

EXPERIENTIAL KNOWLEDGE OF MATHEMATICS TEACHING: FORMATIVE TECHNOLOGIES IN THE EVERYDAY TEACHING PROFESSION

SABERES EXPERIENCIAIS DA DOCÊNCIA EM MATEMÁTICA: TECITURAS FORMATIVAS NO COTIDIANO DA PROFISSÃO DOCENTE

CONOCIMIENTOS EXPERIENCIALES DE LA ENSEÑANZA DE LAS MATEMÁTICAS: TECNOLOGÍAS FORMATIVAS EN LA PROFESIÓN DOCENTE DIARIA

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ABSTRACT: This article aims to understand how the mathematics teacher produces an experiential knowledge that is linked to the paths of their own life histories, of formation, as well as the needs to develop teaching strategies that are linked to the formative needs of students. The study is qualitatively based and is anchored in the (auto)biographical approach, in which the teacher speaks of himself/herself, of his/her professional movements and educational actions, imprinting in his/her narrative the meanings that he/she produces when narrating. The information collection device was a narrative interview developed with three mathematics teachers who work in high school. The results showed that the teaching of mathematics, which takes place in a dialogical relationship based on the experiences of students, achieves a greater condition to generate learning. Contextualization based on the experiences of students favors greater success in learning mathematics and, likewise, produces significance about mathematics in the lives of students.

KEYWORDS: Experiential learning. Teaching of mathematics. Teaching profession.

RESUMO: *O presente artigo objetiva compreender como o/a docente de matemática produz um saber experiencial que é articulado aos percursos de suas próprias histórias de vida, de formação, bem como das necessidades de desenvolver estratégias de ensino que se articulem às necessidades formativas dos/as discentes. O estudo é de base qualitativa e ancora-se na abordagem (auto)biográfica, em que o/a professor/a fala de si, de seus movimentos profissionais e de ações educativas, imprimindo em sua narrativa os sentidos que ele/ela próprio/a produz ao narrar. O dispositivo de recolha de informações foi a entrevista narrativa*

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desenvolvida com três professores/as de matemática que atuam no Ensino Médio. Os resultados evidenciaram que o ensino de matemática, que se efetiva numa relação dialógica a partir das vivências dos/as estudantes, logra maior condição de gerar aprendizagens. A contextualização a partir das vivências dos/as discentes favorece, a estes/as, maior êxito da aprendizagem da matemática e, de igual modo, produz significâncias sobre a matemática na vida dos/as estudantes.

PALAVRAS-CHAVE: *Aprendizagens experienciais. Ensino de matemática. Profissão docente.*

RESUMEN: *Este artículo tiene como objetivo comprender cómo el docente de matemáticas produce un conocimiento vivencial que se vincula a los recorridos de sus propias historias de vida, formación, así como las necesidades de desarrollar estrategias de enseñanza que estén vinculadas a las necesidades formativas de los estudiantes. El estudio tiene una base cualitativa y está anclado en el enfoque (auto) biográfico, en el que el docente habla de sí mismo, de sus movimientos profesionales y acciones educativas, imprimiendo en su narrativa los significados que él mismo / lo produce al narrar. El dispositivo de recolección de información fue una entrevista narrativa desarrollada con tres profesores de matemáticas que trabajan en la escuela secundaria. Los resultados mostraron que la enseñanza de las matemáticas, que se desarrolla en una relación dialógica a partir de las experiencias de los estudiantes, logra una mayor condición para generar aprendizajes. La contextualización basada en las experiencias de los estudiantes les favorece un mayor éxito en el aprendizaje de las matemáticas y, de igual forma, produce trascendencia sobre las matemáticas en la vida de los estudiantes.*

PALABRAS CLAVE: *Aprendizaje experimental. Enseñanza de las matemáticas. Profesión docente.*

Introduction

The daily training of teachers has been transversalized in debates in the educational field that focus on experience as a central element for the production of teaching knowledge. In this sense, the knowledge of the teachers is considered as knowledge arising from the experience woven in the engendering of the teaching and learning processes. They are, in this logic, experiential knowledge, which materializes as events of the teaching action. In this reflexive web, experience is not a knowledge that is revealed by the accumulation of knowledge that the teacher develops by doing something many and repeated times, but a knowledge that is produced in the inventiveness and emergencies of the educational processes, which by their nature, are unpredictable and unique.

