Teachers, education, community and professional learning tasks: A texture for the construction of professional knowledge

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ABSTRACT

This paper presents part of a research on the professional knowledge learned by teachers to teach algebra in the early years of Brazilian Elementary School, in a community of practice (CoP) context, mediated by professional learning tasks. Continuing education took place from March to May 2021, with 21 pedagogical teachers, in teaching activity, belonging to the staff of public servants of a municipal education network, in the interior of the state of Mato Grosso, Brazil. In this excerpt, we intend to discuss to what extent the development of professional learning tasks collaborated for the construction of professional knowledge of teachers participating in a CoP on the teaching of algebra to children. To this end, in addition to the theoretical framework, we present the proposal of teacher training carried out and, in sequence, in a qualitative interpretative approach, in the light of the social theory of learning and the theoretical model of mathematical knowledge for teaching, we discuss how the tasks of professional learning collaborated to the construction of professional knowledge for the teaching of algebra of this group of teachers. It can be inferred from the analysis that, in the context of the community of practice, the tasks of professional learning, more than mediation instruments, were decisive to provide the construction of professional knowledge to teachers. We hope that the discussions and shared results can contribute to the international debate on powerful proposals for the continuing education of teachers.

Keywords: Teacher education, Professional development, Community of practice, Professional learning tasks, Algebra teaching.

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INTRODUCTION

Several Brazilian researchers (Ferreira, 2017; Ferreira et al., 2016, 2017; Lima & Bianchini, 2017; Luna & Souza, 2013; Santos et al., 2014; Trivilin & Ribeiro, 2015) refer to the necessary teacher training for the teaching of algebra in the early years of Elementary School (AIEF), which serves children from 6 to 10 years of age. In such a way that it is recurrent to consider that one of the main challenges to be faced in Brazilian school education is the issue of teacher training, both initial and continuing. In addition, specifically for in-service teachers, who teach mathematics in the AIEF, there is a demand for continuing education on the teaching of algebra, as it is a branch of mathematics that was not treated in higher education courses in Pedagogy.

In this text, we understand the continuing education of teachers as a *continuum* of improving, broadening, deepening and improving professional development, whose focus is on professional learning (Garcia, 2009). Learning is understood as a process of intrapersonal and interpersonal nature of construction of knowledge, knowledge and practices related to teaching practice. We assume the concept of continuing education as practice-based professional development, on the assumption that professional learning is situated (Lave & Wenger, 1991; Wenger, 1998), continuously (re)signified in the interaction and shared practice with other teachers, in a community of practice (CoP).

Considering that our objective is to discuss to what extent the development of professional learning tasks collaborated for the construction of professional knowledge of teachers participating in a CoP on the teaching of algebra to children, we look at the learning experiences of these teachers, evidencing the specific professional knowledge necessary to teach algebra to children. that they revealed. To this end, we organized the text as follows: a) theoretical framework; b) methodology adopted and succinct presentation of the teacher training carried out; c) interpretative analysis and discussion; and d) conclusion.

THEORETICAL FRAMEWORK

The research carried out, as well as the construction of this article, They involved a theoretical framework composed of three axes, in order to guide, analyze and discuss the construction of the professional knowledge of the participating teachers, namely: learning and professional training, The teacher's professional knowledge for teaching mathematics and teaching algebra. Below, we briefly present each axis; however, with a restricted focus on the theoretical perspective assumed, namely: Social Theory of Learning (axis of learning and professional training); mathematical knowledge for teaching (axis of the teacher's professional knowledge for the teaching of mathematics; and *early algebra* (axis of algebra teaching).

SOCIAL THEORY OF LEARNING

In the light of Lave and Wenger's (1991) social theory of learning (TSA), learning is conceived as the history of participation and, therefore, of people's transformation and change. Learning is no longer based on individual processes, but is recognized in social practices, through participation. Learning, as well as participation, is always situated, resulting from the context, the specific relationships and interactions that are established between teachers, the negotiations of meanings they carry out and how each one means to themselves, revealing in actions and discourses (oral and written) in the CoP – their reifications. Thus, learning is understood as a change in actions and/or knowledge.

Social participation, as a process of learning and knowing, takes place in four independent but interconnected dimensions, which are: community, practice, meaning and identity (Wenger, 2013). These are constitutive dimensions of the TSA that manifest learning. In this way, in the community, learning is revealed as affiliation, a sense of belonging, and commitment to the community. Learning is spelled out in the form of becoming a member. In practice, learning is understood as doing and occurs through the use of historical and social resources of the joint objective of the community of practice, when it is in action, that is, learning how to do. In meaning, learning is denoted as experience. Identity, within the community, is present in the becoming of the participants, in what changes in each member.

