EMP Educação Matemática Pesquisa
ISSN 1983-3156
Qualis A1

http://dx.doi.org/10.23925/1983-3156.2025v27i4p024-046

WG19 - Mathematics Education in the context of ANPEd: path and constitution

GT19 - Educación Matemática en el contexto de ANPEd: trayectoria y constitución

GT19 - L'enseignement des mathématiques dans le contexte de l'ANPEd: parcours et constitution

O GT19 - Educação Matemática no contexto da ANPEd: percurso e constituição

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Abstract

In 2025, the Mathematics Education Group of the National Association of Post-Graduation and Educational Research (ANPEd) is celebrating its 25th anniversary, which is an excellent opportunity to look back and examine two relevant aspects for the Brazilian Mathematics teachers: 1) the circumstances that led to the creation of the group – seen as a type of enclave between territories with, apparently, well-defined boundaries; and 2) the main elements that, during the group's existence and actions, have given Maths Education (ME) the epistemological status of a practice and research field. While these aspects seem peculiar, they also reveal what they are and how they adjust to the knowledge areas connected during their establishment. By recognising the pedagogical and educational nature of the group's creation and development, we aim to understand and explain the connection between Mathematics Education and Education, as well as the conflicts and disputes that are part of the group's history. To guide our reflection and analysis, we used articles and dossiers written by the WG as research data, which were compiled as a result of the ANPEd annual meetings since 2004. Currently, the relationship between ME and Education has been an inevitable circumstance, given their converging characteristics and goals, which has fostered dialogue between WG19 and other ANPEd WGs.

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Keywords: Maths education, ANPEd, WG19, Education.

Resumen

En este año en que el grupo de trabajo de Educación Matemática (GT19) de la ANPEd celebra su 25º aniversario, se presenta una excelente oportunidad para echar la vista atrás y analizar dos puntos de interés para la comunidad de educadores matemáticos brasileños, pues se trata de aspectos que, aunque parezcan provocar cierta extrañeza, son en sí mismos reveladores de lo que son y de cómo se configuran las áreas de conocimiento relacionadas en su proceso de construcción. Se trata de: 1) las circunstancias que llevaron a la creación del grupo en 1997 en el seno de la ANPEd, visto como una especie de enclave entre territorios con fronteras aparentemente bien delimitadas; y 2) los principales elementos que, en el curso de la existencia y de las acciones emprendidas por el GT, confieren a la Educación Matemática (EM) el estatuto epistemológico de campo de práctica y de investigación. Reconociendo el carácter pedagógico y educativo de la creación y desarrollo de este grupo, este texto pretende explicar, analizar y comprender el lugar de la EM y su relación con el campo de la Educación, buscando identificar las convergencias - así como las tensiones y disputas que forman parte de su historia. La fuente de los datos son los diversos textos y dossiers producidos por el GT en las reuniones anuales de la ANPEd desde 2004. Actualmente, la articulación entre las áreas de ME y Educación ha sido una contingencia ineludible, dadas sus características y objetivos convergentes, colocando al GT19 en diálogo con los demás GTs de la ANPEd.

Palabras clave: Educación matemáticas, GT 19, ANPEd, Educación

Résumé

L'année du 25e anniversaire du groupe d'Éducation Mathématique de l'ANPEd constitue une occasion privilégiée pour un retour analytique sur deux aspects fondamentaux pour la communauté des chercheurs en Éducation Mathématique au Brésil. Ces aspects, bien qu'ils puissent susciter une certaine perplexité, révèlent en eux-mêmes les dynamiques de structuration des champs de savoir connexes dans leur processus de constitution. Il s'agit de: 1) Les conditions qui ont conduit à la création du groupe en 1997 au sein de l'ANPEd, perçu comme un enclave épistémique entre des territoires aux frontières disciplinaires apparemment bien définies; 2) Les éléments principaux qui, au cours de l'existence et des actions entreprises par le groupe, confèrent à l'éducation mathématiques le statut épistémologique en tant que champ de recherche et de pratiques. Reconnaissant la nature pédagogique et éducative de la

création et du développement de ce groupe, l'étude cherche à expliciter et analyser les articulations et tensions épistémologiques entre les domaines de l'Éducation Mathématique et des Sciences de l'Éducation, ainsi que les conflits et enjeux qui ont jalonné son histoire. L'analyse s'appuie sur un corpus constitué des dossiers thématiques et textes scientifiques produits par le groupe dans le cadre des réunions annuelles de l'ANPEd depuis 2004, ainsi que sur des témoignages de chercheurs et des rapports des différentes coordinations successives. Ces sources permettent de mettre en évidence les traces de la convivialité et des affrontements qui marquent la orientations scientifiques (définition des thèmes, organisation des dynamiques et évaluation) des rencontres nationales ou régionales de l'ANPEd.

Mots-clés : Education mathématique, GT 19, ANPEd, Education.

