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The Mathematics Club of UFU: a collective space for teaching and learning[1]

O Clube de Matemática da UFU: a coletividade na aprendizagem da docência

El Club de Matemáticas de la UFU: la colectividad en el aprendizaje de la docencia

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RESUMO

O presente artigo analisa o processo de contato e aproximação de futuras professoras de Matemática com a Atividade Orientadora de Ensino (AOE), no contexto do Clube de Matemática da Universidade Federal de Uberlândia (UFU), concebido como um espaço formativo fundamentado na Teoria Histórico-Cultural. O estudo, de abordagem qualitativa, utilizou como instrumentos de produção de dados registros escritos da pesquisadora, portfólios das participantes, relatos reflexivos e gravações em áudio e vídeo. A análise foi realizada por meio de episódios e cenas, evidenciando as percepções, os desafios e as aprendizagens das participantes em seu primeiro contato com a AOE. Os resultados indicam que o CluMat/UFU se constituiu como um espaço coletivo de aprendizagem da docência, favorecendo a reflexão crítica sobre a prática pedagógica, a articulação entre teoria e prática e a apropriação de princípios teórico-metodológicos da AOE. Destacam-se, ainda, os desafios iniciais enfrentados pelas participantes, especialmente na compreensão e operacionalização das Situações Desencadeadoras de Aprendizagem. Conclui-se que a participação no Clube de Matemática potencializa a formação docente ao promover o trabalho colaborativo, a reflexão compartilhada e o fortalecimento da relação entre universidade e escola.

Palavras-chave: Ensino de Matemática; Formação Docente; Prática Docente.

ABSTRACT

This article analyzes the process of initial contact and approximation of pre-service mathematics teachers with the Teaching-Oriented Activity (TOA) within the context of the Mathematics Club at the Federal University of Uberlândia (UFU), conceived as a formative space grounded in Historical-Cultural Theory. The study adopts a qualitative approach and uses as data sources the researcher's written records, participants' portfolios, reflective

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reports, and audio and video recordings. Data analysis was conducted through episodes and scenes, highlighting participants' perceptions, challenges, and learning processes during their first contact with TOA. The results indicate that the CluMat/UFU constituted a collective space for learning to teach, fostering critical reflection on pedagogical practice, the articulation between theory and practice, and the appropriation of TOA's theoretical and methodological principles. Initial challenges faced by participants are also emphasized, particularly regarding the understanding and implementation of Learning-Triggering Situations. It is concluded that participation in the Mathematics Club enhances teacher education by promoting collaborative work, shared reflection, and the strengthening of the relationship between university and school.

Keywords: Mathematics Teaching; Teacher Education; Teaching Practice.

RESUMEN
El presente artículo analiza el proceso de contacto y aproximación de futuros profesores de Matemáticas a la Actividad Orientadora de Enseñanza (AOE) en el contexto del Club de Matemáticas de la Universidad Federal de Uberlândia (UFU), concebido como un espacio formativo fundamentado en la Teoría Histórico-Cultural. El estudio adopta un enfoque cualitativo y utiliza como fuentes de datos registros escritos de la investigadora, portafolios de los participantes, relatos reflexivos y grabaciones de audio y video. El análisis se realizó mediante episodios y escenas, evidenciando las percepciones, los desafíos y los aprendizajes de los participantes en su primer contacto con la AOE. Los resultados indican que el CluMat/UFU se constituyó como un espacio colectivo de aprendizaje de la docencia, favoreciendo la reflexión crítica sobre la práctica pedagógica, la articulación entre teoría y práctica y la apropiación de los principios teórico-metodológicos de la AOE. Asimismo, se destacan los desafíos iniciales enfrentados por los participantes, especialmente en la comprensión y en la implementación de las Situaciones Desencadenadoras de Aprendizaje. Se concluye que la participación en el Club de Matemáticas potencia la formación docente al promover el trabajo colaborativo, la reflexión compartida y el fortalecimiento de la relación entre la universidad y la escuela.

Palabras clave: Enseñanza de las Matemáticas; Formación Docente; Práctica Docente.

1 Introduction

Based on the premise of educating through Mathematics, Moura et al. (2017) argue that learning Mathematics goes beyond performing calculations or applying algorithms with the aim of obtaining correct answers; above all, it involves developing human skills and establishing connections between Mathematics and everyday experiences. From this perspective, the civic education of students emerges as one of the central objectives of teaching practice, highlighting the need to redefine both the content addressed and the pedagogical practices employed in the teaching and learning process.

