

Support materials for teachers who teach mathematics in the early years: EMAI and PNAIC

Translated from portuguese: Materiais de apoio para professores que ensinam Matemática nos anos iniciais: EMAI e PNAIC

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ABSTRACT

This article describes the analysis of two support materials facing teachers who teach mathematics in the early years of elementary school: Educação Matemática nos anos iniciais (EMAI) (SP) (Mathematics Education in the Early Years) and the Pacto Nacional pela Alfabetização na Idade Certa (PNAIC) (Brazil) (National Pact for Literacy at the Right Age). Through documentary analysis, having as source the Mathematics notebooks that integrate the two programs, the results show that the guiding principles and the activities contained in the materials indicates possibilities of interactions, reflections, hypothesis survey and establishment of relations. From studies of authors of Education and Mathematical Education, more specifically from the curricular field, the analysis reveals that both materials contain principles that encourage the study of mathematical concepts addressed in the school context and, considering that, if specific moments were organized for discussions and reflections in schools, such materials may have contributed to the work of the teachers who teach mathematics in the early years.

KEYWORDS: EMAI. PNAIC. Curriculum Materials. Mathematics teaching. Teachers of the early years.

RESUMO

Este artigo descreve a análise de dois materiais de apoio voltados para professores que ensinam Matemática nos anos iniciais do ensino fundamental: Educação Matemática nos Anos Iniciais (EMAI) (SP) e Pacto Nacional pela Alfabetização na Idade Certa (PNAIC) (Brasil). Por meio de análise documental, tendo como fonte os cadernos de Matemática que integram os dois programas, os resultados apontam que os princípios norteadores e as atividades contidas nos materiais indicam possibilidades de interações, reflexões, levantamento de hipóteses e estabelecimento de relações.

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Tomando-se por base estudos de autores da Educação e da Educação Matemática, mais especificamente do campo curricular, a análise revela que ambos os materiais contêm princípios que incentivam o estudo de conceitos matemáticos abordados no contexto escolar e, considerando que, se foram organizados momentos específicos voltados para discussões e reflexões nas escolas, tais materiais podem ter contribuído para o trabalho dos professores que ensinam Matemática nos anos iniciais.

PALAVRAS-CHAVE: EMAI. PNAIC. Materiais Curriculares. Ensino de Matemática. Professores dos anos iniciais.

Introduction

It is common for students to enter the Pedagogy course without mastering the main mathematical concepts to be taught in the early years of elementary school. Curi (2005) states that the Pedagogy courses in Brazil, in general, have a Mathematics course with a workload between 36 and 72 hours and the teachers who teach this course, in their majority, do not have specific training in Mathematics or in Mathematics Education. Currently, even with possible changes in this workload, due to requests in legislation, many students complete the Pedagogy courses not only without the mastery of mathematics teaching methodologies, but without an effective understanding of the concepts they will need to teach as mathematics teachers in the initial years of elementary school.

For Ortega (2011), results of different research reports difficulties of some individuals, even teachers, who will teach Mathematics in the early years of elementary school, in effectively understanding important basic concepts in the field of Mathematics. Studies from Curi (2005), Nacarato and Paiva (2008) and Santos (2008) present results in this direction.

Often official curriculum materials, textbooks, and other materials are presented to teachers in the initial years. In this context, it is important to consider how such materials, in the specific case of Mathematics, can be a support to the process of organizing the work of these teachers.

In the state of São Paulo, since 2014, the teachers who teach Mathematics in the public network have, besides the Mathematics textbook, two materials aimed at teaching this subject. One material, organized by the State Secretariat of Education of the State of São Paulo integrates the project called Educação Matemática nos Anos Iniciais - (EMAI) (Mathematics Education in the Early Years) (SÃO PAULO, 2012). The other material is part of the program called Pacto Nacional pela Alfabetização na Idade Certa - (PNAIC) (National Pact for Literacy at the Right Age) (BRAZIL, 2014a), implemented in 2014 by the federal government and, in 2014, brings a publication focused on Mathematics.