Teaching is not orchestrated by linear logics in which the teacher is the executor of a pre-formatted action. On the contrary, it is consolidated articulated to the insurgencies movements that the relationship between teachers and students, between the content to be taught

and the need for the act of knowing the students, produces by summoning the teachers themselves to exercise teaching mobilized by the idea that teaching has specificities that take into account the real learning needs of students.

Thinking in this way, it does not mean, however, to say that teaching is merely effective in the inventiveness of teachers, as it requires constant planning and organization of educational and pedagogical work. But it must be considered that the planned actions move from a rigid structure to take place in the events, Silva (2017), of the daily life of the profession, in which the actions take place mobilized by several factors, among which are the stories of life, the formative paths of the students, as well as the daily experiences that cross the educational process and are present in the inquiries and needs of knowing that the students reveal when they look for them at school and, consequently, in the teachers, the reason for learning what they learn.

Likewise, teaching is also effective, considering the paths, life stories, formation and beliefs that teachers develop in teaching experiences. The uniqueness in the process of living and doing teaching is constituted in the proper and peculiar way in which each teacher finds when creating strategies, actions and knowledge that they use to produce teaching, and from that, produce conditions of learning in students. Therefore, in this architecture of thinking, elements that transversalize teaching can be seen, a dynamic of production of knowledge from experience that, according to Silva (2017), are characterized as experiential knowledge, that is, as the aforementioned author understands, knowledge that are weaved in the engendering of teaching and which are characterized by singular events, lived in the fabrics of educational practice, which are not necessarily repeated, but which are characterized by actions of inventiveness and emergencies that are visible in the educational needs of students.

Conceiving, therefore, that teaching in mathematics is revealed in the plots of a teaching action that is singularized by the daily pedagogical work that the teacher develops, this article seeks to understand how the mathematics teacher produces a knowledge experiential that is articulated to the paths of their own life histories, of formation, as well as the needs to develop teaching strategies that are articulated to the formative needs of the students. In this logic, the present article brings to the scene reflections that surround the following mobilizing question: How are the experiential knowledge of mathematics teachers woven into everyday teaching?

The present study was developed anchored in qualitative research, as we were interested in understanding the meanings that emerge from the subjectivities of the collaborators. The methodological approach was inspired by the (auto)biographical perspective, in which the study participant talks about himself, his professional movements and educational actions, printing in

his narrative the meanings that the very act of narrating produces. The information collection device was the narrative interview made with three mathematics teachers who work in high school. The interviews were recorded using the Google Meet platform, due to social distancing, caused by Covid 19.

The article is structured in three sections in addition to this introduction, in which we problematize the theme and present the objectives and mobilization that generated this research. In the following section, the methodological structure of the study is discussed in greater detail. In section 3, entitled: Experiential knowledge of teaching in mathematics: tactics and tricks in teaching, the results of the interviews are discussed, focusing on the ways in which each teacher was weaving their experiential learning of teaching in mathematics. In the last section we make the final considerations, revealing the research findings and opening questions to think about other studies that problematize the daily training of mathematics teachers in the school routine.

Methodological weaving of the research

The present study was inspired by the paradigms of qualitative research, as it is a type of research that values the source of orality as a central element to understand what is lived and experienced by people who narrate, comment, reflect and think about their own experiences (ALVES; FIALHO; LIMA, 2018; BOGDAN; BLIKEN, 2017; NASCIMENTO; CAVALCANTE, 2018; SEVERINO, 2019). It is also worth mentioning the fact that qualitative research has been evidenced by the condition of expressing itself in various methodological conceptions that enhance and value the narratives of collaborators (FELICETTI, *et al.*, 2019).

We chose to work with this type of research, because we guided the understanding of experiential knowledge in the context of education, and we thought about the possibility of making the voices of research collaborators visible, evidencing what they experience in the world of school, especially regarding the processes of teaching mathematics.