Resumo

Neste ano em que o grupo de trabalho de Educação Matemática (GT19) da ANPEd completa 25 anos apresenta-se uma excelente oportunidade para lançar um olhar retrospectivo e fazer um exercício de análise sobre dois pontos de interesse para a comunidade de educadores matemáticos brasileiros, por serem aspectos que, ao mesmo tempo que parecem provocar certo estranhamento, são, eles mesmos, reveladores do que são e do modo como se conformam áreas de conhecimento conexas no seu processo de construção. São eles: 1) as circunstâncias que levaram à criação do grupo em 1997 no interior da ANPEd, visto como uma espécie de enclave entre territórios com fronteiras aparentemente bem demarcadas; e 2) os principais elementos que, no percurso de existência e ações empreendidas pelo GT, conferem à Educação Matemática (EM) estatuto epistemológico de um campo de práticas e de investigação. Reconhecendo o caráter até certo ponto pedagógico e educativo que o processo da criação e do desenvolvimento desse grupo encerra, este texto objetiva explicitar, analisar e compreender o lugar da EM e a sua relação com a área de Educação, buscando identificar convergências – bem como tensões e disputas que fazem parte da sua história. Tomam-se como fonte de dados os diferentes textos e dossiês produzidos pelo GT a partir das reuniões anuais da ANPEd, desde 2004. Atualmente, a articulação entre as áreas de EM e Educação tem sido uma contingência inescapável, dadas as suas características e fins convergentes, colocando o GT19 em diálogo com os demais GT da ANPEd.

Palavras-chave**:** Educação matemática, GT19, ANPEd, Educação**.**

WG19 - Mathematics Education in the context of ANPEd: path and constitution

The WG19 – Mathematics Education from the *Associação Nacional de Pesquisa e Pós-Graduação em Educação* (ANPEd- National Association of Post-Graduation and Educational Research) completes 25 years in 2025. To celebrate this important date, we take a retrospective and analytical look at its trajectory. Which facts marked this trajectory? Which conflicts and discussions marked this WG's trajectory? What is the recognition of Mathematics Education as a subarea in the field of Education? These and other questions have always been present in the WG discussions. This text aims to demonstrate, analyze, and understand the role of Mathematics Education (ME) and its relationship with the field of Education, seeking to identify convergences, tensions, and disputes that constitute its history. To do so, we are grounded on the material produced by the WG itself, in meetings whose agenda of discussion focused on the debate about the place of ME at ANPEd and in which subarea within the structure of the association it was – and currently is -located. They are materials published in journals or available on the WG's platform, and other specific texts related to the epistemological, political, and social discussions in Education and ME. At times, we used our personal archives as active members of WG19, holding coordination and scientific committee positions.

We begin with a brief contextualization of the WG19 creation within the ANPEd scope. ANPEd is structured into Work Groups (WG), and the creation of a new group implies being a Study Group (SG) for two years as a probationary period. The creation of the SG Mathematics Education was approved in the assembly of the 20th Annual ANPEd meeting in 1997, after an action coordinated by the professors-researchers from *Pontifícia Universidade Católica de São Paulo* (PUC-São Paulo). Professor Sônia Barbosa Camargo Igliori took over the coordination during these two years. At that time, ANPEd meetings were held annually, and, in 1999, after showing the SG's conditions to become a WG, due to the volume of works submitted to the 1998 and 1999 meetings, the General Assembly approved its promotion to a WG, and Professor Sílvia Dias Alcântara Machado became the coordinator. Thus, the ME area earned its space at ANPEd. Conflicts and power relations marked this achievement and permanence as a WG. Due to ANPEd's structure, the WGs are organized in subareas for different actions, such as: evaluation of submitted works by the members of the scientific committee because each work goes through a WG internal evaluator and another from the subarea; contribute to plan the annual meetings; propose themes for the special sections; and implement other actions when necessary.

During these 25 years, the WG went through several changes, some from the organization of ANPEd itself and others by ME's movement that, as Education, has broadened its array of investigation perspectives and study objects. Evidence of this enlargement in the area of Education can be perceived in the amount of WGs; in 2000 (the first year ANPEd has its own website) there were 20 groups; in 2025, 24 WGs and 3 SG, pointing out the extent of investigated themes and the need to regroup the WGs, considering that the themes investigated do not fit the more traditional ones that exist since the creation of ANPEd in 1978. In the specific case of ME, the research objects have also broadened, incorporating themes previously absent, moving from a more psychological perspective at the beginning of the WG to a more critical, historical, social, and political view. As active members of WG19 since its early days, we perceive that this WG assembles researchers from graduate programs in Education. Since 2011, with the creation of the Teaching area at *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* (Capes- Brazilian Federal Agency for Support and Evaluation of Graduate Education), ME was subdivided into two areas: Education (Area 38) and Teaching (Area 46). This subdivision dislocated the investigation themes: in the Education area, the studies in ME focused on themes more convergent to Education, not losing sight of Mathematics, the studies in the area of Teaching are more focused on issues related to Mathematics and its teaching, considering that most courses in the Teaching area are professional ones. However, the WG19 welcomes works from researchers from both areas. And how do the other WGs in the subarea, within ANPEd, welcome the WG of Mathematics Education? How are the conflicts of WG within the same subarea? This will be one of the focuses of this article.

The text is organized into three sections, beyond this introduction and our conclusions. Initially, we present the circumstances to create this WG in the interconnection with Education, highlighting the main tensions and conflicts with the community. In the next section, we discuss the epistemological statute of Mathematics Education as a field of practices and investigation. In the last section, before the conclusions, we point out the current scenario of WG19 in ANPEd.