The municipalities of the interior of the state of São Paulo, in the western region of the state of São Paulo, have been working regularly with the EMAI notebooks in the classroom. In the case of the PNAIC Mathematics notebooks, these are generally used for consultation, study and continuing education processes. Although of different natures, both materials present forms of organization and treatment of the mathematical contents for the initial years of elementary school.

Considering the context presented and the concerns demonstrated by teachers of the municipal network and also of the state education network at times of meetings in schools, in addition to those presented by trainees of the Pedagogy course, regarding the characteristics of these materials, contributions, limitations, it is necessary to describe the study of the structure of the notebooks of EMAI (SÃO PAULO, 2014) and the Mathematics notebooks of PNAIC (BRAZIL, 2014a).

The current educational context, after the approval of a Common National Curriculum Base (BNCC), in a conjuncture permeated by conflicts of several orders, since its initial formulation until the approval in the years 2017 (Early Childhood Education, Elementary School) and 2018 (High School), states and municipalities discuss how to build/readjust their curricula from the BNCC, which is a normative document.

In this elaboration/restructuring process, it is considered that the materials analyzed in this work can be part of the teachers' consultation material, since they represent the material used until 2018, especially the EMAI (SÃO PAULO, 2014), which, in the state of São Paulo, was used in the classroom in most of the municipalities and, in 2020, reached the schools in a single material, called EMAI and Read and Write. The analysis proposed here will be restricted to the 2014 material.

It is understood that the analyzed materials integrate broader policies of the curricular context and, therefore, the contributions of authors dealing with the curriculum in the area of Education and Mathematics Education were taken as a basis. Through documental analysis, the specifics of each supporting material and possibilities for the work of the teacher who teaches Mathematics in the initial years were identified.

Theoretical Reference

The curricular field involves conflicts expressed by different authors dedicated to this subject. Sacristán and Pérez Gómez (1998, p. 123) state that the field of curriculum involves different perspectives and it is important to consider the

investigations aimed at "decision, organization and development in the practice of the contents of the educational project".

For Lopes and Macedo (2011, p. 19), defining a curriculum is not a simple task, as it refers to disputes and the meanings attributed to a definition are "always partial and historically located". The authors enunciate the curriculum as a discursive practice and, therefore, a practice of power. They also defend an institutional curriculum that can deconstruct discourses, hegemonies.

Bishop (1999) states that the curriculum must be based on culture. In the case of Mathematics, to the extent that it understands it as a "multicultural" phenomenon, it defends the proposition of a curriculum sustained by the characteristics of research.

According to Santos (2003, p. 6), it is important to consider the curriculum as "a broad field of studies and significant propositions". In this perspective, it covers "the conditions in which mathematical knowledge is produced, used and taught" and highlights the importance of multiculturalism.

Godoy (2011, p. 188) deals with the articulation of the curriculum, education, and school in a process of regulating society and individuals. It is through the curriculum that "the state educates and sanctions the knowledge that must be learned by students.

Both concepts and processes of schooling are historically constituted social practices, as they refer to the way knowledge intertwines with society producing symmetrical and asymmetrical power relations (GODOY, 2011, p. 188).

The curriculum, for Young (2011), has the educational role of defining the objectives of schools and must be based on engagement, an attitude that goes beyond the instrumental dimension of the specific guidelines addressed to schools and teachers.

The intention of this study is not to deepen conceptual issues related to the curricular field. The cited authors made possible the understanding of the field as something complex, conflictive and that should always be part of the process of analysis and reflection in the field of Education and Mathematics Education. Thus, the interest of this text is directed more specifically to curricular materials produced in the field of Mathematics.

Regarding curriculum materials, for Steps and Nacarato (2018), there are so many prescriptions that come to schools that, most of the time, teachers do not have time to discuss and reflect on what they have received.

One consequence that has been noticed as teachers of Mathematics and in the work with continued teacher training is the fact that the use of curricular materials has not always been concretized in such a way as to make possible concrete forms of support for the work of the teacher.

Pacheco and Pires (2015) argue that curriculum materials, including textbooks, seem to have a greater impact on teachers' practices when compared to the prescribed curriculum. Thus, based on the studies of Remillard *et al.* (2009) and Brown (2009), the authors affirm that curricular materials vary in the way teachers appropriate them.

