

**A Teacher's Curriculum and Training: Between Life Experiences and Teaching Mathematics**

**El currículo y la formación docente: entre experiencias en la enseñanza de las matemáticas**

**Le cursus et la formation des enseignants : entre expériences dans l'enseignement des mathématiques**

**O currículo e a formação do professor: entre vivências e experiências no ensino de matemática**

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**Resumo**

Este artigo tem como objetivo compreender como as vivências e aprendizagens experienciais da docência em matemática emergem narrativamente das práticas curriculares no ensino de matemática no IFSertãoPE. O estudo é de natureza qualitativa por acreditar que o sujeito e a realidade formativa são concebidos como indissociáveis e foi elaborado na abordagem da pesquisa narrativa, caracterizada por se tratar de um processo compreensivo/interpretativo das narrativas/experiências de quatro colaboradores que atuam como professores de matemática do Ensino Médio no Instituto Federal de Educação, Ciência e Tecnologia do Sertão Pernambucano. O dispositivo de pesquisa foi o ateliê reflexivo, desenvolvido em seis sessões. Os resultados permitem concluir que a formação inicial é fundante para a construção de um currículo que se efetive na relação de ações educativas. O estudo evidenciou como as

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aprendizagens experienciais da docência em matemática tecem-se nas microrrelações formativas que os professores desenvolvem por habitar a profissão docente no cotidiano escolar, produzindo saberes e experiências do vivido.

**Palavras-chave:** Currículo, Docência em matemática, Formação inicial, Pesquisa narrativa.

### **Abstract**

The article aims to understand how the experiences and experiential learning of mathematics teaching emerge narratively from curricular practices in mathematics teaching at IFSertãoPE. The study is qualitative because it believes that the subject and the formative reality are conceived as inseparable. The narrative research approach is characterized by being a comprehensive/interpretive process of the narratives/experiences of four collaborators who work as high school mathematics teachers at the Federal Institute of Education, Science, and Technology of Sertão Pernambucano. The research device was the reflective workshop, developed in six sessions. The results allow us to conclude that initial training is fundamental for constructing a curriculum that becomes effective in educational actions. Finally, the study showed how the experiential learning of mathematics teaching is woven into the formative micro relationships that teachers develop by inhabiting the teaching profession in the school routine, producing knowledge and experiences of what is lived.

**Keywords:** Curriculum, Mathematics teaching, Initial training, Narrative research.

### **Resumem**

El artículo tiene como objetivo comprender cómo las experiencias y los aprendizajes experienciais de la enseñanza de las matemáticas emergen narrativamente de las prácticas curriculares en la enseñanza de las matemáticas en el IFSertãoPE. El estudio es de carácter cualitativo porque considera que el sujeto y la realidad formativa se conciben como inseparables; y en el enfoque de investigación narrativa caracterizada por ser un proceso comprensivo/interpretativo de las narrativas/experiencias de cuatro colaboradores que actúan como profesores de matemáticas de enseñanza media en el Instituto Federal de Educación, Ciencia y Tecnología del Sertão Pernambucano. El dispositivo de investigación fue el taller reflexivo, desarrollado en seis sesiones. Los resultados permiten concluir que la formación inicial es fundamental para la construcción de un currículo que se haga efectivo en relación con las acciones educativas. El estudio mostró cómo el aprendizaje experiencial de la enseñanza de las matemáticas se teje en las microrrelaciones formativas que desarrollan los docentes al habitar

la profesión docente en el cotidiano escolar, produciendo conocimientos y experiencias de lo vivido.

**Palabras clave:** Currículo, Enseñanza de las matemáticas, Formación inicial, Investigación narrativa.

### **Résumé**

L'article vise à comprendre comment les expériences et l'apprentissage expérientiel de l'enseignement des mathématiques émergent de manière narrative des pratiques curriculaires en enseignement des mathématiques à l'IFSertãoPE. L'étude est de nature qualitative car elle considère que le sujet et la réalité formative sont conçus comme inséparables; et dans l'approche de recherche narrative caractérisée par un processus complet/interprétatif des récits/expériences de quatre collaborateurs qui travaillent comme professeurs de mathématiques au secondaire à l'Institut fédéral d'éducation, de science et de technologie de Sertão Pernambucano. Le dispositif de recherche a été l'atelier réflexif, élaboré en six séances. Les résultats nous permettent de conclure que la formation initiale est fondamentale pour la construction d'un curriculum qui devient efficace par rapport aux actions éducatives. L'étude a montré comment l'apprentissage expérientiel de l'enseignement des mathématiques est tissé dans les micro-relations formatives que les enseignants développent en habitant la profession enseignante dans la routine scolaire, en produisant des connaissances et des expériences de ce qui est vécu.