The circumstances leading to the creation of WG19 in ANPEd scope

Part of the context presented here can be found in the text by Miguel et al. (2004), from the WG 19 session entitled "*A educação matemática: uma área de conhecimento em consolidação e o papel da constituição de um grupo de trabalho dessa área na ANPEd*" [Mathematics education: a knowledge area in consolidation and the constitution role of a work

group in this area at ANPEd][3][Mathematics education: a knowledge area in consolidation and the role of establishing a work group in this area at ANPEd], in 2003, at the 26th Annual ANPEd Meeting. The session started with Prof. Ubiratan D'Ambrosio presenting some elements related to the emergence and organization of research in ME in the international panorama. In its speech, he highlighted:

> The consolidation of Mathematics Education as a subarea of mathematics and education, with an interdisciplinary nature, occurs with the foundation during the International Congress of Mathematicians, held in Rome, in 1908, of the International Commission on Mathematical Instruction known by the acronyms IMUK/ICMI, under the leadership of Felix Klein. (Miguel et al., 2004, p. 72)

According to him, the early 20th century was marked by the search for an adequate space for ME; The United States already had two associations concerned with mathematics teaching: the American Mathematical Society (AMS), founded in 1894, and the Mathematical Association of America (MAA), founded in 1915. Though they are concerned with mathematics teaching, they did not attract mathematics teachers, which led to the foundation of the National Council of Teachers of Mathematics (NCTM) in 1920. NCTM meetings did not attract ME researchers that, on its turn, felt more welcomed in the meetings of the American Educational Research Association (AERA), founded in 1916 – these meetings "offered the adequate environment for advanced studies, which became very important at the time" (Miguel et al., 2004, p. 72). AERA's space was becoming too small to group the increasing number of mathematics educators and

> by the initiative of James W. Wilson, which was then one of the leaders of the School Mathematics Study Group, from Stanford University, and a Special Interest Group (SIG) in Research in Mathematics Education (RME), in 1968, whose sections were held in the scope of AERA's annual meetings (Miguel et al., 2004, p. 73),

thus creating the WG in the scope of the association. This contextualization enabled D'Ambrosio to establish an analogy with the WG19 and ANPEd; it is possible to have a specific work group of ME within a large association in Education (Miguel et al., 2004).

[3] The article gathers four texts, written separately, referring to the intervention of each author in this session of commissioned work of WG19 ANPEd. They are: "*A educação matemática como disciplina*"[Mathematics Education as a subject] by Ubiratan D'Ambrosio; "*A criação do Grupo de Trabalho de Educação Matemática na ANPEd*" [The creation of the Work Group of Mathematics Education at ANPEd] by Sonia Barbosa Camargo Igliori; "*O projeto de disciplinarização da prática social em educação matemática*"[The project of disciplinarization of the social practice in mathematics education] by Antonio Miguel; and "*O si-mesmo e o outro: um ensaio sobre educação matemática a partir dos trabalhos sobre formação de professores*"[Oneself and the other: an essay about mathematics education from works about teacher education], by Antonio Vicente Marafioti Garnica.

Prof.Sônia Igliori, based on Professor D'Ambrosio, contextualized the creation of the SG that later became the WG. She initially argues that the "creation of a work group in a national association of ANPEd's size, which gathers studies of a given knowledge area, presupposes, above all, the recognition of the area by academia" (Miguel et al., 2004, p. 73). In the 1980s and 1990s, despite the expansion of ME research, with the consolidation of graduate programs in Education and ME, the researchers had few spaces to disseminate their studies. ANPEd is seen as an adequate space for ME researchers. A group of mathematics educators from PUC-SP organized themselves to propose to ANPEd the creation of a WG in Mathematics Education. The proposal was taken to the 20th Annual Meeting in 1997, when the representative group composed of seven professors from PUC-SP were present. According to Sônia Igliori's testimonies, the negotiations were not easy because some mathematics educators were contrary to the creation of a specific WG – they believed this could isolate researchers in ANPEd. According to her:

> They said it would be more important to participate in existing work groups than to create a specific one for mathematics education. The proponents counter-argued that many of us had already tried to send research works for ANPEd and received the answer that the work could not be accepted, though with no merit analysis, due to the lack of conditions for analysis, as the theme was not included in any of the existing work groups. Only the WG Teacher Education was open to the research works in the area of mathematics education, when they were included in the specificity of the first ones. (Miguel et al., 2004, p. 74)

In this same direction, seeking to understand the questions raised at that point about the creation of a specific WG and trying to give meaning to it, Professor Antonio Miguel brings some elements to reflect in a work session in 2003. In his arguments, the author questions whether the creation of a WG would not be a disciplinarization of ME:

> Let us think then that the deepest question our community of mathematics educators should pose itself would be: to what extent the space created by ANPEd through this WG would not be used, consciously or unconsciously, as a one way to fight for the viabilization of what we are calling here a "disciplinarization project of mathematics education" or, in other words, fighting for the project of establishing a new professional category, which is that of mathematics education professional, a category that would keep an independence and autonomy relationship regarding the education professionals and the category of professional mathematicians. (Miguel et al., 2004, p. 81)

Among other arguments, he stresses that this debate, in a way, reproduces tensions in the universities among professional mathematicians, professional educators, and the emerging ME community.

Even though the debates in the 20th meeting were intense on whether to support or not the WG creation, the creation of the SG was approved in the final assembly. Two years later, the WG 19- Mathematics Education was also approved. Thus, the session held at the 26th meeting in 2003 aimed to discuss ME as an area of knowledge in consolidation and to determine the WG's role in the ANPEd context.

At that point, the creation of WG19 had not bypassed these tensions and disputes. Though accepted as a WG at ANPEd, for a while, ME had its space in the subareas as a theme of discussion, raising other tensions and disputes, as the WG19 was allocated in a subarea whose works had little convergence in its investigation objects. Though we could not find which WGs comprised the same subarea of Mathematics Education, we know that in the 28th meeting in 2005, the subarea of WG19 was composed of the following WGs: Education and Communication; African Brazilians and Education; Enviromental Education and Gender, Sexuality and Education [4]. In the 2005 meeting, the WG19 program already had a time slot for the "WG place in the reorganization of the subareas of ANPEd's WGs". Hence, we can perceive the discomfort of this subarea for mathematics educators. In the scientific committee context, the difficulties to evaluate works in such different areas were enormous.