Therefore, the materials of EMAI (SP) and PNAIC (Brazil) are considered parts that interfere in the constitution of the curriculum and do not mean all the aspects that involve the curricular process. However, it is understood that analyzing such materials is important for the studies in Mathematics Education and for the actors involved in the process of teaching and learning this area of knowledge, especially the multipurpose teachers who teach Mathematics in the initial years.

Methodology

It is a qualitative approach research, with descriptive-analytical design, based on documentary analysis. For Marconi and Lakatos (2011), the documental analysis is structured based on the specificity and field of content analysis.

It would be a set of operations aimed at representing the content of a document in a different way. It works with documents and is done mainly by classification-indexing. Its objective is the condensed representation of information (MARCONI; LAKATOS, 2011, p. 29).

According to Lüdke and André (1986), documentary analysis is a type of procedure in qualitative research that has the possibility of using materials that have not received analysis treatment and can still be complemented by other techniques. For Cellard (2008), the importance of using documents in research favors the observation of the process of maturing ideas, groups of individuals, concepts, behaviors and practices.

This article presents, initially, a descriptive study of the notebooks of EMAI (SÃO PAULO, 2014) and PNAIC (BRAZIL, 2014a), with the objective of pointing out the essence of each one, analyze the specificities and, based on these observations, point out possibilities and challenges for teachers who teach Mathematics in the initial years.

It is important to justify that, in 2020, the material articulated to the EMAI project was published with changes based on the Base Nacional Comum Curricular -

BNCC (Common National Curricular Base) and the Curriculum of the State of São Paulo. However, the analysis presented here was carried out between the years 2016 and 2018, so it refers to the material of 2014.

Results and discussion

Early Years Mathematics Education (EMAI): Guiding Principles and Organization

The project Educação Matemática nos Anos Iniciais –EMAI (Early Years Mathematics Education) had its beginning in the process of expanding the project Ler e Escrever da Secretaria Estadual de Educação do Estado de São Paulo (SEE/SP). (Read and Write project of the State Secretariat of Education of the State of São Paulo). According to Pacheco (2016), in the year 2012, the first versions of the material were elaborated with the involvement of teacher coordinators of the pedagogical nucleus (PCNPs), teacher-coordinators (PCs) and teachers. In 2013, reformulations were made, which went through a process of discussions in the teaching networks through collaborative groups. "These preliminary materials were made available online at the first moment. In 2014, with further adjustments scheduled for 2013, the material was made available in print" (PACHECO, 2016, p. 3).

The document containing the EMAI curricular guidelines explicitly advocates a democratic school model and the student's right to access a set of knowledge considered fundamental to the possibility of exercising citizenship. There are specific guidelines for teachers in the initial years and for managers. Mathematics, in the document, is understood as part of the cultural heritage of humanity and constitutes a way of thinking and interfering in the world. Thus, it should develop basic capacities so that individuals are able to solve problems (SÃO PAULO, 2014).

In general, mathematics is seen as primarily related to calculation activities. Such vision limits the meaning of this science, which is also related to measures, geometry, algebra, probability and statistics, and also understands the development of values and attitudes. The curricular guidelines for the initial years, define that an individual becomes mathematically competent when mastering knowledge, develops abilities and positive attitudes before the learned concepts (SÃO PAULO, 2014).

The methodological orientations contained in the material prioritize the teaching of Mathematics directed to significant activities that involve the active participation of the students. In this process of active participation, it is fundamental

that the different forms of learning of the students are considered. Each subject organizes their way of learning a certain concept. In this context, the teacher is responsible for providing the necessary explanations, seeking to prioritize the students' involvement in concrete experiences related to doing mathematics.

The student needs to be involved in a process of reflection about the activities he or she carries out. Such process involves the knowledge of terms, facts and procedures and problem solving. "Learning is, in large part, a matter of establishing relationships, seeing the same things from other angles or in other contexts" (SÃO PAULO, 2014, p. 9).

The guidelines involve learning as a process, with emphasis on establishing relationships and surveying hypotheses. For this, the students' conceptions about what is mathematics and the affective relationship with this science are important factors to be considered.