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In this context, it becomes essential to consider the importance of formative spaces that foster such redefinitions. As argued by Lopes (2004; 2009) and Cedro (2009), these spaces enable teachers and prospective teachers to constitute themselves as active subjects in their own educational development. Thus, they may become

> [...] co-responsible for their own education insofar as they are able to make propositions, suggestions, and reflections regarding the discussions carried out, as well as analyses and syntheses by mobilizing knowledge acquired throughout their personal histories, expressing doubts, concerns, and certainties, and being able to (re)think such knowledge by intertwining their own voices with those of their peers and theorists (Marco; Moura, 2016, pp. 24–25).

For such reflections and exchanges among peers to take place in a meaningful manner, it is necessary for individuals to be guided by common objectives, as proposed by Leontiev (1983). This shared orientation is fundamental for the constitution of collective activities that foster the production of new learning, since, by acting around a common purpose, individuals enhance the construction of meanings and understandings, thereby expanding their possibilities for development. In this sense,

> [...] education is a collective process, and it is through sharing that teachers have the opportunity to appropriate new knowledge, since, although actions may be carried out individually by those who concretize a given activity, learning does not occur in what each person does in isolation, but rather in the interaction among subjects or between subjects and objects. Thus, it is necessary for actions to be developed collectively, while ensuring that each participant has not only the opportunity, but also the commitment to participate (Lopes et al., 2016, p. 25).

As a means of enabling this formative space, the Mathematics Club (CluMat) was created in 1999 at the School of Education of the University of São Paulo (USP/SP) in response to needs related to supervised teaching internships, encompassing teaching, research, and extension activities (Cedro, 2010), and promoting the education of teachers and prospective teachers, as well as students from Basic Education, Higher Education (undergraduate programs in Pedagogy and Mathematics), and graduate studies (Marco; Lopes; Araújo, 2023).

The initial project was expanded and is currently present at the following institutions: the Federal University of Goiás (UFG), the Federal University of Santa Maria

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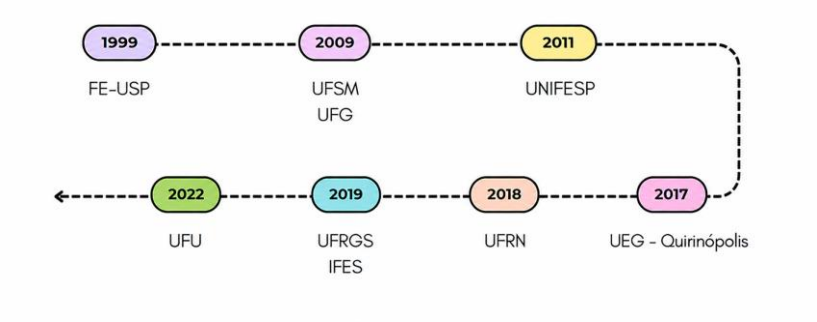
(UFSM), the Federal University of São Paulo (UNIFESP), the State University of Goiás (UEG) – Quirinópolis Campus, the Federal University of Rio Grande do Norte (UFRN), the Federal Institute of Espírito Santo (IFES) – Vitória Campus, and, more recently, the Federal University of Uberlândia (Figure 1).

Figure 1 – Timeline of the Establishment of Mathematics Clubs in Brazil



Source: Adapted from Sousa (2025)

Although geographically distant and marked by their own particularities, all CluMat initiatives are grounded in the perspective of the Teaching-Orienting Activity (TOA), share the same theoretical and methodological principles, and base their actions on the objectives described by Cedro (2010), Lopes (2016), and Marco and Borowsky (2019):

- To organize and plan teaching activities through research, adopting an interrogative and investigative stance in a collective and collaborative manner, with the aim of seeking theoretical and methodological support;
- To develop activities with prospective teachers who will teach Mathematics (in both elementary and secondary education), providing them with an understanding of pedagogical dynamics and the comprehension of experiential knowledge;
- To reflect upon and evaluate teaching practice collectively, allowing not only the assessment of individual and collective performance, but also the appropriation of knowledge related to pedagogical action;
- To conduct theoretical and methodological studies on the teaching of Mathematics at different educational levels;
- To plan and organize Mathematics teaching activities.