This research was developed from the approach of the (auto)biographical method, which is used in several research in education, and which places the teacher, his/her experiences, his/her life and education history in a context of significant centrality of existence (MEDEIROS; AGUIAR, 2018; ROCHA; MALHEIRO, 2019; ROCHA; REIS, 2019; MAFRA; SÁ, 2020). The teacher is the author of his/her narrative, of his/her way of thinking. It is he/she who builds the meanings of what he/she narrates and what he/she thinks about himself/herself, about his/her practices, and therefore about his/her own way of developing the experiential learning of teaching.

Ferraroti (2010), one of the authors who claims the autonomy of the (auto)biographical method, attests that biographical narratives are sufficient elements to compose a legitimate research and points to the need for methodological renewal. This methodological approach corresponded to the requirement of a need for the concrete, so that people could understand their daily lives, their difficulties and contradictions. In this way, the science of mediations capable of translating individual or social micro behaviors was considered. The (auto)biographical approach presents itself as a new form of mediation between actions and structure, between individual and social histories. Therefore, the (auto)biographical approach allows teachers to talk about themselves, weave the threads of teaching and understand, in the very movement of narrating the singularities of their educational practice.

The significant contribution of the (auto)biographical approach is to enable the narrator to know himself, his/her own educational practices based on an epistemological conception woven from the production of narratives that, among other roles, have the function of reconstructing the moment already lived, in another time and structural dimension, which is no longer the lived one, but the narrated one. According to Josso (2004), the approach of the (auto)biographical method marks a process of changing the researcher's perspective, through the refinement of research-action-formation methodologies, articulated to the construction of a life story. In addition, it outlines the contribution of knowledge that encompasses formation and self-formation, elucidating the characteristics of a specific audience.

Josso (2004) considers that the (auto)biographical approach constitutes a means that the subject uses to observe a central aspect of educational situations, favoring an interrogation of the representations of know-how and the references that serve to describe and understand the way to act in teaching in their natural environment. In this sense, the experience of being a mathematics teacher is configured as a possibility of unveiling developed practices, which only those who develop are able to narrate and speak about themselves in the context of experiential praxis. This means developing and understanding an educational practice that is processed through direct experience with the educational reality placed in the daily life of the profession.

The notion of human praxis is, according to Ferraroti (2010), the specificity of the method. This notion is translated by the human essence in the set of social relations. For this author, any praxis reveals the appropriations that these subjects make of the relationships they experience and, also, of the social structures in which they are inserted. So, the process of internalization and externalization evidences the dynamic character of subjectivity. In this perspective, the fusion of subjectivity with social structure occurs.

In this sense, we recognize that the (auto)biographical approach offers the possibility of revealing the meanings that teachers, working in mathematics teaching, produce when reflecting on themselves and on their own ways of weaving teaching. The reflections woven by the (auto)biographical narratives, revealed in the present study, served as an important mechanism for understanding how each teacher builds their teaching strategies and, through this, develops experiential knowledge of mathematics woven into everyday school life.

It is situations like these, also defended by scholars of this method, such as Josso (2004), Nóvoa and Finger (2010), Souza (2011), Rios (2014), Silva (2017) among others, which led us to adopt the research (auto)biographical as a possibility to unveil the meanings and educational practices that math teachers weave in their daily work. To account for this fact, we interviewed three teachers, two men and one woman, who work in Basic Education, teaching mathematics. The interviews were recorded using the image and voice feature on the Google Meet platform. Each interview lasted an average of 40 to 60 minutes. The transcriptions were carried out in full, considering the indications presented by Jovchelovitch and Bauer (2002), regarding the movement of transcribing, reading, giving the narrator to read, correcting and validating what was narrated.

The interviews were of the narrative type, in which the collaborators freely narrate about the theme that was presented to them. In the case of our study, the theme was the teaching activities in the teaching of mathematics in everyday school life. When narrating, the teachers revisited different significant moments of their experiences, generating a sample of the appropriations and meanings that they built over time in their pedagogical practice regarding the teaching of mathematics.

