginning, it was necessary to invite authors. Only after some time the submissions became spontaneous. Initially, most invitations were made primarily with the objective of ensuring articles of consistent quality for the first issues of the journal. The first issue of the first volume contained three articles, one by Marie-Paule Rommevaux, published in French, another by Circe Silva da Silva Dynnekov, in Portuguese, and the last by Celia Hoyles, in English. The second issue is comprised of four articles, one in French by Jean-Claude Raucher, three in Portuguese, one by Gilda de La Rocque Palis and Lynne Ipiña, another by Monica Karrer and Sandra Magina, and finally, one by Wagner Rodrigues Valente. The editorial of this second issue, provided clarifying information about this configuration:

The inaugural issue was organized with the goal of selecting articles that, in some manner, encompass the lines of research of the program. For this second issue, due to feedback from the community about the first issue, we also sought to favor Brazilian research in order to contribute to the enrichment of the scientific debate in the area of mathematics education in Brazil. (Igliori, 1999, np).

Some renowned mathematical educators were invited to publish articles in the first volumes of EMP. Besides those already mentioned, we highlight, as examples: Luc Trouche, Michael Ote, Vicenç Font, Rafael Núñez, Gert Schubring and Régis Gras.

As one of the key contributions of the journal for the advancement of the program in these 25 years, Professor Igliori emphasizes the fact that the journal has made it possible for the faculty and researchers of PUC-SP to establish contacts with international authors, linked to different theoretical perspectives. This has helped broaden the considerations provided in classes, and the work developed in the program is not limited only to Brazilian issues. Additionally, the journal provided a chance for recognition of the work developed in PEPGEM at PUC-SP by international researchers, which gave rise to new partnerships and, consequently, an expansion of the scope of the research developed.

An analysis of all volumes and issues published since 1999 (volume 1 - number 1) up to 2023 (volume 25 - number 1), from the standpoint of institutions and countries of the authors of the papers, supported perception of Professor Igliori regarding the international recognition of the EMP Journal. Throughout the journal's history, researchers from 40 different countries have published results of their investigations through the periodical edited by PEPGEM of PUC-SP. It is also surprising to see the number of different institutions to which the authors and co-authors of the work published are associated, in the 25 years of existence of EMP. The analysis we conducted, showed the presence of 432 different institutions when considering the entire set of articles published. This information is detailed, by continent and country, in Tables 1, 2, 3, 4, 5, 6 and 7.

Table 1.

Different institutions from Africa represented in the articles (Research data)

Country	Number of Institutions
South Africa	1
Benin	1
Mali	1
Madagascar	1
Gabon	1
Total	5

Table 2.

Different institutions from Asia represented in the articles (Research data)

Country	Number of Institutions
Japan	6
Thailand	1
Taiwan	1
Lebanon	1
Israel	1
Indonesia	2
Total	12

Table 3.

Different institutions from Europe represented in the articles (Research data)

Country	Number of Institutions
Germany	5
Andorra	1
Austria	1
Belgium	1
Spain	29
France	37
Hungary	1
Italy	2
Norway	1
Portugal	19
United Kingdom	5
San Marino	1
Sweden	1
Swiss	1
Croatia	2
Faroe Islands	1
Total	108

Table 4.

Different institutions from Oceania represented in the articles (Research data)

Country	Number of Institutions
Australia	3
New Zealand	1
Total	4

Table 5.

Different institutions from South America represented in the articles (Research data)

Country	Number of Institutions
Argentina	16
Brazil	246
Chile	6
Colombia	5
Ecuador	1
Peru	2
Venezuela	2
Total	278

Table 6.

Different institutions from Central America represented in the articles (Research data)

Country	Number of Institutions
Cuba	1
Total	1

Table 7.

Different institutions from North America represented in the articles (Research data)

Country	Number of Institutions
Mexico	14
Canada	1
USA	9
Total	24

Observing Tables 1, 2, 3, 4, 5, 6 and 7, it is clear that, in the African continent, among the five countries that contributed to the EMP, no one is notable for the number of institutions represented; each had a single submission. In Asia, the largest contribution is from Japan (6). Raking second is Indonesia with two institutions in the set of articles analyzed. The European countries with the largest number of institutions whose faculty published in EMP were, respectively, France (37), Spain (29) and Portugal (19). In Oceania, the main contributor is Australia, represented by three institutions. In the Americas, Brazil is the country with the most institutions represented in these 25 years of the journal: 246. Second in the ranking is Argentina with 16. Central America is represented by one country and one institution. In North America,

Mexico (14) and the United States of America (9) stand out as the countries with most significant institutional representation. The presence of different institutions from the same country in the articles published so far in *Educação Matemática Pesquisa* is illustrated in Figure 1.



Figure 1.

Representation on a world map of the presence of different institutions from the same country in articles published in Educação Matemática Pesquisa

The last pertinent aspect highlighted in this article concerns the fields of study to which the special and thematic issues launched were dedicated, in 25 years of existence. The data is shown in Table 8.

Table 8.

Fields contemplated by special and thematic editions of EMP (Research data)

Year	Field
2002	Statistical Method of Implicative Analysis
2003	Geometry
2009	Teacher Training
2010	Technologies in Mathematics Education
2011	Teaching and Learning Differential and Integral Calculus
2012	Historiographical trends and perspectives
2013	Mathematics Education in Higher Education
2013	GT-19 of ANPEd
2014	Implicative Statistical Analysis
2014	Geometry
2015	Guiding Parameters of Research in Mathematics Education in Brazil
2015	Digital Technologies and Mathematics Education

2016	Statistical Education
2017	Curriculum and Mathematics Education
2018	Anthropological Theory of Didactics
2019	Algebraic Education
2019	The World Questioning Paradigm
2019	Didactics of Mathematics (LADIMA)
2020	Research Methodology
2020	Advances in the Anthropological Theory of Didactics (CITAD)
2021	Documentary Approach to Didactics
2021	Statistical Education (Hispanic-Brazilian Seminar)
2022	Philosophy of Mathematics Education
2022	Mathematics Teacher Education/Pedagogical Residency Program

The themes are notably comprehensive. However, there is some repetition (especially, statistics education, anthropological theory of didactics and topics linked to it, implicative statistical analysis, geometry and technology). Therefore, there is a demand for other relevant themes that have not yet been object of EMP special or thematic editions, as well as other fields which, although previously addressed, require renewed debate. Below are some conclusions drawn from the analyses performed.

The results of the research enable us to affirm that the individuals who acted in favor of the transition meticulously considered the conversion of a mathematics program into a mathematics education program, at PUC-SP, in 1994. This reorientation was also remarkable for the indispensable participation of experienced and internationally renowned researchers in the field.

Finally, the launch of the journal *Educação Matemática Pesquisa*, in 1999, signaled an effort to broaden the scope of dissemination of research in mathematics education nationwide, as well as enabled international exchanges. The analysis performed of the articles in the journal identified 432 different institutions in 40 countries, which resonated with the consolidation of the graduate program in mathematics education and, consequently, of the journal itself.

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