We believe that the turning point was on the 30th [5] and 31st meetings (in 2007 and 2008, respectively)[6] – in both meetings Antonio Miguel was the WG representative in the scientific committee. During the preparation for these meetings, the topic of area reorganization resurfaced on the agenda. We recognize the importance of Antonio Miguel's role in this process. At the 30th meeting, Prof. Inês Barbosa de Oliveira, a professor at *Universidade Estadual do Rio de Janeiro* (UERJ) and a member of WG12 – Curriculum, was invited for a session-talk. During this conversation circle, the lively discussions expressed the need for WG19 to be recognized as part of Education, considering the approximation of the study objects of mathematics educators and those from the educational field. In this meeting, a special session (Interdisciplinary cooperation and knowledge production in Education) together with WG12 – Curriculum was organized to discuss the epistemological questions that grant a statute and place to different knowledge areas encompassing the educational field. Prof. Antonio Miguel and Prof. Alice Lopes (UERJ) participated in this debate.

[4] We did not find reports or documents from previous meetings in which this WG configuration had been defined. Furthermore, we did not find information about whether, when created, the WG19 was inserted in this subarea.
[5] The WG19 coordinator was Vinicio de Macedo Santos and the vice-coordinator Adair Mendes Nacarato.
[6] Until 2013, ANPEd national meetings were held annually; from then on, they became biannual, only in odd years (National Meeting); regional meetings are held in even years (Regional Meeting).

We evaluate that, between the 30th and 31st meetings, there was a greater movement from other coordinators and members of the scientific community towards the recognition of the WG as an important space at ANPEd. Thus, in the preparation for the 31st[7] meeting in 2008, the WG reorganization was debated and, among the proposals presented and taken to the WG participants, we began integrating the subarea with the following groups: WG04 - Didactics, WG08 – Teacher Education, WG12 – Curriculum, and WG16 – Education and Communication. The community of mathematics educators within the scope of ANPEd has earned an important space at that time, with a greater dialogue on the investigation themes, overcoming the tensions and disputes that existed so far.

Another highlight of the 30th meeting was the decision towards a new format of commissioned work. Previously, the WG participants elected a theme, and the researchers who had this investigation object would send their texts - a researcher was indicated to articulate the texts and present the commissioned work. In this meeting, the WG had the commissioned work "Mathematics Education and public policies: curricula, evaluation, didactic books, and teacher education," and Prof. Antonio Vicente Marafioti Garnica from *Universidade Estadual Paulista* (UNESP) was the articulator. Since then, this is the format of the commissioned work of WG19[8] at ANPEd annual meetings. The themes, previously chosen by the participants in each meeting, evidence the movement of ME and its approximations with Education.

Understanding the relationships between ME and Education demands understanding the constitution of these areas, which will be the focus of the next section.

The area of Mathematics Education, its nature and ends

In this section, we seek to discuss the configuration of ME as an area of investigation and professional education. First, we discuss the approximations of ME with the Education area and, after, the establishment of the area as ME or as Mathematics Didactics.

A possible approximation between ME and Education

The establishment of the ME area is diverse and controversial because, as Ponte (2008) state, it gathers three important domains: 1) first one from social practices, whose nucleus are teaching and learning practices of teachers and students but that also includes other strands, such as support practices of extra-school learning and the production of didactic materials; 2) a

[7] WG19 coordinator was Adair Mendes Nacarato and Marcelo de Almeida Bairral the vice-coordinator.
[8] We will discuss later the importance of this format of commissioned work in the last section of this text.

second of academic investigation, where a new knowledge about what happens in the previous domain is produced; 3) a third of teacher education, in which this knowledge is transmitted to new generations of teachers and researchers and also teachers who are already professionals.

These are domains that overlap and nurture each other. This overlay is understandable because each actor, at different moments in their trajectories, acts in more than one of these domains, occupying a space and delineating their own pathway. According to this author, "the influences and the multiple relations among these domains are not a simple 'noise' that needs to be eliminated to understand better what happens to each of them. On the contrary, they are a constitutive element" (Ponte, 2008, p.1) and, according to him,

> the oldest of the three domains is the social practices of mathematics teaching-learning and, associated to it is the emergence of teacher training courses, mathematics education gradually establishes itself, mainly since the 1980s, as a training field. Finally, following the previous one, the academic field of research in Mathematics Education establishes itself as a scientific domain with full rights, namely in the Education area. (Ponte, 2008, p. 2)

We admit that different types of tensions mark the constitutional process of this area. There is a pathway to be carefully followed in the practices, teacher education, and studies in Mathematics Education, which consists in avoiding the "endogenous confinement" often practiced within a specific area and a possible "exogenous dilution" in the relationship established with the more general area of Education. In this sense, the practice of a self-referent, self-sufficient, and independent discourse is not uncommon, on the one hand or on the other, practices that silence the power of an area whose nature is supported in the dialogue with other similar scientific areas. By doing so, academic Mathematics Education distorts itself and loses social relevance (Ponte, 2008).

The creation and permanence of the ME WG in the scope of ANPEd, while marked by strangeness and tensions, raise the supreme challenge of affirming and grounding an epistemological specificity that enables its existence in dialogue with Mathematics and Education.