**Mots-clés :** Curriculum, Enseignement des mathématiques, Formation initiale, Recherche narrative.

## **The curriculum and teacher training: between experiences in mathematics teaching**

It is Mardi Gras! Synonym of joy and creativity that captures the richness and diversity of cultural expressions. In this celebration, what matters is singing, dancing, being happy, crazy, a genius, an artist, king, and queen of this enchanted world, to which I have eagerly waited four years to contribute. A study that details its allegories and ornaments, set within a time limit for the parade, and materializes in the following lines.

It is in this context that we glimpsed the execution of this storyline, which is a research project that has been developed with the collaboration of four teachers revelers. All of them have degrees in Mathematics and teach the subject at The Federal Institute of Education, Science and Technology of Sertão Pernambucano – IFSertãoPE, focus of this research. It is important to note that writing this storyline was based on our own experiences, as well as the experiences of the reveler's contributors who did not lose the samba beat when narrating their ways of acting in the teaching profession. We narratively weaved their peculiar ways of carrying out educational projects, highlighting their pedagogical approaches to interacting with students and building teaching experiences in Basic Education. By doing so, we have become carnival enthusiasts of education at the center of the samba celebrations on this illuminated stage, where I have always dreamed of parading in golden attire.

So, dear reader reveler, we invite you to join us in the epiphany entitled "Who never has? Let them cast the first stone... The Curriculum and Teacher Training". Just as we would invite a friend to enjoy a good meal, an exciting theater play, or even a good movie, we invite you to get into the carnival spirit, wear a costume, and participate in this parade. The main objective of this storyline is to understand how experiences and experiential learning in teaching Mathematics emerge narratively from the curriculum development in Mathematics education at IFSertãoPE.

We start from the issue that the initial training of teachers is of fundamental importance for constructing a curriculum that is effective in mathematics teaching in everyday life. Therefore, the training is built on the paths of experiences and life experiences that each individual construct in the university, but, above all, in the moments when they inhabit the teaching profession, making experiential learning flow from everyday school life. Therefore, it is our life marks and experiential learnings that we consider based on everyday school life, in the student's life experiences, and in the *acontecências*<sup>4</sup> of the school. It is important to emphasize that, for the writing of this article, we adopted the concept of *acontecências* as what

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<sup>4</sup> Recurring events, regularly occurring event.

happens in the day-to-day of the school, for example, and generates experiential learning (Silva, 2020).

Weaving a study that emerges from the problematizations of initial teacher education, supervised internships, and other formative actions, we developed this study based on the following question: How do teachers narrate their experiences and life experiences with initial teacher education and weave a curriculum to develop the teaching of mathematics at IFSertãoPE?

This movement makes us believe that these experientially developed practices and knowledge in contexts value the student's understanding and enable us, as teachers, to become protagonists of the process, generating a dialogical relationship that values recognition and alterity among subjects. Using the metaphor of carnival weaving, we begin to analyze how experiential learning in mathematics teaching emerges over time from two perspectives: the time of learning and the time of producing experiences.

In this logic, we developed the present study anchored in narrative research, which triggered in us, researchers, a criticality of the condition of being and existing, as well as a critical analysis of academic and scientific productions, reviewing ways of understanding ourselves, understanding others and the reality of life.

The choice was justified as an opportunity to offer collaborating teachers a moment to reflect on their practice and express it through narrative. Through narrative research, participants had the opportunity to relive their formative processes experienced throughout their trajectories, mobilizing them to understand how *acontecências* emerge from teaching experiences, re-signified by experiences that, to a certain extent, determine the way of thinking and behaving of each of the collaborators.

And it is in this adventure, metaphorizing our narrative research through the weaves of carnival, we conducted this research intending to understand how the teachers of IFSertãoPE and ourselves produce life experiences and learnings in the teaching of mathematics.

The article is divided into three sections in addition to this introduction. In the next section, we will present some details of the methodological approach, explaining how we collected information. In the section dedicated to the analysis, we will explain some narratives from collaborating teachers about their experiences with teaching mathematics, in which training and curriculum are problematized. Finally, anchored in a narrativity dimension that allowed us to write from our own experiences, we have been fostering a dialogical relationship with the collaborators and promoting reflections on the formation of mathematics teachers and

the curriculum made visible through mathematics teaching. Lastly, we will present our final considerations, systematizing the study's main findings.