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An important characteristic of the Mathematics Club is sharing; that is, prospective teachers share and reflect through dialogue with the other participants in this space, since

> [...] sharing means engaging with others through exchange and, likewise, appropriating both actions and the meanings and understandings they assume. We believe that this condition generates a movement of interdependence between the diversity of knowledge possessed by the subjects involved and teaching actions, which are qualitatively transformed through this interaction. (Lopes, 2009, p. 15).

As Lopes (2009) points out, one of the objectives of the meetings held within CluMat is to collectively promote discussions on lesson plans and teaching proposals, whether developed by student teachers or participating teachers, followed by the evaluation of the experiences lived. In this process, particular emphasis is placed on task planning, highlighting the importance of teacher intentionality in the organization of teaching, which becomes guided by the objectives of what is intended to be taught, as well as by the actions and operations to be developed throughout the proposal.

In 2022, at the Institute of Mathematics and Statistics of the Federal University of Uberlândia, a space with these characteristics was created through the project "The organization of mathematics teaching: university-school partnership," proposed by professors Fabiana Fiorezi de Marco and Ana Cláudia Molina Zaqueu Xavier. The proposal aimed at establishing a training environment based on collaboration, reflection, and articulation between university and school.

In this context, the present work focuses on the initial training of mathematics teachers participating in the Mathematics Club of the Federal University of Uberlândia (CluMat/UFU). The article aims to present the possibilities of the Teaching-Oriented Activity within the context of CluMat/UFU. To this end, aspects related to the initial contact and approach of the project participants to this theoretical-methodological perspective are initially discussed. Then, elements resulting from this formative experience are analyzed, and finally, considerations are presented regarding the contributions of CluMat/UFU to teacher learning.

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2 Theoretical Framework

To provide theoretical support for this research, a discussion is presented regarding the foundations of the Teaching-Orienting Activity (TOA), exploring its potential for the education of prospective Mathematics teachers. In addition, aspects related to the actions developed within CluMat/UFU are described.

2.1 The Teaching-Orienting Activity and Its Formative Possibilities

As stated by Moura (2002), the Teaching-Orienting Activity (TOA) is structured in such a way

> [...] as to allow subjects to interact, mediated by content, negotiating meanings with the objective of collectively solving a problem situation. It is an orienting activity because it defines essential elements of educational action and respects the dynamics of interactions, which do not always lead to the results expected by the teacher. The teacher establishes the objectives, defines the actions, and selects the auxiliary teaching tools; however, they do not control the entire process, precisely because they accept that the interacting subjects share meanings that are modified in relation to the object of knowledge under discussion. (Moura, 2002, p. 155)

The TOA is configured as a mediating element between the teaching activity (teacher) and the learning activity (student), since both are inseparable, as their motives must converge toward students' appropriation of the historical experience elaborated through theoretical thought and scientific concepts. In this process, the subject is engaged in a learning activity and, simultaneously, constitutes the object of the teaching activity.

The Teaching-Orienting Activity maintains the structure of activity proposed by Leontiev, since it

> [...] indicates a need (the appropriation of culture), a real motive (the appropriation of historically accumulated knowledge), objectives (teaching and learning), and proposes actions that take into account the objective conditions of the school institution. (Moura et al., 2010, p. 96).

We understand that learning does not occur spontaneously, but is culturally mediated. In this sense, the organization of teaching by the teacher may articulate theory and practice, materializing in Learning-Triggering Situations (Situações Desencadeadoras

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de Aprendizagem – SDA), whose references include games, emerging everyday situations, or the virtual history of the concept.

Learning-Triggering Situations are central to the process of knowledge appropriation, since they are intentionally organized based on historical needs experienced by humanity, which led to the production of concepts aimed at engaging subjects in situations that motivate them to seek collective solutions to meaningful problems (Oliveira; Panossian, 2021).

According to Moura and Lanner de Moura (1998), when used for pedagogical purposes, games aim to place students in problem situations similar to those historically encountered in the development of mathematical concepts. To this end, it is essential to understand their objectives, know their rules, carry out the moves, and subsequently evaluate the subject's performance. Lopes and Borowsky (2017) emphasize that games organized with pedagogical intentionality can enable students to explore mathematical concepts and solve problems interactively, fostering creativity and collaboration. Thus, when intentionally organized, games not only engage students in challenges (cognitive, physical, and others), but may also promote the transition from empirical to theoretical knowledge, making the learning process both dynamic and intentional.