Lave and Wenger (1991) present the idea of CoP linked to the conceptions of participation and learning. They argue that participation and learning are part of the evolutionary process of becoming a member of a CoP and present it as "a set of relationships between people, activities, and the world, over time, in relation to other tangential and partially overlapping communities of practice" (p. 98). A CoP is made up of a group of unique people, that is, with different knowledge, skills and experiences (common practices), who are willing to share knowledge, interests, perspectives and, in a special way, to share practices for the construction of knowledge, both in the personal and collective dimensions. The authors even condition the existence of knowledge to participation in CoP (in several), in such a way that it can be considered that there is no construction of knowledge without participation in a social practice.

From this perspective, in a CoP, the learning of the members takes place through their participation in practice. Therefore, seeking teacher professional development within a CoP presupposes understanding that this space provides the development of a discourse and a shared activity that permeates learning, through participation, the social negotiation of meanings and collective learning (Amado, 2017), that is, a social practice that enables the construction of professional knowledge.

MATHEMATICAL KNOWLEDGE FOR TEACHING

The shared practice of the CoP of the teachers participating in continuing education was anchored in the theoretical model of mathematical knowledge for teaching (MSC), proposed by Ball et al. (2008). The authors define the MSC as the mathematical knowledge necessary to carry out the work of teaching mathematics, focusing on teaching, on the tasks involved and on the mathematical demands of these tasks, encompassing the multidimensional knowledge of a certain mathematical content or concept that the teacher needs to know and understand well in order to create the best learning conditions for their students.

Ball et al. (2008) propose two domains of MSC: content-specific knowledge (CC) and pedagogical content knowledge (CPC). In each one, there are three subdomains, namely: a) CC subdomains: general knowledge of the content; expert knowledge of the content; and knowledge of the content on the horizon; b) subdomains of the CPC: knowledge of the content and of the students; knowledge of content and teaching; and knowledge of the content and curriculum.

Common content knowledge is knowledge that is not exclusive to teaching, which can be used in other contexts and by other professions. Content specialist knowledge is mathematical knowledge that is unique to teaching and goes beyond that taught to students. It implies knowing mathematics with depth and rigor. The knowledge of the content on the horizon demands mastering if and how what is taught in one school year is related to the following years, so that the teacher can teach the basis, the mathematical foundation to his students. Content and student knowledge is knowledge that combines knowing mathematics and knowing what students know or don't know and need to learn at any given time. The knowledge of the teaching content is also a combination, implying an interaction between the understanding of the specific mathematical content to be taught and the didactic-pedagogical understanding of how to make this content comprehensible, in order to provide the student's learning. Curricular content knowledge involves knowledge of the materials and programs available in each school year and at the intersection with different subjects of the same school year.

It is consistent with the theoretical model of the MSC to think about teacher education with reference to the three pillars proposed by Ball and Cohen (1999), namely: a) research on teaching in teaching; b) research into the practice itself; and c) learning in and with practice. A formative perspective that presents "new ways of understanding and using practice as a place of professional learning" (Ball & Cohen, 1999, p. 6) and is grounded in professional learning tasks (TAP). Thus, TAP are tasks designed to provide learning to teachers in a specific situation (Ball & Cohen, 1999) and are characterized, among other aspects, by the use of practice records (Ball et al., 2014). Therefore, in a context of practice-based professional learning, it becomes coherent, pertinent and feasible for the practice of a community to be mediated by working with TAP.

TEACHING ALGEBRA TO CHILDREN

The main objective of teaching algebra in AIEF, as prescribed in the Brazilian curriculum organization (Brasil, 2018), is to develop the algebraic thinking of young students, through generalizations and expression of these generalizations, but without the structuring of an algebraic (symbolic) language. There is affinity in the conception defended by international researchers of the *Early Algebra*, because it proposes its teaching integrated with other mathematical contents, that is, through an algebraization of the curriculum (Kaput, 1999) and algebraic thinking is understood as "a process in which students generalize mathematical ideas from a particular set of examples, establish generalizations through the discourse of argumentation, and express them, increasingly, in formal and age-appropriate ways (Blanton & Kaput, 2005, p. 413).