In this way, the interviewees play an important role in the production and structuring of pedagogical knowledge, evidencing their role in the production of practices with the teaching of mathematics. The methodological approach made it possible to perceive the importance of practices that gain meaning and visibility in the narratives, promoting an understanding that teachers are not just technicians who execute norms and propose recipes or are only concerned with applying certain theories in pedagogical practice, but also, they are builders of new knowledge, mainly arising from the action of the established relationships and the coexistence with the different actors and actresses inside and outside the school.

Narrative interviews have a significant importance because they are pointed out with a greater level of depth, because they go beyond the question-answer scheme that characterizes most interviews. In this context, for the development of the present work, we consider the fact that the techniques of narrative interviews require the researcher to know the research

environment, its functioning, its configurations, requiring, for that, that preliminary understandings be made, constituted by immersion in the field and consequent observation.

The analyzes were produced according to the paradigm proposed by Ricouer (2000), called comprehensive interpretive. Thus, we read all the narratives, observing the nuclei of meaning, which emerged from the choices produced by the subjects, regarding the pedagogical actions practiced in the daily life of mathematics teaching that they develop. In this logic, it is the teacher himself/herself the protagonist, the subject who chooses facts, information and situations that he/she wants to tell and re-signify in a perennial process of construction of meanings and protagonism of his/her own history, formation and professional performance. Thus, when remembering the actions developed, the subject filters the experiences through memory, identifying them as a reference experience. Josso (2004, p. 40, our translation) defines this experience as “[...] a unique and decisive existential event in the effective practices of a life [...]”, and why not say a practice that is unique in the experiences of each teacher who deals daily with the educational practices of teaching mathematics.

Experiential knowledge of teaching in Mathematics: Tactics and tricks in teaching

Tardif (2010) considers teaching knowledge to be plural, developed both in pedagogical practice and in the teacher's formation process. According to Tardif (2000) this knowledge, in addition to being able to present an individual and collective character, is validated by the experience itself, when this allows the teacher to know how to do and know how to be. The author believes that experiential knowledge represents a set of updated knowledge, acquired and necessary within the scope of the teaching profession, and does not come from institutions or formation courses.

It is, therefore, a knowledge that does not come from a theory, that is not found in books and neither is it learned during formation courses. For, it is practical and, as it is, it is in it (in practice) that it is constituted, and it is in it that it is validated. That is, in facing situations that are not foreseen, in knowing how to deal with controversial issues, in knowing the events resulting from a certain action.

In Tardif's (2010) conception, experiential knowledge provides relative certainties that facilitate the process of interaction and, when it comes to teaching work, these are necessary knowledge, based on the premise that teaching work is not individual, it is interactive and immersed in a context full of symbols, beliefs, values, interpretations, decisions, among other characteristics.

Unlike Larrosa (2002), Tardif (2010) considers it possible to partially objectify the knowledge of experience. This is justified by saying that the knowledge produced in everyday practice and in the confrontations of the profession is not something that remains in individuality, but that is commonly shared among peers, or, at least, can be shared. And it is this sharing that allows the production of experiential knowledge, in view of the tactics and strategies developed during the teaching career. The knowledge produced in the pedagogical practice also acquires a certain uniqueness as it relates to other knowledge, including experiential knowledge, such as: disciplinary, curricular and professional formation.

When reflecting on his/her own work, the mathematics teacher is able to discern a range of elements that can help him/her in the elaboration and execution of other strategies and new behaviors in the face of the problems that arise from their experience in the daily life of the profession. With a conception of experience as an event that touches, transforms and is singular, Larrosa (2002) conceives that experience does not result from accumulated knowledge, but from a knowledge that is operationalized in the events of life, and in our case, in the events of mathematics teaching.

So thinking, for the teacher to develop an experiential learning, it is necessary that something happens to him/her, touches him/her and not that things simply pass with him/her and happen in a way that does not change his/her own way of conceiving teaching and educational practice. This requires: “interruption, stopping to think, looking, feeling, suspending opinion, the automatism of action, cultivating tenderness, attention [...] giving yourself time and space” (LARROSA, 2002, p. 25 our translation). Therefore, being a subject of experience means being an exposed, open, suffering, receptive, submitted, sufferer subject.