The themes to be developed in the initial years of elementary school, in the first five years, in the material of the EMAI, are: Natural Numbers and Decimal Numbering System; Operations with Natural Numbers, Space and Form, Quantities and Measures, Information Treatment: introduction to Statistics, Combinatorial and Probability. In the case of the 4th and 5th year, the topic Introduction to Rational Numbers is added. In the curricular guidelines there are learning expectations that are considered guiding axes. It is intended that these axes will allow the construction of activities called Trajetórias Hipotéticas de Aprendizagem (THA) (Hypothetical Learning Paths).

The THA are sequences of activities that aim to build on students' previous knowledge and assume that the teacher has mathematical, didactic and curricular knowledge to organize the necessary interactions during the activities.

He plans what he will do in the classroom and develops his tasks, in an interactive process in which it is fundamental to carefully observe the attitudes and learning process of each child, so that pertinent interventions can be made. Completes this cycle, the evaluation of students' knowledge that the teacher must perform on an ongoing basis to make decisions about planning the next sequences (SÃO PAULO, 2014, p. 12).

Pires (2009, p. 157) uses the study by Martin Simon (1995) to clarify the concept of hypothetical learning path. Each trajectory is organized based on three components: the teacher's objective for the student to learn a concept, the teaching activities, and "the hypothetical processing of learning," which consists of perceiving how the students think, understand, from the actions observed during the activities.

"The notion of the hypothetical learning path, for Simon, presupposes the importance of the relationship between the intended goal and the reasoning about teaching decisions and the hypothesis about this path" (PIRES, 2009, p. 158). The use of the term trajectory, in this context, signals the idea of a path. Such a path can be modified from the teacher's perception of what the student has understood or from his or her own view on mathematical concepts.

For each year, learning expectations are proposed, including a detailed picture of the concepts to be developed. The following is a summary of the aspects considered most important in each year and which are described in the material.

In the first year, the starting point is to take into account the students' previous knowledge about the different functions of numbers: cardinal, ordinal and code, through games and jokes and the use of a variety of teaching materials. The importance of activities to be done orally is highlighted because the students are beginning the process of literacy in their mother tongue. Operations should be handled in the context of problem solving. Space and Form is a theme that, according to the guidelines, can start from spatial notions, through the observation of the space in which the child is inserted and the work with the location in that space, with emphasis on the importance of reference points. Also in the first year, it is proposed that activities with measurements be carried out, focusing on the comparison of two magnitudes of the same nature and unconventional ways to measure. Regarding the topic of Information Treatment, it is suggested the work with opinion polls with records of the results in charts, tables and graphs with a level of difficulty consistent with the age of the child in the first year (SÃO PAULO, 2014).

In the second year, the themes worked in the first year are expanded. In the case of numbers, the amount of digits increases and the objective is expanded to identify the regularities of the decimal numbering system and solve problem situations. The focus is, starting from problems, to encourage the registration of children and progressively, to begin the study of the algorithms of operations. In Space and Shape, the location in space is a theme that is also amplified and terms such as "right, left, front, back, above, below" are important for the child to understand and communicate in the space in which they live (SÃO PAULO, 2014, p. 21). The three-dimensional and two-dimensional figures are approached focusing on the global properties of what the child sees and, little by little, it is intended that the children perceive regularities. The indications in the material on Quantities and Measurements are focused on measuring time, temperature, length, mass and

capacity, but through problematizing activities and predominantly practical. The theme Information Processing continues in the second year with the collection of data, organization in simple tables and graphics and highlights the importance in the process of communicating the results based on the collected data.

In the third year, in numbers, to continue the process of understanding the decimal numbering system, the work with grouping, position value and also starting from problems is indicated, the mental calculation is emphasized and the records of the cases of addition and subtraction approach the conventional algorithms of the operations of addition and subtraction. As far as Space and Form are concerned, the differential in this year is to focus on spatial relations and representations, both as regards displacement in space and geometric shapes. The practical activities are important and the registers begin to be expanded. It is already possible for children to identify figures by observing parts of them. In Quantities and Measurements, there is amplification in the study of the monetary system and measures of time. There is also a more systematic work that indicates the need for standardized units of measurement and conversion of these units when necessary. Information Processing is a theme that, in the third year, continues with the collection of data, representation in tables and graphs, but advancing in the reading of these and interpreting the results in a more in-depth way (SÃO PAULO, 2014).