Blanton (2008) clarifies that algebraic thinking is a mental habit to be acquired by students in school, from the early years, through teaching action that should regularly provide students with the opportunity to "think about, describe, and justify general relations in arithmetic, geometry, and so on" (p. 94). Among the three strands proposed by Kaput (2008) to work on generalization and symbolism in the school mathematics curriculum in Brazil, the emphasis is on stimulating the development of functional thinking and generalized arithmetic. Developing functional thinking involves making generalizations about data that relate to each other through didactic work with repetitive and recursive sequences. Developing generalized arithmetic implies exploring the potentially algebraic character of arithmetic, through generalization about operations and their properties and reasoning about relations between numbers, relations of equality and the notion of equivalence of the sign of equality - aspects that constitute the heart of algebra as generalized arithmetic (Kaput, 2008).

Considering that, in the AIEF, the objective is to provide the development of students' algebraic thinking, focusing on their ideas, reasoning, representations, conjectures, arguments and generalizations, the importance of teaching work emerges. After all, the implementation of a mathematics curriculum from the perspective of *Early Algebra* It requires professional learning from the teacher, in order to master the knowledge necessary for this teaching, including the curricular knowledge related to algebraic thinking and its teaching.

METHODOLOGICAL PATH AND TEACHER TRAINING

We carried out a qualitative research of an interpretative nature (Bogdan & Biklen, 1994) and the research field was composed of a group of 21 pedagogical teachers in service in the AIEF, belonging to the staff of public servants of a municipal school system, in the interior of the state of Mato Grosso, Brazil. Teachers who deliberately decided to participate in continuing education and who, in this text, are referred to with fictitious names (which they chose). Also, when there is reference to interventions by the researcher-trainer (first author), she will be identified as FP.

The pedagogical organization of the training was focused on professional teacher learning. We conceived and elaborated three TAPs, in a three-dimensional design, integrating *Teaching Assignments*, *Experiences* and *pedagogical tasks.* To this end, in addition to resorting to research carried out in the area, we used artifacts from teaching practice, such as: textbook activities, large-scale test questions, mathematical tasks and classroom records of other AIEF teachers. The *Teaching Assignments* contain mathematical tasks with potential for the teaching and learning of algebraic thinking in AIEF and, therefore, intertwined with the professional knowledge necessary for the teaching of mathematics. The *Experiences,* with records of practice (Ball et al., 2014) on real episodes of teaching and learning (Smith, 2001) or on research carried out from real episodes, analogous to teaching tasks. The *Pedagogical tasks,* with questions or theoretical-practical tasks, provide the articulation between mathematical knowledge, properly speaking, and pedagogical knowledge, both to analyze the teaching tasks explored and to projections in their teaching practices. There are three constitutive elements of the TAP, designed to mediate the social learning of professional knowledge, in a CoP context, through interactions, relationships, negotiations of meanings and reifications in shared practice, raised by the resolutions, discussions and reflections carried out in the meetings. In addition, we used complementary texts to theoretically reference what was explored and experienced in the TAP.

Continuing education in CoP, mediated by TAP, took place from March to May 2021. There were nine meetings, held on Tuesday afternoons. With a hybrid configuration, three meetings were face-to-face and the others were online. From the second to the seventh meeting, we worked with TAP. The didactic-pedagogical approach with the TAP, in the practice of the CoP, was admittedly exploratory and reflective in nature. To this end, we adopted the following methodological procedures: a) start with a teaching task, through resolution (individually, in pairs or together), socialization and discussion; b) study of one or more experiences related to the teaching task; and c) carrying out pedagogical task(s), also with plenary, collective, socialization and discussion activities. A procedural definition in the light of situated professional learning, socially constructed and grounded in concrete situations (Lave & Wenger, 1991; Wenger, 1998) and based on collective discussions of and practice (Ball & Cohen, 1999). A methodological path that took place in a *continuum* in the practice of the CoP, collectively constructed and shared by all its members.

In general terms, TAP1 was centered on functional thinking, has tasks involving repetitive and recursive sequences and is composed of three teaching tasks, three experiences and two pedagogical tasks. TAP2, directed to the arithmetic generalization of natural numbers and their fundamental operations, was organized with two teaching tasks, two experiences and a pedagogical task. On the other hand, TAP3, focusing on the notion of equivalence of the sign of equality, was composed of a teaching task, two experiences and a pedagogical task.