From the perspective of the virtual history of the concept, subjects are presented with a narrative that synthesizes a concept historically developed by humanity. As highlighted by Moura (1996), the virtual history of the concept may be presented through

> [...] problem situations posed by characters from children's stories, legends, or from the history of Mathematics itself, as triggers for the child's thinking, in such a way as to involve them in the construction of solutions that are part of the context of the story. In this way, counting, performing calculations, and recording them may become a real necessity for the child. (Moura, 1996, p. 20).

The emerging everyday situation is characterized as a problem experienced in students' daily lives, which the teacher brings to and conducts within the classroom, since it carries within itself a need originating from the subjects themselves. Moura et al. (2010, p. 121) state that "The problematization of situations emerging from everyday life provides educational practice with the opportunity to place the child before the need to experience the solution of problems that are meaningful to them." This situation may take the form of a narrative, a news report, or the triggering

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problem itself. It should be emphasized that it preserves the characteristics of a Learning-Triggering Situation; that is, it must orient toward theoretical thinking, encompass the logical-historical movement of concepts, and enable discussion among subjects in the search for a collective synthesis of the problem.

As argued by Moura and Lanner de Moura (1998), we understand that the theoretical-methodological perspective of the TOA may contribute to students' appropriation of historically constructed mathematical knowledge, thereby fostering their psychological development.

From this perspective, the teacher's role is understood as that of an organizer of teaching, responsible for enabling students to appropriate more elaborated cultural forms of historically produced mathematical concepts. In this sense, the Teaching-Orienting Activity is also formative for teachers, since, while planning their actions, they continuously revisit and reorganize their knowledge and practice through dialogue, reflection, and the sharing of experiences. According to Moura (2010), within the TOA, both teacher and student are subjects in activity and, as such, constitute individuals who carry knowledge and values that are manifested in actions oriented toward the production of qualitatively new knowledge.

To make this perspective of teaching organization feasible, it is important to establish spaces that allow Mathematics teachers and prospective teachers to share meanings and experiences, as occurs in the Mathematics Club. Such spaces foster the collective resolution of problems, enabling the analysis of ideas and different perspectives within the dynamic teaching and learning process.

2.2 The Mathematics Club at the Federal University of Uberlândia

Inspired by the Mathematics Club proposal conceived by Moura in 1999 at the Faculty of Education of the University of São Paulo (FEUSP), in partnership with the Application School of the same university (EA-FEUSP), the Mathematics Club of the Federal University of Uberlândia (CluMat/UFU), organized from the perspective of Historical-Cultural Theory and the Guiding Teaching Activity, is configured as a formative space aimed at the training of future teachers, teachers of Basic Education and Higher Education, students of Basic Education and post-graduate students.

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CluMat/UFU aims to constitute itself as an initial training space for students of the Bachelor's Degree courses in Pedagogy and Mathematics, in order to value collective work, encourage the planning, execution and evaluation of teaching situations in a collaborative way.

According to Sousa (2025), the Mathematics Club at the Federal University of Uberlândia was conceived through the extension project entitled "The Organization of Mathematics Teaching: University–School Partnership," designed as a possibility for reducing the distance between teacher education and classroom practice, as well as for bringing Higher Education Institutions and Basic Education Schools closer together, recognizing the importance of articulation between these institutions. The project had as its central objective

> [...] to establish a space for theoretical and methodological discussion among teachers, prospective teachers, and graduate students regarding the organization of Mathematics teaching, based on the actions developed in the classrooms of the teachers participating in the project. (Sousa, 2025, p. 47)

The project's objectives included: collectively identifying the mathematical content addressed in Basic Education and experienced by participants during their supervised internships; conducting theoretical and methodological studies on these contents and associated teaching proposals; organizing and developing teaching situations in partner schools; and, finally, evaluating the proposed actions. It is noteworthy that moments of reflection, evaluation, and re-evaluation took place throughout the entire development of the project. Furthermore, participation in the project did not require enrollment in Supervised Internship courses[4], although all participants were linked to at least one of these curricular components.