Mathematics Education (ME) and Mathematics Didactics (MD)

Nowadays, many countries, including Brazil, seek a terminological adjustment and a common grammar, and both terms have been used as synonyms. However, the historical background of the area indicates that the Anglo-Saxon world has used the expression "Mathematics Education" for the knowledge area that, mainly in France and in other countries

in Continental Europe, is called "Mathematics Didactics"; some Latin American countries use the term "Educational Mathematics".

The fundamentals of ME derive from the many interpretations from various knowledge areas (Mathematics, Psychology, History, Philosophy, Sociology, Linguistics, Epistemology, Computing), with Mathematics as the main reference area. In this sense, the approximation and differentiation between both occur in the direct reason in which the questions raised and their answers show which is the study objective of Mathematics Education and which are the theoretical guidelines that establish its knowledge source. According to Sierpinska and Lerman (1996), if is possible, in several aspects, a symmetry of answers to some questions about the genesis and processes of mathematical knowledge formulated either by mathematicians or mathematics educators, we should remember that this occurs less due to the nature of the questions and more due to the common points between the epistemological perspectives that ground the investigation about the knowledge in question. In these authors' opinion, the epistemology of Mathematics Education refers to the study of Mathematics Education proposals related "not only to the possible worlds of mathematical contents but also to the minds of immersed students and teachers, worlds and minds, in a complex context of educational institutions" (Sierpinska & Lerman, 1996, p. 829).

The questions derived from there ask about the objectives of Mathematics Education, about the types of relationships and processes established in the teaching and learning of Mathematics, whether there is a particular theory regarding these processes, or if the more general theories of education enable asking about such relationships and processes.

Sierpinska and Lerman (1996), Godino (1991, 2000, 2006) and Confrey (1994, 1995a, 1995b) collaborate with their studies to characterize the manifestations of theoretical perspectives that have been grounding Mathematics Education as an area of knowledge and investigation. These authors analyze different epistemological perspectives that have based the distinctive activities in Mathematics Education, highlighting and discussing characteristic traces. In their perspectives the main ones are the constructivist approaches (varieties of the constructivism since Piaget); the sociocultural approaches (from Vygotsky and followers); the interactionist approaches (Mead, Blumer, among others); Chevallard's French Mathematics Didacts (theory of transposition and the anthropological theory of the didactic), Brousseau (Didactical Situation theory) and Vergnaud (theory of conceptual fields). To these approaches, others can be added, such as Freudenthal Realistic Mathematics; D'Ambrosio's Ethnomathematics; Wittgenstein's perspective of language games; and Ole Skovsmose's Critical Mathematics Education.

A more complex idea of the research statute in the area of Mathematics Education can be formed from the examination of a large number of studies about the state of knowledge conducted in several countries; and the annals of the main national and international events that gather teachers, graduate students, and researchers in Mathematics Education.

Based on several sources, such as *handbooks*, relevant journals, and annals from national and international events on the area, Santos (2008, 2015) characterized the ME area, pointing out its main themes, interest focuses, and reference theories, allowing a certain view of some aspects present in the panorama of Mathematics Education during the last decades. When indicating emphases and perspectives in the area, the author also shows, on the one hand, a recoil or oscillations in the research regarding the themes considered primordial– such as problem solving, active methods, etc. – and, on the other, the emergence of new themes and subthemes or the broadening or deepening of themes already under discussion, such as information and communication technologies, culture, and social context, ethnical-racial relationships, multiculturalism etc. We can thus observe a Mathematics Education movement towards the multiplication of questions to be investigated; the diversification of theoretical-methodological references; and an increasingly greater specialization of the researchers' interests as part of a process of strengthening and institutionalizing the area in the academic scope. In the Brazilian case, we can understand the emergence of ANPEd WG19 as part of this process.

The identification of certain themes with educational research; the permanence and change of focus (evaluation, teacher education, problem solving); the emergence in more recent times of themes that were not considered before (new technologies, environmental and sociocultural issues, linguistic, difference and inclusion aspects); and the "disappearance" of some themes (active learning, learning by association) or the incorporation of others (ME of theoretical fundaments, Society and ME, multiculturalism etc.) in broader investigation problems are signs of a movement of renovation and improvement of research and the theoretical bases that ground them. The attention to the differences of social, cultural, ethnic, and racial nature – depending on the context – and the strong indication of a Mathematics teaching that is inclusive, aware of the difference, and non-selective indicate the presence of political pressures, social demands with traces of a "new world order" that transcend the limits of a given country, and, consequently, the limits of ME itself and call upon educators and researchers to overcome these limits, re-signifying its role.

In the way ME has been established, as a field of practices and knowledge, Santos (2008) points out an oscillation between two main perspectives that reveal the understandings

of a complex phenomenon regarding Mathematics and its teaching, which reinforce tendencies pointed out by the aforementioned authors. These are perspectives already signaled by Steiner (1985) in the early 1980s and that deepened from then on. A tendency is perceived in the self-analytical exercise of groups of mathematics educators seeking internal theoretical bases; and the other is to be developed by formulating internal demands for the cooperating subjects. The debate in the early 1980s reflected a need to elucidate the issue of whether there is one or more theories supporting Mathematics teaching and the research in Mathematics Education. The target or task was to seek an epistemological specificity for an ambivalent area regarding the domains of issues that mobilized and continue to mobilize the interest of different groups involved in such issues.