The instruments used to obtain the data were: the written productions of the teachers; direct observation and notes in a field diary of the researcher-trainer; and the transcripts of the recordings of the meetings and the chat of the online meetings. From the corpus of the research, for this article, excerpts of discourses (oral or written) were selected that show meanings reified by the teachers in the practice shared in the CoP, specifically about the specialized knowledge of the algebraic content of the AIEF, which occurred during the realization and discussion of the TAP. Then, they were submitted to interpretative and discursive analysis (Moraes & Galiazzi, 2016).

ANALYSIS AND DISCUSSION

In the pulse of the CoP, in the community's practice, the collective and gradual process of construction and mobilization of professional knowledge was forged in the TAP. In the analysis of the learning experiences about the MSC, we cannot say that the teachers learned this or that professional knowledge, configuring it as static and conclusive. However, in moments of shared practice, the teachers revealed meanings constructed on some professional knowledge negotiated in the community, evidencing their learning experiences. Thus, we identified and interpreted the professional knowledge expressed by the teachers in the CoP, in the domain of knowledge of the mathematical content (algebra in the AIEF) and in the domain of the pedagogical knowledge of this content (about the teaching of algebra in the AIEF), revealed in their discourses (oral and written). Meanings that denote changes in the professional knowledge of teachers and potentially, can generate transformations in their teaching practices.

In teaching practice, there is a constant interrelationship between the domains and subdomains of the MSC, which are mobilized by teachers in an integrated way and even simultaneously. However, for the purpose of analysis, we considered the subdomains of the MSC as categories. Among the six subdomains, we emphasize here the prevalence of content specialized knowledge (CEC). The teachers started at the first meeting without understanding what algebraic thinking would be, ratifying the statement of Blanton and Kaput (2005) that most teachers who teach children have little experience with the types of algebraic thinking, and they are often mere products of the traditional training they have received. However, in community, soon after, they were constructing generalizations and expressing them in natural language, that is, constructing laws of formation of repetitive and recursive sequences, each in its own way. We analyzed that the exploratory work of the teaching tasks of TAP1 (with repetitive sequences of butterflies and increasing recursive sequence with dominoes), in the shared practice of the CoP, collaborated for the teachers to negotiate meanings, building concepts and skills that enabled them to experience algebraic thinking regarding the exploration of patterns and description of generalizations. motivating them to learn in order to teach their students. Among the discourses that revealed the construction and subsequent mobilization of the SCC regarding the exploration of patterns and description of generalizations, we highlight reifications expressed by the teachers that are, in themselves, evidence that they were constructing this knowledge (Table 1).

Table 1 - Evidence of the construction of the CEC mediated by the exploration of TAP1

What was built/reified		**Excerpts that highlighted the reifications**
Generalization of repetitive sequences and their expression	Next (from the elements of the repeating unit)	I multiplied by 3 because there are 3 butterflies. In the 3 times table there is 15 [...] The fifteenth position is exactly the last butterfly, 15, which is the last butterfly, will be white. (Emerald, E2) Count by 3 until you reach the position you want. Then, see if there was a complete trio or not, see which butterfly it stopped at (its color). (Pearl, E2) Counting by twos. Completed, color of the second butterfly. Not completed, color of the first butterfly. (Leninha, E3)
	Distant (establishing a relationship of a general nature)	Finding multiples of 3. [...] every time the remainder is 2, my butterfly will be yellow. Whenever the remainder of the division is 1, it is blue butterfly. If the math is accurate, I'm finding a multiple of 3, so it's a white butterfly. (Emerald, E2) Because I only have two colors of butterflies, yellow and blue, alternating on the pendant, the blue butterfly will always be in a position that is a multiple of two. (White Orchid, E3) The second term, the second butterfly (yellow) represents a multiple of 2, every exact division will be a yellow butterfly, every division with a remainder will be a green butterfly" (Apolo, T2) In my sequence, the white butterfly is on the even numbers (0, 2, 4, 6 and 8) and the black butterfly is on the odd numbers (1, 3, 5, 7 and 9). (Pearl, T2)
Generalization of increasing recursive sequences and their expression	Law of formation by recurrence (from the previous term; next)	From one stone to the next, increase two points, one on each face. (Jasmine, E4) So, the top face and the bottom face, I noticed that the quantity that was at the bottom, in the next piece, the quantity would be at the top. (White Orchid, E4) Dominoes: an increasing and finite sequence (only 9 terms), which increases the number of points on each face by one or by two the total value of points with each new stone. (Pearl, notebook)
	Formation law by general (distant) term	The top face is one less than the value of the bottom face. The underside is the position value of the stone. (Emerald, E4) It becomes (n - 1) + n. (Monion, E4) [...] like this: 2 X NF + 2. (Lua, E4) The cool thing is that the table allowed this. Just like how to write the formation law algebraically! (Pearl, E4)
Algebraic symbolization	(Re)signification of the conception of algebraic representation	With this expression, if you tell me the order, the position of the stone you want, I can tell you the number of each face and the total value. (Apollo, E4)