During the meetings, participants came into contact with theoretical foundations related to the Teaching-Orienting Activity through the reading of texts, the viewing of videos, and presentations. In this process, teaching situations were developed, accompanied by constant reflection regarding their adequacy to the specific needs of

[4] In the Mathematics Program at the Institute of Mathematics and Statistics of the Federal University of Uberlândia, the 400 hours of supervised internship are distributed across four curricular components: Supervised Internship I, II, III, and IV (Mathematics Program Curriculum Guidelines [PPC Matemática, Uberlândia, 2018).

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students and partner teachers. Whenever possible, the planned situations were implemented, allowing observation of the results and the identification of both positive aspects and elements requiring improvement, thereby fostering a continuous movement toward the enhancement of teaching proposals and the learning of teaching practice.

At the end of each meeting, there was a moment dedicated to discussing issues emerging from the studies and internships, as well as from the participants' initial teaching experiences. Subsequently, participants produced records in portfolios[5], in which they systematized not only the most relevant points discussed, but also their personal reflections. In these records, they expressed doubts, considerations, and analyses regarding the topics addressed, in addition to establishing relationships with their teaching practices and internship experiences. In this sense, the portfolio constituted a space for critical reflection, allowing for the analysis and systematization of learning, the identification of aspects to be further explored or revised, and the development of strategies for incorporating new knowledge into their future teaching practices.

During the study of texts and the development of teaching proposals, participants had the opportunity to share conclusions, challenges, and doubts, as well as to rethink their initial understandings regarding the themes addressed. This interaction not only enriched the process of learning teaching practice and the mathematical concepts involved, but also stimulated collective reflection, enabling the attribution of new meanings and understandings.

Through this dynamic, CluMat was consolidated as a dynamic and plural formative space, promoting a sense of belonging and collectivity among participants and fostering discussion of difficulties and possibilities related both to mathematical concepts and to classroom dynamics.

[5] We understand the portfolio as an instrument of dialogue between educator and trainee, insofar as it enables the expansion and diversification of the perspective of the subject in formation. By fostering the confrontation of doubts and conflicts, it creates conditions for the trainee to emerge from them more aware, better informed, and more confident in the process of becoming a professional. In this sense, the portfolio should be developed continuously and reflectively, allowing the movement of the trainee's thinking to be followed as they become (or do not become) capable of critically analyzing their own practices (Sá-Chaves, 2000).

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3 Methodology

This article derives from a dissertation developed within the Graduate Program in Mathematics at the Federal University of Uberlândia and approved by the Research Ethics Committee (CEP), under number 095221/2023. As instruments for the production of empirical material, the researcher's written records, portfolios produced weekly by the participants of the Mathematics Club, a final reflective written report, as well as audio and video recordings.

For the presentation of the empirical material, fictitious names were adopted when referring to the four selected participants, with the aim of preserving their identities, which are presented in Table 1. As criteria for the selection of these participants, consideration was given to the records they produced, such as portfolios and teaching proposals, as well as to their level of involvement and attendance at the project's weekly meetings.

Table 1 – Participants of the Mathematics Club

PARTICIPANTS	PROFILES
Amanda	She was 20 years old, in her fifth semester of a Mathematics degree, participating in the Institutional Scholarship Program for Teaching Initiation (PIBID), and doing an internship with sixth-grade classes in elementary school.
Bruna	She was 20 years old, in her fifth semester of a Mathematics degree, had participated in PIBID (Institutional Scholarship Program for Teaching Initiation), and at the time was a member of the Tutorial Education Program (PET).
Carla	She was 22 years old, in her sixth semester of a Mathematics degree, had worked as a monitor for the Junior Scientific Initiation Program (PICJr), was a member of the PET program, and was doing an internship with sixth-grade elementary school classes.
Daniela	She was 20 years old, in her sixth semester of a Mathematics degree, participating in the PET program, and doing an internship with eighth-grade classes in elementary school.

Source: Sousa (2025, p.50)

The research adopts a qualitative approach because, as stated by Bogdan and Biklen (1994, p. 48), it seeks to "analyze the data in all its richness, respecting, as much as possible, the manner in which these records were produced and transcribed." According to these authors, the use of this approach in teacher education constitutes an advancement, since it

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> [...] offers prospective teachers the opportunity to explore the complex environment of schools while simultaneously becoming more self-aware regarding their own values and the ways in which these influence their attitudes toward students, principals, and other individuals. (Bogdan; Biklen, 1994, p. 287).