Summing up, historically situating the process of constituting this movement, offering maps about the themes that mobilize educators and students involved – and that interest them – enables to verify that the research and teaching practices of these areas are guided not only by a variety of theoretical and methodological focuses but, also, by the interest of producing particular theories to study the questions related to mathematics education. Consequently, we can contemplate and evaluate if these paths are mutually excluding or if there is a possible convergence, as they weight arguments that understanding these questions and answers can be distorted when supporting that there is a colonization of other areas over ME, weakening it; or limits, if we situate ourselves in the sphere of an autonomous scientific area that depends only on a close relationship to the area of reference, in this case, Mathematics. The instigating and promising experience with French Mathematics Didacts represents, from our perspective, a bet in a second perspective. One of its representatives, Chevallard (1985), advocates the existence of a cognizable, pre-existing, and independent object of our intentions, endowed with a need, a particular determinism, called the didactic system, and established by a teacher (T), knowledge (K), and student (S). It is a system that marks the pedagogical debate in its multiple interpretations, re-signifying the Didactics and the Mathematics Didactics (and their sciences). In this debate, we highlight the participation and essential contribution of, among others, Houssaye (1988), regarding the so-called "pedagogical triangle" shown in Figure 1.

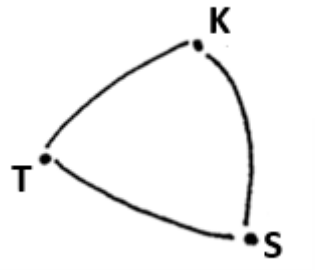

Figure 1.

System according to Chevallard (1985, p. 23)

We understand that there is in this movement aiming to identify Mathematics Education and Mathematics Didactics as experimental sciences.

Marked by Kuhn's (1970) idea of normal science, the first tendency sees the process of theoretical production and the constitution of Mathematics Education, in the investigation field, covering "a scale that goes from pre-paradigmatic activities, to mono-paradigmatic sciences, passing by multi-paradigmatic activities" (Steiner, 1985). What was seen by the second tendency – strengthened in the subsequent course of Mathematics Education history- as the nature and characteristic of the area of Mathematics Education, from the perspective of the first tendency was established (and continues to be established) as a phase of multi-paradigmatic science. Therefore, what could seem a confusion of paradigms or "theoretical weakness" of a science colonized by others, because it does not invest in its own theories, becomes, as Charlot (2006) states, its own power and way to establish itself.

Lester (2005, p. 177) uses a metaphor that characterizes this relationship in an original way and translates with some precision what happens:

> similar to the thinking process characterized by the French word *bricolage*, a notion taken from Claude Lévi-Strauss. A *bricoleur* is a handyman that creates pragmatic solutions in practical situations and is an expert in using what is available. In like manner, I suggest, as Cobb and Gravemeijer, that instead of adhering to a particular theoretical perspective, we act as *bricoleurs* adapting ideas from a variety of theoretical sources to understand our target objectives that should aim not only to deepen our fundamental understanding of learning and teaching mathematics but also to help us to provide the practical wisdom about the professional problems that raise concerns. If we start paying Much attention to these objects, the problem of the theory is susceptible to be solved.

Any investigation field is supported by a theoretical framework or epistemological references that enable understanding of the knowledge and solving the problems formulated in

this field – it is not different from ME. The efforts towards defining and understanding the matrices that give their theoretical support would not allow us to reach a powerful unified theoretical reference about which the problems of Mathematics Education are claimed, studied, and investigated nowadays. Some factors contribute to this, such as the relative youth of the area and, certainly, the interdisciplinary nature of the knowledge field in the frontier of Education Sciences and Mathematics, whose problems touch different areas of knowledge and benefit from them.

However, an understanding prevails that the tendency of disciplinarization, indicated by the practices undertaken by specific groups in the ME area, answers a need to build study objects, professional and academic identities, within the larger field of Education, which seeks the definition of a stronger specificity, with its own concepts and, eventually, research methods (Charlot, 2006). The French experience discussed by Charlot suggests a speculative movement that happens in the case of Education, as in ME and other connected areas, considering their interdisciplinary natures, whose frontiers are flexible and favorable to movements and frontier transgressions. Nonetheless, this condition also continues to produce tensions and dilemmas between mathematics educators, as already mentioned: confine itself to a rigorous disciplinary specificity or dilute itself in a mere juxtaposition of discourses from different areas with which it relates, subordinating itself to them.

We do not consider in this text any logic that creates a hierarchy among disciplines, granting them the *status* of science of not-science, by disqualifying it, be it in the general scope of large knowledge areas, be it within the field of human sciences or the educational field, refuting the "unquestioned epistemological imperialism of the general over the particular that is almost always followed by a value scheme of inferiorization of the particular regarding the general to which it is connected" (Miguel, 2008, p. 393). This perspective also contraposes a certain interpretation, possibly inherited from Platonism or positivism, which hypertrophies the position of Mathematics in the terrain of sciences and school subjects.
ciências quanto no terreno das disciplinas escolares.

Nowadays, the WG is integrated into ANPEd, and the movement on it shows the connections between Education and ME. Part of this movement is the focus of the next section.

WG19 – Mathematics Education in the scope of ANPEd: current context

The current moment of research and institutionalization of teaching and research practices in this area, instead of granting a character of an autonomous area with its own

concepts and research methods, within an educational field, affirms its relevance as an interdisciplinary area that has as a study object a set of issues related to Mathematics teaching and learning and, as such, are Education issues.