It is from these experiences that experiential knowledge is generated, validated by the teaching practice itself in everyday life and in the knowledge and organization of the work that the teacher develops. It is from this context of an experiential learning that emerges from what is lived, that everyday life is understood as what is given each day, which is presented in an unprecedented way and which is revealed as an emancipatory way in which the teacher thinks and performs their actions and see in them the unique elements that make them unique, as unique are the experiences, which, according to Larrosa (2002), are never repeated.

The knowledge that occurs between knowledge and life concerns the teacher's own reaction and experiential movements, which he/she develops within the scope of everyday events. By knowing and producing knowledge about what happens to him/her throughout his/her professional life, the teacher creates meaning for the experience and devises his/her own ways of producing mathematics teaching. In his narrative, Roberto reflects on the formation

course constituted in the school itself and in the relationship with the students and with the mathematical knowledge itself.

So I always wanted to be a math teacher. I thought it was very beautiful to be able to know the rules, calculations and formulas. I was delighted and thought it was important to know many subjects, such as functions, equations, you know? Know how to do the calculations, explain all this to the students. But then when I get to school and start working with the students, I realized that teaching outside of their context was not doing much good. It was no use knowing how to solve the questions in the book, even contextualized, it was not the context of my students, who lived on the street, playing ball, running, those things. That's when I started to study how to teach mathematics from the reality of each student, trying to make sense of it. Man, you only learn that in the classroom, at school, going to the patio to play ball on the court and teach geometry there, calculating, showing, you know [...] (Roberto, narrative interview, 2021, our translation).

Experiential knowledge is revealed in Roberto's narrative, mobilized by the teacher's need to contextualize teaching from the student's experience, from his/her real needs to see in mathematics meanings that go beyond the mere content or that emerge from the paths of teacher formation. Therefore, Roberto is touched by a unique experience, which is weaved, as Silva (2017) says, in the everyday events of the profession, in which tactics and cunning, Certeau (1994), make up the reflective arsenal of the teacher to align the teaching of geometry with the daily practices of their students who are focused on the game of marbles, or even football on the court.

In this sense, the teaching of mathematics gains a centrality in the practice of Teacher Roberto, who considers the knowledge of the students, arising from their experiences with football and the practice of the game of marble, to develop strategies for teaching geometry using the court space and the rule of the game itself as essential elements for students to understand the concepts of area, perimeter, diameter and their functionality in mathematics. Upon seeing meaning in mathematics, the students began, according to Roberto's narrative, to consider an articulation between the school and their lives, the way in which they built relationships with their colleagues and with the community itself. So were the students, according to the teacher's narrative, who sought to explore greater relationships between mathematics, physics and their daily lives. In another part of the narrative, Teacher Roberto reports that the students proposed a reflective practice on mathematical concepts. So he reports:

It was in a class developed in the schoolyard that the students suggested studying the theories of geometry in practice. There, the students

proposed to create games with different geometric figures that would be produced in the school area and that would have another use, such as producing trash cans, benches, and even some games that they wanted to build for younger students to play, you know?. What they were telling me is that we needed to make mathematical knowledge useful to the school and easy to understand for them. It was to get out of the paper, to think about the calculations and creative formulas of learning geometry. This involved other subjects and also longer time, as students stayed in school longer, involved with the mathematics of life, as they said. And it was from there that I was experiencing and letting myself be carried away by these ideas of the students and when I saw it I was well involved with the activity, creating more and more and [...] (Roberto, narrative interview, 2021, our translation).

No matter how much planning there was in Teacher Roberto's practice, the daily life, the relationship with the students and their learning needs were decisive for the teaching to be architected in a different way, in a peculiar way to the context in which teaching itself takes place. Such a teaching perspective shows that educational practice is not linear and does not occur anchored in a pre-established structure, much less in conditions of knowledge transfer. Freire (2005) ratifies and defends a pedagogy of student autonomy, in which teaching is not reduced to the mere transmission of knowledge, but the mobilization for the other to learn. Being a mathematics teacher, for Roberto, means being open to learning that is built on the unpredictability of everyday life and on the ways in which the teacher and students become protagonists in the teaching and learning process.