To analyze the records and portfolios produced throughout the project, we employed scenes and episodes as proposed by Moura (2004):

> Episodes may consist of written or spoken statements, gestures, and actions that constitute scenes capable of revealing the interdependence among the elements of formative action. Thus, episodes are not defined on the basis of a set of linear actions. It may be that a statement made by a participant in an activity does not have an immediate impact on the other subjects of the collective. This impact may become evident at another moment, when the subject is required to make use of some knowledge in order to participate in a collective action. (Moura, 2004, p. 276).

According to this author, the scenes integrate the episodes and allow the researcher to analyze the reflective process developed within the scope of the research. The episode presented here was selected based on the statements and excerpts from the portfolios referring to the initial approaches and first contact of the CluMat/UFU participants with the Teaching Guidance Activity, highlighting their reflections, considerations, and challenges in the face of the proposed approach.

For the presentation of participants' statements and reflections, the following methodological procedure was adopted: indication of the participant's name, the data collection instrument from which the record was extracted, and the corresponding date. Table 2 summarizes the process of organizing the empirical material and apprehending the investigated phenomenon.

Table 2 – Organization of the Analysis

EPISODE: Contact and Familiarization with the Teaching-Orienting Activity	**SCENE 1:** First Contacts with the Teaching-Orienting Activity
	SCENE 2: Initial Challenges Faced During the Studies and the First Indications of Appropriation of the Theory

Source: Prepared by the authors

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Based on this organization, the following section presents evidence of the participants' first contacts with the Teaching-Orienting Activity, as well as the challenges faced by them throughout this process.

4 Analysis and Results

4.1 Episode – Contact and Familiarization with the Teaching-Orienting Activity

This episode seeks to highlight the different perspectives and forms of familiarization experienced by the prospective teachers with the Teaching-Orienting Activity throughout their participation in the CluMat/UFU. In 2022, the first group of teachers and prospective teachers to take part in the project's activities was formed, and it is important to emphasize that none of them had previously had contact with this theoretical-methodological perspective.

Thus, the formative process experienced within the Club was configured as an initial space for approaching the foundations of the Teaching-Orienting Activity, enabling the participants to become acquainted with its principles, discuss its assumptions, and reflect on its implications for Mathematics teaching practice. Throughout the meetings, through moments of collective study, activity planning, and analysis of the experiences developed, the prospective teachers gradually appropriated concepts and forms of teaching organization guided by this perspective.

In this context, the aim was to understand how this first contact influenced the way in which they came to conceive Mathematics teaching, especially with regard to the organization of learning situations capable of engaging students in problem-solving and in the construction of meanings for mathematical concepts. Thus, this episode highlights aspects of this process of familiarization, emphasizing perceptions, reflections, and learning constructed by the participants during their involvement in the activities of the Mathematics Club.

Scene 1 – First Contacts with the Teaching-Orienting Activity

The project was organized with the aim of contributing to the learning of teaching practice from the perspective of the Teaching-Orienting Activity. As an initial contact, the project coordinator suggested the reading of a text, which prompted the following discussion:

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> ***Daniela:*** *I was unfamiliar with the theory, and when I began reading, I encountered a problem... the great difficulty students experience in the classroom regarding Mathematics content, which led us to reflect on ways of teaching. (Portfolio excerpts, 05/25/2022)*
> ***Amanda:*** *The reading was simple, but since I did not know the theory, I read the text several times to better understand it. At first, I thought it was a good approach to use in the classroom. I had not encountered it during my internship. (Portfolio excerpts, 05/25/2022)*
> ***Bruna:*** *During the initial reading, I distanced myself somewhat from the text because I kept reflecting on the difficulties presented by teachers. But I believe this is related to the theory, right?! (Portfolio excerpts, 05/25/2022)*
> ***Carla:*** *While reading the text, I noticed another difficulty observed by teachers and interns: students' focus and attention during class. They are very distracted and unable to stay focused on something for long, which brings us back to the discussion that the activity needs to generate a need in the student in order to minimize these concentration difficulties students have been experiencing after remote learning. (Portfolio excerpts, 05/25/2022)*

Through this dialogue, we identified some indications that the participants appear to recognize the importance of the Teaching-Orienting Activity as an ally to the teacher, as well as its developmental potential within the classroom context. Furthermore, the need to reflect on teaching practice becomes evident, especially regarding the teacher–student–knowledge relationship.