### **Methodological approach**

The act of narrating allowed us to become aware of our experiences. By grasping this concept, we began to view narrative not as a mere representation of ourselves but as an element in the creation of knowledge and practices we produce. From this perspective, we understand narrative as a powerful tool for formative reflexivity that enables us to intertwine our lives as researchers with those of the collaborator-narrators, fostering the re-signification of life and teaching. This understanding of narrative constituted an opening and a condition for this process.

That is why, from a theoretical and methodological perspective, qualitative research grounded the study, which aided us in the rigorous pursuit of knowledge and understanding of the research object and the narrative research approach (Clandinin & Connelly, 2011), which involves a comprehensive and interpretive process of exploring the narratives and experiences of the research collaborators and the meanings constructed by each of them. This approach considers the interaction between personal and social elements and how in a given situation, a connection exists between the past, present, and future. Finally, the study focused on the experiences of training and professional performance, exploring what moved and inspired us and serving as a way to reflect on those experiences.

Like warriors, Brazilians who do, each in their way, their *ziriguidum*<sup>5</sup>, the collaborators in this research were four dedicated teachers who work at Integrated High Schools (IHS) in the campuses of IFSertãoPE. The average age of the group is thirty-two years and four months. All of them are graduates with an Education in mathematics, a specialization, and a master's degree. Only one of the collaborators holds a Ph.D. in Mathematics. The research collaborators held prominent and protagonist positions in the movement of narrativity that developed while sharing their experiences in their daily lives at school.

The selection process for the collaborators was based on the following criteria: a) being a permanent teacher at IFSertãoPE; b) having a degree in mathematics and teaching this subject at IHS; c) agreeing to participate in the research and being available for it; d) responding to the invitation letter; e) completing the sociodemographic questionnaire via the Google form link. The perspective substantiates the criteria that the study was conducted with mathematics

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<sup>5</sup> It means rhythm, swing.

teachers who possess a degree in the subject matter and are currently teaching it at the Federal Institute of Sertão Pernambucano. Consequently, it would enable us to discern the influence of their training and professional experience on developing pedagogical approaches that demonstrate an active curriculum.

Considering the reflective workshop as an essential tool for this research, we cannot underestimate the significance of storytelling, as it provides us with opportunities to comprehend life and the world in all its complexity. Through narration, we prompt ourselves to reflect critically on the events we encounter, and as a result, they acquire meaning and become happenings.

We used the reflective workshop as a device inspired by Silva (2017) to collect information. This device brought together all collaborators synchronously to create a discussion circle, focusing on axes that raised questions about teaching mathematics and its *acontecências* in school. Throughout the workshops, we prompted the collaborators to produce reflections about their practice and how it affected their training and professional performance, using questioning and pondering.

The workshops were conducted over six sessions, with an interval of two weeks between each session, during the second half of 2021. These meetings were conducted online using the Google Meet platform, consistently scheduled for Saturday mornings, and lasted an average of two hours per session. It is worth emphasizing that the collaborators, themselves, requested that the meetings take place on Saturdays, given the demands of their work and the diverse routines of the IFSertãoPE campuses, which would have made it difficult to hold the workshops during the week. We emphasize that all the reflective workshop meetings were recorded with the permission of the research collaborators.

The notion for its conception arose from research conducted by Silva (2017), who drew upon her readings and observations of the biographical workshop formulated by Delory-Momberger (2008). Creating a temporal and spatial environment is the foundation of Delory-Momberger's workshop that facilitates the comprehension of experiential learning. In her study, Silva (2017, p. 59, our translation) posits that "The reflective workshop functioned to establish a venue wherein experiences were presented for analysis, discussion, and intervention by all involved participants".

Based on this perspective, we have proposed to our research collaborators a space where they can share their experiences, engage in dialogue and reflection on the process of teacher education, and elucidate the strategies, subtleties, and implications inherent in the teaching of mathematics.

The implementation of this workshop presented a significant challenge in light of the circumstances surrounding the Covid-19 pandemic, as it had to be conducted remotely. It should be noted that the workshop was not executed as Silva (2017) suggested, as the pandemic necessitated measures of physical distancing.

This perspective is justified by the argument that in narrative research, the act of narration enables the mathematics teacher to (re)consider their condition, initiating a process of formative reflexivity. This process is initiated by questioning oneself and placing oneself at the center of the issues built throughout one's training process and professional performance. According to Delory-Momberger (2008, p. 365, our translation), the biographical workshop project is "a process of becoming and being-for-others that allows individuals to construct their sense of self in retrospect". Our approach to this methodology is designed to promote this process of "becoming" by encouraging teachers to fully engage in the exercise of teaching, to learn, comprehend, and develop their knowledge of the teaching profession within the context of their daily work. This perspective is similar to the rehearsals performed by samba schools during the preparation period for their parade. These rehearsals promote the process of "becoming" to the extent that the members engage with the plot, practicing and refining their samba singing and fostering a sense of belonging with the organization they represent.