Allowing yourself to live the experience with students is allowing yourself to experience a production of knowledge, in which and by which the teacher is touched, making it possible to learn with, in order to become collaborative and participatory in the students' learning process. In this idea, experience for Roberto demands the understanding of a knowledge that is a pure event, which is consolidated, as Tardif (2010) asserts, with a disciplinary knowledge, but which is woven in the attitudes of allowing oneself to experience, of producing a deed that displaces the teacher to guarantee the students' learning autonomy position.

From a curricular perspective that considers the learner's autonomies, Teacher Roberto's practice is revealed to be a mediator, a facilitator of learning in a perspective of developing ways of learning that favor the cultural transformation and mathematical knowledge of the students. In this logic, the teacher starts to understand how learning occurs, when he/she realizes that the strategies used by him/her are fundamental for the production of students' learning, therefore necessary for students to learn from significantly and through processes of reflexive autonomies that the student develops.

Anchored in a dialogic paradigm and openness to learn with himself/herself and with the students themselves, the teacher lets his/her personal and professional enthusiasm flow, finding in the students' suggestions the possibility to develop strategies that will be used to teach geometry, considering the characteristics of the students, their motivations and engagements with the school and the educational space. In this dynamic, the teacher subtly engenders a plan that is flexibly built, choosing geometry contents that allow students to carry out actions in such a way that the lived experiences generate new learning. To a certain extent, experiential learning is also anchored in the condition of loving what you do and opening yourself up to generate autonomy in the learner. This perspective is also defended by Bordenave and Pereira (2010), who, addressing the issue of teaching, tell us that:

the secret of good teaching is the teacher's personal enthusiasm, which comes from his love of science and his students. This enthusiasm can and must be channeled through adequate planning and methodology, aiming above all to encourage students' enthusiasm to carry out, on their own initiative, the intellectual and moral efforts that learning requires. (BORDENAVE; PEREIRA, 2010, p. 56, our translation).

Teacher Roberto's students' own initiative enabled them to have participatory and collaborative learning with the teacher's own teaching process, as well as anchored in an autonomy that was revealed in the perspective that the students themselves were the authors of the learning strategies. This idea was also contemplated in the narrative Carlos who developed a work with mathematics in contexts of countryside education. In his narrative, the aforementioned professor addresses how mathematical knowledge is re-signified by its action of enabling students' autonomy, but also in the construction of their autonomy when teaching the four mathematical operations. In his narrative Carlos tells us that:

I was always bothered at school for having to learn a lot of things that had nothing to do with my life. You know, the thing you're wondering why I want to know about this? Well, I took this thing to my classroom to think about mathematics in a logic for the student, not for mathematics itself. That's how I had an experience at YAE talking to students who came from villages, who worked in the fields. Then, I went to do a contextualization based on their experiences in the countryside. I went to work on mathematics using the concepts of tasks, planting corn, percentages of fertilizers, seeds, a lot of other elements that allowed me to work on mathematics in a way that would serve the realities of the students. But you know that thing about showing mathematics in formulas and books? Well, I also did this by revealing how they could appropriate it for their daily lives. (Carlos, narrative interview, 2021, our translation).

Carlos' narrative focuses on two situations that deserve reflection. The first concerns an idea of teaching mathematics that goes beyond contextualization for the sake of contextualization. In other words, working on contextualized mathematics means developing meanings for what is lived, for what is experienced by the learners themselves. In this logic, the work in the field that some students carry out is the motto to develop teaching strategies of addition, multiplication and subtraction anchored in the situations of the farm itself and what is built in it as mathematical knowledge. Therefore, educational practice converges to a production of knowledge in mathematics that enables the student to appropriate knowledge, building meanings for learning. This implies recognizing that the student is, as conceived by Freire (2005), mobilized to develop reflexive autonomy and to feel that he or she participates in the process of learning mathematics.