In the fourth year, the work with the decimal numbering system acquires a more formal character and the orders and classes of numerical writing with the appropriate nomenclature are presented. This means the possibility of reading numbers with a much larger number of digits than that worked in previous years. The problems involving multiplicative structures (multiplication and division) are indicated so that children can solve different problems and understand the procedures involving the multiplication and division algorithms. This year the "first approximation of the students with the rational numbers" are suggested and the care of working together the fractional and decimal representations is suggested (SÃO PAULO, 2014, p. 29). In the theme Space and Form, in the fourth year, the activities are aimed at children to establish relationships between the properties of figures, both internal to a given figure and between figures. The importance of definitions is highlighted, but so that they are built collectively. In Grandeur and Measures, the units of length, mass and capacity are resumed, but addressing their multiples and submultiples, focusing on the most common. Information Processing is expanded

through the work with various types of graphs, including that of sectors and deepening the interpretative analysis of tables and graphs.

In the fifth year, as far as numbers are concerned, the focus is on expanding and consolidating the work already begun in previous years, with the decimal numbering system, and with problem solving involving additive and multiplicative structures. The work with rational numbers, including percentage representations, continues that year. In the Space and Shape axis, the concepts of location in space and three-dimensional and two-dimensional shapes are expanded with more formal classifications and nomenclatures and work is developed with triangular rigidity, symmetry and expansion and reduction considering flat figures. In relation to the theme Greatness and Measurements, besides deepening the concepts worked on in previous years, the concepts of perimeter and area are explored. In the case of Information Processing, besides enlarging the reading of graphs and tables, including percentages, problems involving combinatorial and simple probability are proposed (SÃO PAULO, 2014).

In the document, in proposing the learning expectations over the five years, there are some didactic guidelines on important points to be addressed and their possible difficulties. It is clear what is considered essential and concepts that only need to be introduced during this period. There are tables detailing the learning expectations per year. The themes, separated in axes, at some moments are articulated in these charts.

Based on the learning expectations indicated, the curricular guidelines propose a section called "The organization of classroom work". This section presents a constructivist perspective of learning that, it seems, is concretized in the Hypothetical Learning Paths. It is expected that when discussing the proposed sequences, teachers will include oral and written activities, games, teaching materials, problems and exercises. "The important thing is to understand the purpose of each activity within the sequence and establish relationships between them. Isolated activities do not usually promote the expected learning" (SÃO PAULO, 2014, p. 42).

The guidelines contained in the EMAI prioritize the constant study and analysis of the activities by the teachers. There is also concern in developing positive attitudes in relation to Mathematics and the possibility of working with projects as a way to give meaning to the study of mathematical concepts. It is also possible to identify the concern with the realization of the activities in an interactive way, either

among students, pupils and teachers or among the teachers when studying the proposed sequences.

The notebooks for teachers bring general guidelines at the beginning, for example, when it states that it is a material to help in the planning of classes and study, reflection and discussion with colleagues and pedagogical coordinator. It also suggests that after studying the activities, it would be important to consult the textbook or other materials used in the school. After the initial orientations, the Hypothetical Learning Paths begin, divided into units.

It is important to point out that if the Teacher's and Student's Notebooks are effectively used together in the way they are proposed, and serve as study, reflection and discussion material between teachers and pedagogical coordinator, and other materials are used in this process, the activities can help the teachers' work. There is the concern, in each activity, to investigate the previous knowledge of the students about the theme, problematize the answers of the students and indicate other important situations for the understanding of the concepts. The interaction proposed is fundamental for the construction of concepts.