WG19 is consolidating itself as a space to discuss broader Education questions in the context of ANPEd. The 2007 and 2008 annual meetings were central to some changes in the construction of WG's meetings. We highlight two events that show evidence of these changes: the organization of commissioned works and the participation of WG19 in special sessions.

As shown, in the 30th meeting in 2007, the WG assumed a new format of commissioned work, which privileges a higher number of group participants: in each meeting or email communications, the researchers choose a theme that will be the focus of the next national meeting; the researchers that investigate this theme submit their texts that, if approved by the *ad hoc* evaluation committee, will compose the collection that will be under the responsibility of a researcher, from the WG itself or external, to make an articulation between different texts and organize the commissioned work.

A retrospective look at the commissioned works of the WG19 from 2007 to 2021 provides evidence on how the chosen themes converge with broader discussions in the educational field, articulating a connection between the wider context and specific ME-related issues. Most of the time, these themes emerge from the need for researchers' theoretical-methodological discussions.

Therefore, we can consider that, throughout time, the presence of WG19 at ANPEd shows a process to evidence its role to build the area of ME and the strong bonds that connect it to the Education area – which, in our perspective, has elements that reveal the design of the Education area itself, relying on the cooperation of areas and subareas that establish it in the academic sphere.

This becomes explicit in how the WG19 defines the themes of the commissioned works, which conjugate tasks, agendas, and challenges of its reference area: ME. Table 1 shows the commissioned works since the 30th Annual ANPEd Meeting.

Table 1.

Commissioned works since the 30th Annual ANPEd Meeting

Meeting	Year	Place	Theme	Invited researcher
30th	2007	Caxambu-MG	"Mathematics Education and public policies: curricula, evaluation, didactic books, and teacher education"	Antonio Vicente Marafioti Garnica (UNESP)
31st	2008	Caxambu-MG	"Public policies of Mathematics teacher education"	Cristiano Alberto Muniz (UNB)
32nd	2009	Caxambu-MG	"Autobiographical narratives and oral history: teacher education practices in Mathematics Education"	Elizeu Clementino de Souza (UNEB)
33rd	2010	Caxambu-MG	"Mathematics Education and Childhood: Different Exploration Possibilities"	Rosana de Oliveira (UERJ)
34th	2011	Natal-RN	"Mathematics Education in High School"	Celi Espasandin Lopes (UNICSUL)
35th	2012	Porto de Galinhas-PE	"The place of mathematics in the mathematics teaching degree"	Plínio Cavalcanti Moreira (DEMAT/UFOP) and Ana Cristina Ferreira (DEMAT/UFOP)
36.ª	2013	Goiânia-GO	"Essay between Images and Concepts of Mathematics Education: curriculum, teacher education practices, and training and the early years of elementary school"	Guilherme do Val Toledo Prado (UNICAMP)
36th	2015	Florianópolis-SC	"Professional development of teachers who teach mathematics: collaboration and curriculum materials in the scope of *Programa Observatório da Educação* (OBEDUC)"	Andréia Maria Pereira de Oliveira (UEFS)
37th	2017	São Luís-MA	"Theoretical and methodological approaches in Mathematical Education: approximations and distances"	Jonei Cerqueira Barbosa (UFBA)

38th	2019	Niterói-RJ	"Caravels in Sight: formation of teachers who teach mathematics between contexts of regulation and loss of rights and resistance forms"	Victor Augusto Giraldo (UFRJ) and Filipe Santos Fernandes (UFMG)
39th	2021	Belém-PA (Online)	"Curriculum (de)construction for early education of teachers who teach mathematics: challenges and scenarios of possibilities to (re)exist"	Márcia Cristina de Costa Trindade Cyrino (UEL) Regina Célia Grando (UFSC)
40th	2023	Manaus-AM	"Educating Mathematics teachers and basic education: social justice and equity in the process of rebuilding Brazilian democracy"	Vinicio de Macedo Santos (USP)

As we can see, for 12 years, WG19 has been using this dynamic of commissioned works. The themes are varied, without losing the focus on ME. We observe that, in the first two editions, the concerns were centered on broader issues of public policies, such as curriculum, didactic book, evaluation, and teacher education. The theme of teacher education was the object of discussion in eight meetings, varying the docus and involving different educational levels, in pre- and in-service education: childhood education, elementary school, high school, and teaching degrees. In some meetings, the WG selected themes that concerned them at that moment. For example, in the 32nd meeting, the theme focused on the narratives, considering that the use of narratives as a source of data and research methodology started at ME – and, thus, the works submitted went through the evaluation of a researcher external to the WG, who was a reference in this investigation field. The same occurred in the 36th meeting, when the invited researcher was a reference in studies focused on Elementary education. Equally important for the WG are issues related to the area itself, as the place of mathematics in the Mathematics Teaching degree (the theme of the 35th meeting) and the methodological approaches in the ME research (theme of the 38th meeting). At the 39th meeting, the WG mobilized itself to discuss issues related to the turbulent period of Brazilian history, marked by contexts of regulation and loss of rights and forms of resistance. The themes of the two last meetings follow the same direction, in which mathematics educators proposed reflecting about possibilities of (re)existence and (re)democratization, with ME focusing on social justice and equity.

The themes of the special sessions are discussed at WG19 and other WGs interested in these themes, resulting in proposals articulated between the WGs, as we can see in Table 2 below.

Table 2.