We proposed the reflective workshop device by drawing on the context and acknowledging narration as an act of knowledge. Our objective was to offer research participants a platform to create a scenario for sharing their experiences with mathematics teaching through dialogues and reflective practices that explore how teaching in mathematics is constructed in everyday school life. Moreover, through narrative, the participating teachers could establish a network of indicators (both visible and invisible) that convey their understanding of educational behavior. It has been demonstrated that the pedagogical practice narrative, presented by the participating teachers, transforms the event into a story of experiences that generates learning. As Leal (2009, p. 11, our translation) asserts, "Those who tell, listen, write, and read all learn. All those who understand the value of sharing knowledge gained from experience learn."

It is important to emphasize that during this study and the implementation of reflective workshops, we recognized the provocative nature of narrative research and its impact on the researcher and collaborating teachers. Through the process of narration, the participants were able to mobilize alternative meanings and reframe their experiences, leading to a significant reconfiguration of their training and professional development.



Taking inspiration from Mota (2022), we are now comfortable asserting that through our involvement in narrative research and our evolution as narrative researchers, we have recognized narrative as a space for understanding both what is narrated and what is experienced. However, this has also led us to navigate dilemmas and delicate situations that challenge our sense of fragility as researchers. For example, we used to believe that conducting research and producing scientific knowledge required a strict separation between personal and professional spheres. Today, these perceptions have transformed. As narrative researchers, we validate our research methods by presenting our life experiences and justifying our implications from our subjective perspectives. We recognize ourselves as subjects undergoing (trans)formation, influenced by the phenomena studied. Within this framework, we view narrative research as a means of learning through our experiences and those of our collaborating partners.

### **Who never has? Let them cast the first stone...<sup>6</sup> The Curriculum and Teacher Training**

Who never has? Let them cast the first stone... The purpose of this section is to articulate the discussion that has taken place surrounding the curriculum of teacher education, particularly in the field of Mathematics at the undergraduate level. This conversation represents a significant "cleaning," driven by the intense samba plot that inspires and excites the community. It is a true carnival of reflection that offers opportunities for learning through joy, movement, and the coming together of bodies and the creativity of minds. This pedagogical approach brings together differences and revitalizes the teaching profession by asking important questions: What do we have in this teacher education curriculum? What does it offer to future mathematics teachers?

As represented by this metaphor, the symbolic moment of learning does not intend to initiate an epistemological debate about the curriculum. Instead, it aims to prompt reflection on what is observed in the bachelor's degree program in Education. This includes not only the content and the relationship established regarding the stages of education served by future teachers but also the potential for agreement between the themes that arise in the curricular matrices of higher education courses and basic education.

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<sup>6</sup> The heading of this section refers to the plotline "Who never has? Let the first stone be cast..." from the Grêmio Recreativo Escola de Samba Acadêmicos do Grande Rio (A Brazilian samba school from the municipality of Duque de Caxias, which parades in the carnival of the city of Rio de Janeiro), created by the carnival designers Renato Lage and Márcia Lage in 2019.

Therefore, we have deemed it necessary to thoroughly examine the Curricular Guidelines for the Mathematics Teaching Degree, as outlined in Resolution CNE/CP n° 01/2002, to reflect on the formation of the identity of these courses (Brazil, 2002a). In addition, the Curricular Guidelines outline the competencies and abilities that future mathematics professionals should develop throughout their education in accordance with Resolution CNE/CP n° 01/2002.

In recent decades, the applications of mathematics have significantly broadened their scope, encompassing an ever-increasing array of fields and industries (...) Moreover, the skills and competencies acquired by mathematicians during their education, such as logical reasoning, critical thinking, and problem-solving abilities, equip them to occupy positions in the labor market beyond the confines of academia in fields where abstract reasoning is an indispensable tool (Brazil, 2002a, p. 1, our translation).

Flexibility in undergraduate programs is crucial to meet students' wide range of interests, particularly in light of the potential for future mathematics professionals to work in various areas related to their field of expertise. Additionally, guidelines highlight two critical aspects of mathematics education: the consolidation of fundamental mathematical knowledge and concepts typically acquired during basic education and the comprehension of the meaning of what will be studied in higher education when students have already developed experience and a set of representations.