The second question points to a situation that many teachers face in the dynamics of teaching, which concerns the meanings of the content worked in the face of students' learning expectations. If there is no attribution of meaning, if the teacher cannot transpose the idea that he/she teaches because what is taught is important, the student does not even develop a learning process, he/she is simply left with the idea of fulfilling schoolwork, in which the passing grade becomes the most important thing.

However, it must be considered that the teaching strategies developed by Carlos appear as insurgencies of a teaching that is architected from the daily life of the profession. It is only in the school, in the space and in the educational relationships that he/she establishes with the students that the teacher engenders his/her own ways of thinking about mathematics in specific contexts. The specificity of articulating the rules of operations to the operative knowledge that students develop in the field implies a condition that it is what is experienced by the teacher in teaching that such tactics and tricks, as Certeau (1994) teaches us, are they effect and demarcate an experiential learning of teaching, woven on the “school floor”, in the daily relationships and processes of teaching and learning.

When it comes to mathematics education, there is a need for teaching to materialize in innovative perspectives, which according to Alves and Cavalcante (2017) gain notoriety in the field of mathematics education when teachers consider the learning context and the real needs of learners. In this direction, the idea of teaching implies a dimension of considering the contexts in which learning should take place. It is, therefore, contexts that enable understanding and attribution of meanings to what is learned, which is based on an idea of innovation linked to the understanding of contextualized doing.

According to studies developed by Alves and Cavalcante (2017), it has been quite necessary for educators to seek to develop teaching practices that enable learning that is also anchored in the perspectives of innovation, understood as fundamental in the construction of elements that facilitate teaching practice. Also, with a view to contextualizing teaching and thinking about the valuation of living spaces and how these spaces can be taken as places of learning, allowing the student, from this, to innovate in the processes of understanding and development of learning (SILVA; LOPES; SANTANA, 2021; SOUSA, 2016; SOUSA, 2017; MOCROSKY; ORLOVSKI; LIDIO, 2019).

Another narrative, that of Professor Tereza Raquel, shows how the teaching of trigonometry can also be a practice contextualized from the daily life of students in the countryside. Working with trigonometry composes the arsenal of contents worked with students, in which the compositional nature of the founding concepts is considered with the objective that countryside students understand the essentiality of trigonometric knowledge in their daily life. Thus, teaching moves in the direction of valuing knowledge contextualized by the paradigms of rural environments. In this logic, students have the opportunity to perceive how mathematics is articulated to their daily, everyday knowledge, with which the student deals in the countryside, within the family. It is from this condition that the understanding of the child is observed when understanding that the school prepares them for life, so that they can deal with situations with which they live. In a contextualized teaching practice, teacher Clara narrates about a workshop she developed on teaching trigonometry in the fields of one of the school's students. In her words she tells us that:

Promoting a workshop in a rural area to see in practice how we can apply mathematical concepts and demonstrate to young people who live in the countryside the usefulness of mathematical knowledge was of great importance in my own professional practice, because it was through it that I was able to mobilize knowledge to build trigonometric sense for myself and for the students. Mainly regarding the movement of teaching mathematics based on proposals for contextualized education, for offering us conditions to reinvent actions in teaching, thinking about the use of the knowledge that each student brings with them and that together we can build from the experiences we develop. in the daily teaching of mathematics teaching at school (Tereza Raquel, narrative interview, 2021, our translation).

It is at school, in the countryside, in their daily lives, cultural dimensions of the teaching and learning process that are conveyed in the narrative of Tereza Raquel who learns with the students in their daily lives in the countryside and at the same time, teaches them to transcend decontextualized knowledge of mathematics, leading them to understand mathematics from

other places, but which do not distance themselves from what each student experiences in their school routine, especially in their daily lives with farm work.