		I'm loving making sense of it all! (Emerald, E4) I look at the expression we constructed and it makes sense. (Jasmine, E4) I've always been more into pure, exact calculation. Slowly I'm learning to think, to reflect on mathematics. I need to do it more often. (Moon, E4)
	Algebraic representation	An Bottom side = n A1 ... bottom side = 1 A46 ... bottom side = 46 (White Orchid, notebook) The top side is n – 1. The bottom side is the value of n. The total value of the stone is the sum... It is: (n - 1) + n. (Monion, E4) Or [...] n = (n - 1) (Emerald, E4) If I take A9, which is the eight-nine stone, it gives (9 – 1) +9 = 17 (Pearl, E4) Observing the table, we write that the number of stars is double the number of figures + 2, like this: 2 X NF + 2. (Moon, E4)

Source: From the first author, 2023. Caption: E (date); T (written assignment).

In the exploration of TAP2 (with the 2021 calendar and use of the hand calculator), we address the relationships between natural numbers, their properties, representation and organization in the decimal numbering system and operations. By exploring regularities in the internal organization of the months, organized in 7-day weeks, the teachers identified the algebraic character of arithmetic. There was nothing new in describing the regularity that months are organized into 7-day weeks. The unexpected and unusual thing referenced by Professor Orquídea Branca was to realize that, if we look at the month by the regularity of the days of the week, it is composed of seven increasing recursive sequences with different terms, but which follow the same growth pattern (it always adds 7). Also, it was noted that this occurred every month. Some excerpts reveal these discoveries of relationships, such as: "How could we have never seen this? That's 7 different sequences in the numbers, in the terms. But with the same standard." (Ares); "Look how cool, the sequence of the 3rd (3rd, 10th, 17th, 24th and 31st) in the month of August is the same as in the other months." (Azalea); "We know that the month has 7-day weeks. But I had never observed that if the 4th fell on Monday, the next Mondays will always be with the same days as the sequence of the 4th, that is, the 11th, 18th and 25th." (Jasmine); "I think the law of formation can be by addition, but it can be by multiples of seven, right? If it's 7 by 7, it has to do with the multiplication table and its multiples." (Monion).

In the registration of the laws of formation, even using natural language, there were significant differences. Not only because of the peculiarity of each one's way of writing, but, and fundamentally, because they were determined by the relationships and regularities that they perceived and considered regarding the month or the days of the month, as can be seen in the following excerpts: "They always begin on the first day. These are sequences that go until the 28th

(29th), 30th and 31st. The default is always +1, like the decimal numbering system itself." (Apollo); "In the sequence that the 1st term is the 7th, the other terms are the multiples of 7 themselves." (Ares); "To find the sequence of days from day 4, just add 7. That's 4, 11, 18 and 25." (Azalea); "The week has 7 days. Then the streak increases by 7. If it's day 3, a week from now, it's going to be day 10 because 3 + 7 = 10." (Moon); "Each month is a recursive number sequence, the next day depends on the previous one, always adding 1." (Sun); "Each month is organized into 7-day weeks, forming 7 different number sequences, starting with 1, 2, 3, 4, 5, 6, or 7, with the same pattern. The following terms can be found by the multiples of 7 added to the first term." (Monion).

As a result, another important concept of the CEC constructed by the teachers was the understanding that it is possible to have different ways of identifying and describing regularities, representing them, establishing relationships and generalizing, as explained by some teachers: "It is very cool to have so many options to relate to addiction. The table helps you see the regularities." (Moon); "It's impressive to think about mathematics like this... with various possibilities to see regularities and patterns." (Maya); "I thought the math was always so accurate. Being able to think about different possibilities, from what you observe, from the pattern you find, has been a great discovery." (Pearl); “[...] The tables allow you to search for regularities in the numerical expressions of the different operations, exploiting the multiples of 7." (Emerald); "I can identify different regularities by the representation in the tables. And from them, arrive at different laws of formation." (Monion).