Resolution CNE/CP n°. 02/2002 provides evidence that Mathematics courses should structure their curricular contents to follow the following guidelines:

- a) Employ the representations that students possess of mathematical concepts and school processes to structure the development of approaches throughout the course.
- b) Construct a comprehensive understanding of the contents in a theoretically significant manner for the student (Brasil, 2002b, p. 4, translated).

In the context of the National Curricular Guidelines for Mathematics Teaching Degree courses, CNE/CES n°. 1.302/2001, it is crucial to emphasize that the curricular organization mandated for Higher Education institutions comprises two elements: specific contents that are considered common to all Mathematics courses, and contents that constitute the standard part. This common part includes mathematical concepts taught in Basic Education, content from areas related to Mathematics that serve as sources of problems and applications of mathematical theories, and content from the fields of Science of Education, History, Philosophy of Science, and Mathematics (Brazil, 2001c).

Based on the findings of Souza and Coutinho (2019, p. 498, our translation) "can argue that effective progress in education is contingent upon the development of teachers with the

ability to discern and comprehend issues pertinent to pedagogical practice and the educational system as a whole". From this perspective, it can be inferred that ongoing discussions surrounding the training of mathematics teachers are primarily concentrated on the curriculum, particularly about components related to Mathematics Education that are present within these programs. It is taking into consideration that the curriculum is defined as "a praxis that involves the mastery of the specific content (mathematics) and the mastery of ideas and pedagogical processes related to the assimilation or the appropriation/construction of school mathematical knowledge" (Fiorentini & Lorenzato, 2006, p. 5, our translation).

Upon reviewing the research conducted by Gatti and Nunes (2009), it is apparent that the authors delineate three distinct categories of Mathematics Teaching Degree. These categories are predicated on the degree to which the course content is explored in depth throughout the program. Specifically, the categories are as follows:

1° These categories include programs prioritizing specialized training courses in Mathematics, encompassing the content areas stipulated in the Curricular Guidelines for Mathematics courses exclusively designed for Bachelor's degrees. These programs delve extensively into Algebra, Analysis (including courses on Differential Equations, Complex Variables, Vector Calculus, and Topology), Geometry, the Geometry of Transformations, and non-Euclidean geometries. While pedagogical disciplines are also included in these programs, their workloads are relatively limited;

2° Another category of programs includes those that prioritize basic mathematics training, in compliance with the Curricular Guidelines for Mathematics Courses, alongside pedagogical training focused on education. However, only a relatively small portion of the program is dedicated to subjects within Mathematics Education;

3° Yet another category of programs encompasses specialized training courses in Mathematics designed to meet the Curricular Guidelines for Mathematics Courses and courses dedicated to Mathematics Education. Such courses may include Mathematics Didactics, Philosophy of Mathematics, History of Mathematics, Topics in Mathematics Education, and some courses about the broader field of Education (Gatti & Nunes, 2009, p. 109, our translation).

It is important to highlight that the presentation of course content in undergraduate programs often fails to promote the construction of a broad and meaningful understanding for students. Moreover, these contents are frequently fragmented and lack cohesive meaning, thus leading to a contradictory nature in the curricular document.

The authors Gatti and Nunes (2009) also highlight another significant aspect of the training imparted by these various program types, as they state:

The Mathematics Teaching Degree aim to train professionals with distinct backgrounds, including individuals with a strong mathematical foundation who may not feel adequately prepared to navigate classroom situations that extend beyond the scope of mathematical knowledge, as well as those with a pedagogical education disconnected from the specific field of mathematics, requiring graduates to establish connections between these domains. It is widely acknowledged that the few Mathematics Teaching Degree that offer comprehensive training in Mathematics Education can provide prospective teachers with more contextualized and meaningful experiences to develop their pedagogical practices (Gatti & Nunes, 2009, p. 109, our translation).

When considering the types of courses and the profiles of these graduates, Professor Salgueiro <sup>7</sup>, who completed his teaching degree between 2006 and 2009, emphasizes that:

My initial training curriculum for the Mathematics Teaching Degree encompassed a range of didactic-pedagogical disciplines to foster a robust exchange of experiences between myself and the instructor teaching the subject (...). However, it should be noted that around 80% of the course subjects were focused on the specific content of the mathematics field (Professor Salgueiro, reflective workshop, 2021, our translation).