Pacto Nacional pela Alfabetização na Idade Certa - PNAIC (*National Pact for Literacy at the Right Age*): guiding principles and organization

The PNAIC was approved in 2012 by Ordinance No. 1,458 of December 14, 2012, in an attempt to ensure that children were literate by the end of the third year of elementary school. In 2013, the focus of the project was on literacy in the mother tongue and in 2014, several notebooks were launched involving themes on Mathematical Literacy (BRAZIL, 2014a). In the context of Mathematics, the following notebooks were published:

Presentation Booklet

Booklet 1 - Pedagogical Work Organization

Booklet 2 - Quantification, Records and Groupings

Booklet 3 - Building the Decimal Numbering System

Booklet 4 - Troubleshooting Operations

Booklet 5 - Geometry

Booklet 6 - Quantities and Measurements

Booklet 7 - Statistical Education

Booklet 8 - Mathematical Knowledge and Other Fields of Knowledge

Besides the Presentation Booklet and the eight specific volumes on work with Mathematics, three booklets were published: Mathematics Education in the Field;

Inclusive Mathematics Education; and Games in Mathematics Literacy. The collection also includes a booklet on Mathematical Literacy Games. All the material is destined for continuing education for teachers in the first three years of elementary school.

In the Presentation Booklet, it is worth highlighting some important principles. In the process of preparing the material, we identified the activities "voices from all regions" and reports on the practices of teachers who worked in classrooms in the first three years of elementary school (BRAZIL, 2014a, p. 5).

The advocacy of Mathematical Literacy from the perspective of literacy. Mathematics is understood as an instrument to read the world, interpret facts and regularities present in the universe around individuals. The objective of the material is to subsidize discussions and reflections on continued classroom training for teachers in the first three years of elementary school. It highlights the importance of playfulness and play, characteristics of the universe of children between 6 and 8 years and the Learning Rights in Mathematics articulated to these characteristics (BRAZIL, 2014a).

Notebook 1, entitled "Organization of Pedagogical Work" addresses important points. Initially, there is a strong emphasis on the practices carried out by teachers to involve students in the perspective of a learning community, which learns collaboratively. To this end, this notebook addresses issues related to class planning.

For planning to become a teacher action guide, it needs to reflect a process of rationalization, organization and coordination of the pedagogical doing, articulating the school activity, the cultural and social practices of the school, the objectives, the contents, the methods and the evaluation process. This planning must have the collective work of the school community as a structuring axis, being the pedagogical coordination the instance of formation and consolidation of the school collective (BRAZIL, 2014b, p. 7).

Themes such as the annual planning during the school year and the weekly planning are developed in detail. There is a concern with planning, so that it is collective, shared and flexible. Methodological approaches of activities are discussed, based on reports of experiences of teachers who worked in the initial years. There are suggestions for reading books, articles, videos and indications for teachers to maintain interaction and dialogue not only with students, but with fellow teachers and pedagogical coordinator. Also, that there is a favorable environment for student learning and adequate space in which they can make their records.

The PNAIC highlights the concern with the continued formation of the literacy teacher and identifies some axes of this formation: reflectivity practice, socialization,

engagement and collaboration. The training structure consists of two groups of teachers: the trainers and the study advisors.

The Presentation Booklet highlights the importance of problem solving through activities that do not need to have a high level of sophistication, but need to have meaning for those involved. Both children and teachers experience in their daily lives activities that involve processes of quantification, ordering, measurement, organization and location in space and observation in different ways. Despite containing activities, formulators make clear that the teacher has autonomy to rework the activities based on the characteristics and needs of students. It is also present in the material the need to start from the children's knowledge and the importance of learning mathematical concepts as a right. The structural axes presented are Numbers and Operations, Algebraic Thinking, Space and Form/Geometry, Quantities and Measures and Information/Statistic Treatment and Probability. The treatment of the contents in spiral is defended, always resuming to advance in the process of construction of the concepts. Notebooks 1 to 8 present the following sections: Beginning the Conversation; Deepening the Theme; Sharing; To Know More; Suggestions for Activities for Group Meetings; Activities for Home; and School and References (BRAZIL, 2014a).

The analysis carried out showed that the deepening texts present in the notebooks aim to involve teachers in a process of study and reflection on specific themes of Mathematics, with activities consistent with the studies presented in the texts. One aspect that deserves to be highlighted is the concern in stimulating the understanding that Mathematics is for everyone. Besides the theoretical texts that include reports of experiences, there are also suggestions of activities for teachers to use in their classrooms or discuss with their colleagues.