Special sessions proposed in collaboration with other WGs

Meeting	Year	WG Involved	Theme	W19 Representative
30th	2007	WG12 WG 17 WG 19	"Interdisciplinary cooperation and knowledge production in education"	Antonio Miguel (Unicamp)
31st	2008	WG 19 WG 14	"Education and social justice"	Arthur Powell (Rutgers University-Newark)
32nd	2009	WG 12 WG 16 WG 19 WG 24	"Culture and teaching: new perspectives for educational reality ?"	Ole Skovsmose (Aalborg University and Unesp)
33rd	2010	WG 12 WG 16 WG 19 WG 24	"Curriculum and teaching: educational policies and everyday practices"	We did not find the WG representative[9]
34th	2011	WG 04 WG 08 WG 19	"Beginner teacher and professional development: policies and practices"	Dario Fiorentini (Unicamp)
35th	2012	WG 04 WG 08 WG 19	"Teacher education for professional education"	Armando Traldi Junior (IFSP)
		WG 12 WG 16 WG 19	"Teacher education and technologies"	Marilena Bittar (UFMS)
36th	2013	WG 08 WG 12 WG 19	"Public policies of teacher education for K-12 education"	Adair Mendes Nacarato (USF)
37th	2015	WG 08 WG 19	"National Education Plan and teacher conditions"	Vinício de Macedo Santos (USP)
38th	2017	WG 08 WG 19	"Educational policies in dispute and the new legislations in teacher education"	Antonio Miguel (Unicamp)

[9] The folder from the 33rd meeting is not available on the ANPEd page.

39th	2019	WG 16 WG 19	"Platform invasion in K-12 and higher education during the pandemic"	Marcelo Bairral (UFRRJ)
40th	2021	WG 04 WG 19	"Movements in didactic and curriculum in the pandemic"	Marcelo Bairral (UFRRJ)
		WG 04 WG 19	"(Des)configuration of modern school education in pandemic times: new challenges for public policies"	Victor Augusto Giraldo (UFRJ)
41st	2023	WG 19 WG 21	"For an antiracist education and gender equity: integrating scientific knowledge into education"	Maria do Carmo Sousa (UFSCar)

Concerning the themes of the special sessions (Table 2), we perceive the presence of WG19 representatives, reaffirming how mathematics educators are involved with Education issues; in some meetings, the WG participated in two sessions. Due to the composition of the subarea in which WG19 is inserted, the themes are related to teacher education, curriculum and public policies, technologies and professional education. In the 30th meeting, the theme highlights the moment ANPEd experienced regarding the reorganization of subareas when Antonio Miguel (WG19) and Alice Lopes (WG12) participated in a debate about knowledge production and interdisciplinarity. We highlight the theme of the 31st meeting focused on social justice issues, which were also the focuses of the commissioned work of the 41st meeting. We also stress the WG participation in the 41st meeting focused on antiracist education and gender equity, highlighting the extent to which mathematical educators are involved in broader discussion agendas that affect the current context.

In the last Years, Brazilian education has been dominated by neoliberal policies, demanding resistance and (re)existence positions. As Hypolito (2021, p. 36) analyzes,

> the formulation of educational policies has been overly influenced by the formulation of "evidence based" knowledge ... the educational policies started to have a strong influence of quantitative data, formulated from large-scale evaluations, creation of indexes, standardized tests, which should be the base of data and indicators to show that the acceptance of using these pieces of "evidence" will be used, undoubtedly and without questions, to ensure a supposed improvement of education quality.

Analyzing and denouncing how these policies have hindered teachers and students have been the focus of many commissioned works and special sections, signaling approximations between the studies in ME and in Education.

Equally important are the WG19 positions regarding the themes of social justice, antirracist education, and gender equity – which marked the last two national meetings.

This retrospective aims to show how the WG19 themes were getting increasingly closer to those in Education, enabling the current configuration. Mathematics educators are always aware of the broader educational, political, and social context and, thus, seek articulations with different groups in the scope of ANPEd.

To conclude

In the annals of ME history there are testimonies and documental records that inform us about the process of emergence, institutionalization, and development of the area, in many cases supported in associative movements, with a punctual and local nature, that led to the formation of informal small groups based on professional and interpersonal relationships established in the school environment, in which immediate interests blossom with the pedagogical practice itself. This type of *cellula mater* and the movements that resulted in the creation of subjects, graduate programs, teacher education and specialization courses, scientific societies, events, publications, etc. can recognize similarities and differences that turn Mathematics Education in a scientific area of worldwide project with a universal nature and particular cultural traces in each country. As pointed out in this text, the articulation between the ME areas and education has been an inescapable contingency, given its converging characteristics and ends. We can consider the presence of WG19 at ANPEd as a singular and important element in the construction of the area of Mathematics Education in our country.

Throughout the text, we wanted to highlight how the process of creation and consolidation of WG19 in the scope of ANPEd was marked by tensions and debates and, on its turn, were and are present in the establishment of ME, in the curriculum organization of the academic spaces of teacher education and in the research field, with the existence of the Education and Teaching areas at Capes. However, we can say that these tensions and debates present in the process of establishing the WG19 and its coexistence with other groups within ANPEd were progressively attenuated, giving space to other issues that became challenges and stronger tensions for the Education area. The economic, political, and social changes in the country; the dismantling and erasure of neoliberal social rights in different countries, mainly peripheral ones, in the post-globalization period; and, still, the effects of the sanitary crisis that devasted humanity in this decade has challenged the educators' community regarding the place of Education and the research in and about Education nowadays. Hence, if the questions regarding the relationship between academic groups and the knowledge areas remain, the conflicts provoked by them tend to have less projection when facing the enormous educational challenges in contemporary times.

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