After describing the type of curriculum in his teaching degree, Professor Salgueiro also discusses the place of pedagogical disciplines in his initial training when he says:

Pedagogical disciplines in my undergraduate program were viewed by many, in our immature mindset at the time, as disciplines that did not make much of a difference and were a waste of time. Deep down, we only wanted mathematics, mathematics, and mathematics. They were somewhat sidelined on the curriculum in their percentage and nothing more (Professor Salgueiro, reflective workshop, 2021, our translation).

Professor Portela, who completed his teaching degree from 2002 to 2005, states that:

My initial formation curriculum focused mostly on specific Mathematics courses but did not extensively cover the contents. Pedagogical courses accounted for 40% of the program. I remember having good readings on the National Curriculum Parameters that had recently been implemented in teaching (Professor Portela, reflective workshop, 2021, our translation).

Based on the teachers' narratives, even though both courses have a similar structure, it is noticeable that Professor Salgueiro's course prioritized specific Mathematics training, with fewer pedagogical classes and a low workload for these components. On the other hand, Professor Portela reveals that he graduated from a course that invested more equitably in basic

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<sup>7</sup> The names of the contributors were assigned to the Special Group Samba Schools of Rio de Janeiro. The objective, among others, was to preserve the personal identity of the contributors, as recommended by the Certificate of Ethical Appreciation Presentation No. 47056121.5.0000.5546 and Opinion No. 4.861.205 of July 22, 2021, from the Research Ethics Committee, which approved the study from which this manuscript originated.

Mathematics training and pedagogical training for the education field. Furthermore, Professor Salgueiro reveals a devaluation on the part of students regarding pedagogical disciplines, in detriment to an excessive appreciation of specific disciplines. According to Cury (2001, p. 14, our translation), this extreme appreciation is linked to "an absolutist view of the discipline" and the fact that, historically, undergraduate teacher education programs were mainly composed of engineering teachers with " (...) a solid background of knowledge in the area, but generally without specific pedagogical training, extremely valuing mathematical content at the expense of teaching methods" (Cury, 2001, p. 12, our translation).

When analyzing the workload of undergraduate Mathematics Teaching Degree, Gatti and Nunes (2009, p. 100, our translation) found that:

Proportionally, General Didactics accounts for 1.6% of the time in this Mathematics Education degree, knowledge directed towards basic school accounts for 18.5%, and in-depth knowledge specific to the disciplinary area accounts for 34.1%. It is interesting to note that Research and Final Coursework (TCC) occupy 3.7% of the course time, fewer hours than Complementary Activities (5%), which include labels such as "Academic-Scientific-Cultural Activities", "Complementary Activities", "Independent Studies".

Considering the analysis carried out by the authors, it is noticeable that, in addition to the issue of the proportion between specific and pedagogical contents, the initial teacher education curricula for mathematics teachers almost do not carry out practices focused on research, with the main emphasis on the relationship between teaching and learning of Mathematics. From the perspective of curricular formation, some other problems are pointed out by Fiorentini *et al.* (2002, p. 54, our translation):

(...) disconnection between theory and practice, between specific and pedagogical training, and between training and school reality; less prestige of the teaching degree compared to the bachelor's degree; absence of historical-philosophical and epistemological studies of mathematical knowledge; predominance of a technical-formal approach to specific disciplines; lack of theoretical-practical training in Mathematics Education of teacher trainers.

The problems presented by the authors allow us to reflect on the Supervised Internships, which, in general terms, should guarantee the articulation between the curricular axes present in the Mathematics Teaching Degree. In this sense, we recall the development of the Supervised Internship during our initial training, and we faced the reality that this phase was merely bureaucratic. As a result, most of the time was spent explaining how to fill out documentation, the required workload, and the development periods. We remember that to complete this training stage, it was only necessary to submit a form with the dates we were in

the school, describing the actions taken on those days, and the signature of the teacher who supervised the internship *in loco*. Nothing else. No guidance, no visits from the internship teachers or the internship supervisor at the school. The activities we developed during the two internships were designed how we believed they could be and aligned with the content the teacher had to cover according to the planning.

One of the challenges of the teaching internship in teacher education is to overcome bureaucratic and unreflective practices that dissociate theory and practice, bringing slight effectiveness to the professional training of education majors. In this regard, the Brazilian Society for Mathematics Education (SBEM) (2003, p. 5-6, our translation) emphasizes that "the isolation between teacher education institutions and the distance between teacher education institutions and Basic Education systems generates disconnection between mathematical knowledge and pedagogical knowledge and between theory and practice."