Then, in TAP3, in the search for unknown values so that numerical expressions of addition and/or subtraction were true equalities, transversally, properties and relations between inverse operations were explored. Rather than finding the same value as a result in both expressions, we explore why a given number would be the unknown value. From this perspective, some professors revealed evidence of the SCC, as follows:

> It's not just about solving, finding the same result. The important thing is what to do so that the sentences are equivalent. I didn't even think about 14. I looked at the first installment on each side, the 9 and the 8. From 9 to 8, it decreased by 1. It's a sum, so in the other installment, the unknown number has to be -1 (of the 6), the 5. [...] The activity makes us relate the sentences to be equivalent. (Apollo)
> The equation 19 + X = 17 + 2 I solved by relating to the neutral element of addition. (Ares)
> In the case of 8 – 3 = 12 – X, I also thought about relating the numbers. From 8 to 12, it increased by 4. It's subtraction. To be equivalent, X also has to increase 4 (of 3), which gives 7. (Emerald)
> In that cut-and-paste activity, of unknown values... The 15 + 8 + 12 = X + 12, the equivalence was using the associative property, wasn't it? Then it was 23. [...] There, the equality relationship does not change if you add the same value on both sides, such as 2 + 5 + 1 + X = 4 + 4 + X. (Moon)
> In this one, 19 – X = 16 + 3 – 4, I first saw that 19 was equivalent to 16 + 3. Then, in order to get the same results, I couldn't change the value 19. Then I repeated the -4. After that I realized that it was the same operation and value on both sides. This is what the BNCC has as a property of equality. I think I get the point! (Maya)
> What a cool activity, with cutting, pasting, and a lot of algebraic thinking, eh. We explored different addition and subtraction sentences, determining unknown values so that if they

> were equal, they would have the same result. I think my students would be able to solve and learn that way. (Pearl)
> This equation requires thinking that what you do on one side you have to do on the other. The equation 12 + 5 – 5 = 12 – 8 + X. On the left-hand side, +5 – 5, gives zero. In the second, in order for 12 to continue to result, it has to be +8 which with -8, gives zero. So 12=12. Equivalent members remain. (Stump)

In short, the teachers' discourses evidenced negotiated meanings regarding: a) understanding that there is more than one way to perceive regularities, identify patterns/relationships/properties and construct training laws; b) identification of regularities and properties of the natural numbers, fundamental operations and their inverses; c) identification of relations and properties of equality, for the construction of the notion of equivalence; d) generalization of repetitive and numerical recursive patterns; e) expression of generalization, through argumentation and recording in natural language; f) exploration of different forms of representation, not only to construct generalizations but also to express them; and g) conception of algebraic representation, by demystifying the common sense that it is a ready-made area of mathematics, whose rules and formulas must be memorized and applied.

CONCLUSION

In this research on teacher training in CoP, the TAP have always been involved in the central process of negotiating meaning, whose learning is denoted as experience, that is, as an experience of negotiating and attributing meaning. According to Lave and Wenger (1991), I believe that the dynamic and active process built among the members of the community is what enabled them to experience thinking algebraically. After all, how can one feel at ease in the mathematics he teaches without knowing it, without having appropriated it, without having constructed meanings? They also reflected on how to promote the development of this algebraic thinking in their AIEF students and analyzed different strategies for solving mathematical activities, as well as their teaching.

During the CoP, with strong engagement and commitment of the teachers, with intense interactions, several actively participating, I consider that there was an expansion of the TAP, that is, they had their formative function resignified. More than mediation instruments as proposed by Ball and Cohen (1999), they have become central to the practice of the community, implicated in most of the negotiations of meaning that occurred in the meetings and always implicated in the negotiations of specific meanings (about algebraic thinking and its teaching).

The TAP became fundamental in the interactions and relationships between teachers, who shared their professional knowledge and built a shared practice, generating collective professional knowledge about the teaching of algebraic thinking, through processes of negotiation of meanings. Therefore, we conclude that the TAP coined the practice of the community and, ratifying the TSA (Wenger, 1998), that the professional knowledge produced collectively in this CoP was the result of the participation of teachers who sought to learn together how to improve their practice in the teaching of mathematics.

In the light of the TSA (Wenger, 1998), we can affirm that there was construction and mobilization of professional knowledge for the teaching of algebra in the AIEF in the shared practice of the CoP, as we analyzed in the evidence of the movements, learning experiences, changes in the professional knowledge of teachers, with emphasis on the CEC. Thus, we conclude that teacher training in CoP, with the shared practice coined by TAP designed to meet the training needs of each community, is a powerful proposal, if participatory, collaborative, shared, constructed, creative training is desired. We hope to contribute to the international debate on the continuing education of teachers.

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