EMAI and PNAIC and the Mathematics teacher of the early years

Based on the brief description of the materials analyzed, it is considered that, despite some differences in general aspects, it is possible to point out some consensus. Both materials explain the importance of the teachers' reflection process and propose activities that provoke discussions and interactions between teachers and between teachers and students. The active role of the student is an outstanding aspect, as the activities take as a starting point the previous knowledge, the hypotheses of the students, the valorization of the registers. The incentive to the autonomy of the teacher is also an aspect that appears in both the EMAI and PNAIC notebooks. In the guidelines of these materials it is stated that the activities can be

adapted, that other materials should be consulted, and that it is up to the teacher to organize the activities according to the specificities of each class.

They are materials that seek to escape from the mechanization and fragmentation of mathematical concepts and there is an attempt to provoke both students and teachers to get involved in a process of reflection, hypothesis survey, generalization, validation or denial of results. Following, Box 1 brings a synthesis of the two materials analyzed in order for the reader to have clarity about the specificities of each material. It should be noted that they are materials of different nature and were organized and implemented with different purposes and objectives.

Table 1 - Summary of characteristics of the materials analyzed: EMAI and PNAIC

EMAI Material (2014)	Material PNAIC Mathematics (2014)
State Government (São Paulo)	Federal Government (Brazil)
Proposed in 2012 as an extension of the Read and Write Program. First version of the separate notebooks per year, published in 2014.	Beginning in 2013 with mother tongue literacy and mathematical literacy 2014.
Notebooks for students and teachers from 1st to 5th grade.	Notebooks for continued teacher training - 11 volumes divided by specific axes and didactic-pedagogical themes, from 1st to 3rd grade.
Hypothetical Learning/Sequences Trajectories to be studied in the Collective Pedagogical Work Classes (ATPC) in schools and developed in the classroom.	Texts of deepening and suggestion of activities for teachers of the first three years of elementary school.
Active role of students and teachers.	Active role of students and teachers.
Suggestion for the formation of a study group of the material at school during the ATPC.	Specific training given by universities in meetings with teaching guidance teachers and later by guidance teachers with literacy teachers in municipal and state education departments. Financial assistance for those involved in the form of scholarships.
Activities that provoke interaction.	Activities that provoke interaction.

Source: Prepared by the author.

At EMAI, due to the organization per year and intended for use with students, the hypothetical trajectories of activities, organized through sequences of activities, are highlighted. It is understood that if the school organizes study groups as suggested in this material, there may be contributions to the conceptual and methodological deepening of teachers.

The material of the PNAIC of Mathematics, perhaps by the form of organization as study material for the teacher and not specifically organized for use in the classroom, presents a broad approach to mathematical concepts. Each notebook on a specific theme contains texts by different authors in the field of Mathematics Education and accounts of diverse experiences, accompanied by the vision of the teachers who work in the early years of elementary school. It is also

considered that the organization by axes contributes for teachers to have contact with important results related to the teaching of mathematical concepts.

It is argued in this text that the materials analyzed have positive characteristics as support materials for the teacher. However, it is considered that, depending on the form of use defined by teachers and managers, such materials allow loss of teaching autonomy. The proposed sequences may lead the teacher to think that who has conditions to elaborate activities is the specialist and he only performs. Another limitation that may occur is when there is the understanding by teachers that the material should be used exclusively and should not be used as a textbook, for example. In this case, the teacher will not find the detailing of important mathematical concepts, which are addressed primarily in textbooks.

In this line of thought, one agrees with Pires (2000) when he states that sources of support are needed for a curricular proposal. It is understood that curricular materials, the concretions of a certain proposal, also need these sources. Such sources involve "terms such as interaction, relationship, integration, connection, web, network" (PIRES, 2000, p. 128). It is about incorporating interdisciplinarity and perceiving mathematics as a system of relationships. The curriculum should not be considered as a mere list of contents, but "as a strategy of educational action, integrated to a more comprehensive educational project" (PIRES, 2000, p. 129).