Regarding the importance of Supervised Internship, Cyrino and Passerini (2009, p. 126, our translation) indicate that:

(...) the supervised internship represents contact with the multiple elements that make up the educational practice, enabling a discussion and reflection on the educational process in schools. Gradual and systematic contact with the future field of work, with school situations at different levels of education throughout the entire initial training course, can enable the future teacher to recognize the limits and potentialities of observed educational practices, analyze, construct, and test possible actions to remedy or meet the practical needs with which they will come into contact in their future professional practice.

We would have liked to experience our internship from this perspective, as it would have been an opportunity for us to be properly inserted into the field of professional practice and thus experience teaching by interacting with school agents and students in their daily routines. As Gatti and Nunes (2009, p. 109) state:

In projects and curricula, it is unclear how the mandatory internship hours are integrated into various institutions. However, some institutions do not distinguish activities intended for Teaching Practice and Internship. The internship supervision and validation processes are also not explicitly addressed.

The dissonance between what is written and what is experienced, that is, what is legally provided and the practice in Supervised Internships, makes it so that the future teacher does not concretely experience the teaching experience; they become, therefore, just another prescribed requirement in the curriculum and not a feedback element of the course that

concretely enables a complete formation for the future teacher, to prepare them for future challenges.

This fact does not seem to have been the reality of Professor Beija-Flor when he says:

My bachelor's degree was excellent. During the internship period, we went inside the schools themselves. There was no such thing as staying outside. The schools were both from the state and the municipality. When I arrived at the school to teach, I felt that impact, but it wasn't that big because I came from a good education at the university that prepared me to some extent for this. I didn't despair! (Professor Beija-Flor, reflective workshop, 2021, our translation)

The teacher's narrative makes it clear that the perspective adopted by his bachelor's degree in Education was based on a valorization of practice during the training of teacher education. Undoubtedly, the experiences and opportunities provided during this training period allowed Professor Beija-Flor moments of reflection on his autonomy, responsibility, and professional commitment. Moreover, there is the possibility of a global and critical analysis of situations in the concrete learning context of basic Education, emphasizing professional performance with an emphasis on observation, participation, planning, teaching practice, and evaluation of the teaching and learning process.

Professor Viradouro presents a different reality based on his experience during the internship. According to him:

During the internship, the teacher deceived everyone, I will use the word deceived because she always said everything was great. Since my father was a teacher, I knew it was not like that. The school itself and the education system was not easy. (Professor Viradouro, reflective workshop, 2021, our translation).

Differently from Professor Beija-Flor's narrative, Professor Viradouro's speech reveals that the academic knowledge offered by his course was limited by theory, which often distanced the future teacher from the reality of the classroom. We are not trying to minimize the importance of theory in the teacher training process but rather drawing attention to the absence of practices in the training process that could provide a learning experience for the student teacher closer to the school context

In this sense, teacher education programs, with few exceptions, in the view of Pimenta and Lima (2018, p. 33, our translation):

(...) do not provide a theoretical foundation for the future professional's actions, nor do they take practice as a reference for theoretical foundation, (...) that is, they lack theory and practice, (...) teacher education curricula have become a cluster of disconnected

disciplines, without any explicit explanation of their links to the reality that gave rise to them.

This leads us to believe that, in many cases, the internship is understood as the practical part of teacher training courses, including mathematics, and constitutes the only moment when future teachers go to the school space, thus allowing for the emergence of anguish, apathy, uncertainty, incomprehension, and frustrations.

The authors also point out that "practice for the sake of practice and the use of techniques without due reflection can reinforce the illusion that there is practice without theory or theory disconnected from practice" (Pimenta & Lima, 2018, p. 37, our translation). Thus, in this case, it would end up reducing the internship to a set of "techniques to be employed in the classroom, the development of specific skills in class management, and the completion of observation forms" (Pimenta & Lima, 2018, p. 37, our translation).

It is necessary to have greater clarity about the purpose of internships within teacher education programs and the relationship between knowledge and action or between theory and practice. Supervised Internship plays an essential role in professional training because it enables students to familiarize themselves with the reality of schools, thus, it is very important to understand and be aware of actions that are taking place within the school community, how these movements are being established, the lack of it and why. With this, they learn to criticize the practice being experienced in the classroom and can also confront the theory being taught to them with the realities existing in practice, questioning, dialoguing, and constructing their knowledge.

It is worth noting that since Law no. 9,394/96, teacher training policies (initial and continuing) have undertaken some actions. According to Gatti *et al.* (2019, p. 177, our translation), little progress has been made despite all efforts.