In this way, teaching learning, and in the context in vogue here, to work with the issues of teaching geometry contextualized with the knowledge of the countryside, emerges as a process that is resized from the experiences achieved in the school routine. Thus, teachers create new ways of doing things, which are integrated into the way in which each one understands and develops knowledge for teaching. From the point of view in which the daily life is taken in some works, Alves (2003) tells us that:

The works that are concerned with the daily life of the school and with the different cultural modes present there, then, start from the idea that it is in this process that we learn and teach to read, write, count, to ask questions to the world around us, to nature, to the way men/women relate to each other and with it, to poetize life, to love the Other. That is, while we reproduce what we have learned from other generations and from the social lines that determine hegemonic power, we are creating, every day, new ways of being and doing. (ALVES, 2003 p. 66, our translation).

Many actions are developed in the school in its daily life, which culturally are understood as repetitions of certain practices. Thus, we annually see educational days, parents' meetings, commemorative festivities, cultural activities, class councils, teachers' meetings, development of educational projects, among others. The school in a commonsense logic would be compared to a factory dimension in which it produces and reproduces its actions in a cadence characterized by repetitions. But this would be a mistaken analysis and would deny the dimension of understanding that subjectivities are in the school.

The “arts of doing” are unique in everyday life, in the same way that the subjects who are there are unique. Thus, everyday life is seen in a heterogeneity that promotes the production of new ways of making the school cultural practice develop from the ways that each one appropriates the educational universe, especially in the on-screen study of the mathematics learning universe. In this reflexive web, when teachers experience everyday school life, they enable a production of experience, which, as Larrosa (2002) asserts, is what happens to them, touches and transforms them, producing, according to Silva and Rios (2018) knowledge teaching experiences. Coming from tactics and tricks (CERTEAU 1994) woven into the daily life of mathematics teaching, which implies, as Tardif (2010) assures, teaching knowledge.

Final considerations

Architecting the teaching of mathematics from the reality of students, considering what they know, and what they need to know from their experiences, constitutes an emerging need, especially when one thinks about the role of the school and the teacher in the face of producing a teaching that generates meanings for the student. In this direction, the work showed how the teacher who builds his practice and experience based on what is lived and expected by the students produces a better sense of learning mathematics under the eyes of the students. It is about creating mechanisms and ways to enable mathematics to be learned and valued by students, as a knowledge that has value and meaning in their lives.

In this argumentative direction, the results showed that the teaching of mathematics, which takes place in a dialogic relationship based on the students' experiences, achieves a greater condition to generate learning. The contextualization based on the students' experiences favors, for them, greater success in learning mathematics and, in the same way, produces significance about mathematics in the students' lives.

The (auto)biographical narratives made it possible for teachers to become aware of themselves and of the work they develop with students, creating an atmosphere of sensitive understanding that their pedagogical work has had an impact on students' lives, giving them the condition to perceive how mathematics crosses their lives and enables them to use mathematical knowledge to build relationships with the place they live and the way they live.

This conception was produced by the movement of narrating their experience with teaching, in which the action of narrating summoned the participants to produce awareness of their role in the teaching they carry out. In this direction, the narratives were the way in which the experiences could be relived and constituted by the language in a new time, in a new dimension of the understanding of the teaching practice itself, architected with the meanings that the school and the community summon the mathematics teacher to produce in countryside areas.

Daily life and the notion of experiences emerged as central to visualize the way in which each teacher narrated and architected their educational practice in the dimensions that rurality, experienced by employees, made possible. In this sense, teaching mathematics was not limited to transmitting the specific knowledge of the component to the students, but to working the concepts of mathematics from the views and meanings that teachers and students found in the ruralities they experienced. Thus, as well defined by Certeau (1994), teachers built tactics from the cunning they were able to produce to generate the teaching of mathematics, designed with

the fabric of society, in this case, the society of students who experience the countryside and its dimensions.

Last but not least, the work showed that the teachers' listening to the formative needs of students makes them protagonists of the learning process. This was what was seen in some narratives, in which the teacher, open to dialogue with the students, listened to them in their curiosity and inventiveness to produce trash cans and other materials from the geometric textures. Listening to the students and aligning the teaching of geometry to this practice made perfect sense for the student, but also for the teacher, who can build the teaching from other realities, which transcend the teachings of formation and calculations found in books and teaching materials.

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