The analyzed materials try to articulate the different sources of support cited by Pires (2000) and one can perceive in them the concern directed to the construction of meaning by the students. However, it is understood that such advantages contained in the materials will only be enjoyed by teachers if they are involved in a process of study and reflection in order to understand the objectives and principles underlying the proposed materials.

Pacheco and Pires (2015), in their analysis of teachers' views on the EMAI Project, found inadequacies related to the way the materials are presented and used at school. They also highlight difficulties with institutional aspects, such as when teachers complain about difficulties in obtaining printed material.

In the case of PNAIC, Passos and Nacarato (2018, p. 131) emphasize that the program "considered the school culture and the contexts of its practice".

In the PNAIC Presentation Booklet, Fonseca (2014) presents reflections that contribute to the understanding of teachers about this perspective, emphasizing that the teaching of Mathematics in the Literacy Cycle must go beyond the teaching of the numbering system and the four fundamental arithmetic operations, involving students in significant situations, with social practices of reading and writing

different types of texts. It is a Mathematics education that values students' knowledge and helps them understand the ways our society organizes their experiences with the support of Mathematics, promoting world understanding and reading. This concept of literacy from the perspective of literacy refers us to the ideas of Paulo Freire, who strongly defended respect for the knowledge of the students and the movement to listen to them in order to build with them a reading of the world (PASSOS; NACARATO, 2018, p. 123).

The above mentioned authors regret the interruption of the program and warn that it was replaced by prescriptions that plaster the work of teachers, "exercised by business sectors and not by the formative spaces of the institutions that train teachers". This situation can be verified by the involvement of such sectors in the elaboration and approval of the BNCC.

The challenges for teachers who teach Mathematics in the early years of elementary school, it seems, are of several orders. It is necessary to consider the working conditions of these teachers, if the hours intended for study in school are really organized for this purpose, if they can organize the time to discuss activities, concepts, objectives of the activities, questions about the nature and importance of Mathematics, the learning process of the students and the teachers themselves.

Based on the authors of the curricular field cited in this study, who define the curriculum as a vision of discursive practice that has the possibility of deconstructing discourses and hegemonies (LOPES; MACEDO, 2011), based on culture (BISHOP, 1999), field of studies and significant propositions (SANTOS, 2003), which involves symmetrical and asymmetrical power relations (GODOY, 2011) and based on engagement (YOUNG, 2011), it is possible to consider that teachers who teach Mathematics in the initial years are far from investing in a process of struggle, resistance and engagement for changes in curriculum materials organized by the state or business sectors. It is important to stress that, considering the working conditions of these professionals, there is often no time even to effectively understand the prescriptions of the materials received, as well emphasize Steps and Nakarato (2018), let alone to question, resist, go beyond what is placed.

Conclusions

The basic document and the notebooks of the EMAI explain the importance of the existence of study groups in schools for discussion and reflection on the hypothetical trajectories of learning during the realization of the ATPCs and with the pedagogical supervision of a member of the Municipal or State Secretariat of Education.

As for PNAIC, there was a training organization oriented by universities and in conjunction with a team of managers from the municipalities or the State Education Secretariat. There was training for teachers called "study advisors", who, in turn, organized the training in the municipality where they worked or in the Board of Education when it was responsible for the initial years.

The theoretical foundation implicit in the two materials is articulated to the proposed activities and demands a process of reflection both for the continued formation of teachers and during classroom development with the students. Interactions, reflections, hypothesis surveys, establishment of relationships, fundamental processes for the construction of mathematical concepts are proposed. It is important to emphasize that, if the training took place as suggested in the guidelines of the documents, the materials can thus represent possibilities to support the work of the teacher. If they did not occur or occurred in a mechanical way, it is understood that even if they were well organized, such materials may have been exploited in a superficial way and therefore far below the intended objectives and principles.

Both the EMAI and the PNAIC (Mathematics Notebooks) are important documents for the process of study and reflection of teachers both individually and among their peers and with the school management team. Use in the classroom, without this process of study, without critical evaluation, can limit the autonomy and the possibilities for the development of diversified activities by teachers that could go beyond what exists in the materials.

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Received: July, 2020.

Approved: October, 2020.