In the realm of policies, criticisms of deprofessionalization, precariousness, and simplification of teacher training, as well as the weak articulation between initial training, continuing education, professional insertion, and working conditions, salary, and career of education professionals, stand out. In the realm of formative practices, in the context of initial and continuing education, criticisms mainly concern the weak articulation between theory and practice, between specific knowledge and pedagogical knowledge between universities and schools.

Despite the existence of movements that aim to train teachers based on what is described in official documents, these changes are not significant Gatti *et al.* (2019), considering the analysis of research published in this context, highlight that training remains incomplete due to the dissonance between theory and practice in teacher education curricula.



Finally, it is necessary to say that due to the general "cleaning" that had to be done by formative institutions, metaphorically and joyfully removing the "crusts" that hinder the achievement of an evolution grade 10, so that the guidelines and regulations contained therein would gain materiality, the implementation of the DCN for teacher education, through the adaptation of initial and continuing education courses, has constituted a challenge for educational policies.

### **Final considerations**

Upon finishing the writing of this article, we realized how relevant it was to produce reflections from the movement of narrativity, in which reflection emerges from lived experiences, from what is narrated in frank dialogue with what various authors say about the theme of curriculum and the training of mathematics teachers. Thinking about the curriculum and the training of mathematics teachers meant highlighting how we reflected on the topic based on our experiences and how the contributors did so.

In a metaphorical adventure of thinking about Mardi Gras, of considering the peculiar way of weaving a plot, of constructing the formation of a reveler called a mathematics educator, we narratively explored the themes of curriculum and teacher education. This involved reflecting on lived experience, educational experience, and inhabiting the teaching profession.

As a foundational concept, the experience was associated with knowledge resulting from what is constructed repeatedly, of knowledge perfected over time. However, it was through immersion in readings and discussions with collaborating professors that we learned exactly the opposite, namely that knowledge is lived in the dimension of singularity, of the specificities of events, generating a movement of modified learning, structured and organized by what singularly touches us and that happens to one and not necessarily to another. From this idea, the fact is conceived that experience is lived, felt, and not necessarily narrated.

When encountering the narrative research methodology, we immediately understood that "the focus of the entire work could not ignore the narrativity of our self, of the way we construct our experiences of formation and professional performance from our life history" (Vieira, 2022, p. 216, our translation). This aspect gave this article a dynamic of vivacity, generated in the disposition that we were constructing to narratively continue undressing, stretching our experiences and lived experiences, not in an attempt to imprison them in words, but to enable words to confer the closest meanings to those that each experience revealed.

Therefore, adopting the methodological perspective of narrative research has become an experiential movement of being that has stretched itself to understand itself and its own

experiences with teaching mathematics. At this moment, we speak of ourselves and the study's collaborators, who followed the epistemic-political principles of narrative research to stretch themselves in their understandings of being and living mathematics teaching.

Through the reflective workshop, it was possible to engage in a reflective process about teaching to embrace the idea that experiences need to be narrated and understood based on the actions that each subject carries out when talking about themselves and how they think and act in teaching mathematics. This possibility became evident, among other reasons, because narratives socialize experiences, revealing the influences resulting from relationships established in school practice. Through socialization, both at the institute and in their daily lives, teachers were able to build and perceive how the experiences of being a teacher emerged as a possibility for reflection and the constitution of processes for the production of experiences and knowledge in the teaching of mathematics.

The research showed an evident concern among teachers about students' learning conditions, with the teacher-student relationship and teaching articulated with the students' everyday life and formative needs being central to this condition.

In the context of this study, we engaged in a problematizing discussion about the curriculum and supervised internship, highlighting the importance of immersing teachers in the daily life of the profession. In this way, we were able to explore concepts of inhabiting the teaching profession, recognizing that this inhabiting involves the existence of an entity and a being in constant movement of ebullition, transformation generated by a reflexive metamorphosis that constantly impelled us to think about the experiential learning of the mathematics teacher and how it occurs intuitively and operationally.

The study showed how initial training in mathematics, through our experiences, was distant from the experiential movement of inhabiting the profession of a teacher. The main problem was highlighted in the narratives of our collaborators, who pointed to a distance between their initial training and the construction of knowledge related to mathematics teaching. However, we also observed more contemporary training approaches, indicating the existence of a curriculum woven through the daily experiences and practices of mathematics teachers.

Finally, the study also showed that the concept of experience transitions from conceptions that associate it with the idea of an experiment to concepts that demonstrate experience as a narrated event based on the actions that teachers develop to generate learning. The concern with mathematical knowledge gives way to an idea of school mathematics, woven into the structure of general and specific training for students at the institute.

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