This reflective movement aligns with what Moura *et al.* (2016, p. 116) state when emphasizing that the TOA is considered as:

> [...] orienting, in the sense that it is constructed through the interrelationship between teacher and student and is related to the teacher's reflection, who, throughout the entire process, feels the need to reorganize their actions through the continuous evaluation they conduct regarding whether or not the results achieved by their actions coincide with the proposed objectives.

We further understand that the TOA enables the re-signification of the teacher–student relationship, also constituting a formative unit for the teacher who, by participating in spaces that promote sharing and reflection, finds conditions for transforming their practice.

> ***Amanda:*** *The readings of the texts and books provided me with a great deal of learning! Being able to read about proposals that used the virtual history of the concept and other methods in the classroom with students from the early years of Elementary Education was fantastic. Their*

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> *creativity, the classroom implementation, and reading about how much the students learned and enjoyed it sparked great interest in me. (Portfolio excerpts, 06/08/2022)*

Throughout the meetings, the contact of the Mathematics Club members with the Teaching-Orienting Activity triggered a continuous process of reflection. Amanda, for example, recorded in her portfolio the impact of the readings undertaken, highlighting her development and growing interest in the theoretical perspective presented. Her reflection on the virtual history of the concept demonstrates engagement with the topics discussed, which allows us to infer that her understanding of the TOA and her process of learning teaching practice were under development.

This movement of study and reflection, shared with colleagues, enabled these participants of CluMat/UFU to develop a broader understanding of the TOA, paving the way for the development of new teaching proposals and for strengthening collective work among teachers, prospective Mathematics teachers, and Basic Education students.

Scene 2 – Initial Challenges Faced During the Studies and the First Indications of Appropriation of the Theory

Based on the theoretical studies developed within the scope of CluMat/UFU, the members of the Mathematics Club began to demonstrate interest in the discussions, presenting their first impressions, understandings, and challenges.

> ***Carla:*** *During the meetings and readings, we addressed the importance of having a human perspective toward our students and always encouraging and working in such a way that they understand the topic being addressed, but also feel capable of understanding everything that will be presented to them. It is important for the teacher to understand that each classroom is different and that each student is unique as well, and when planning, we need to take this into consideration. (Portfolio excerpts, 06/15/2022)*
> ***Carla:*** *Situations emerging from everyday life are related to everything we discussed in this meeting because, based on the situations students bring into the classroom, we can discuss and find ways of teaching through them. I believe this is the most complicated approach because we need to know our classroom very well, right? (Portfolio excerpts, 06/22/2022)*

From Carla's records, it is possible to identify indications of her familiarization with the Teaching-Orienting Activity approach. By explaining her understanding of situations emerging from everyday life, the participant demonstrates a certain assimilation of the methodological principles underlying this TOA reference, while also recognizing the challenges involved in its

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implementation. In this sense, there is evidence of an understanding that it is the teacher's role to enable students to confront meaningful problems, engaging them in the search for solutions that are meaningful to their own reality (Moura, 2002).

Carla also reflects on the possibility of articulating everyday situations with mathematical concepts, establishing relationships between theory and practice. The difficulty she points out indicates a formative process under development, in which the subject not only appropriates concepts, but also confronts the challenges involved in implementing them in pedagogical practice. Such challenges constitute elements of professional development insofar as they foster revision and reflection, contributing to a deeper understanding of the theory and its implications within the school context.

Participant Bruna also presented her reflections regarding Learning-Triggering Situations, highlighting, similarly to Carla, both challenges and curiosities, especially concerning situations emerging from everyday life. In her account, Bruna demonstrates how such situations may constitute a starting point for the teaching and learning process, while also making explicit the difficulties involved in operationalizing them within the classroom.

> ***Bruna:*** *Everything we discussed is closely related to the text and to situations emerging from everyday life. Through this, we become more human and begin to look at students differently, recognizing that each student has their own needs. In this way, we started discussing the text, remembering that learning-triggering situations aim to generate students' interest in our class and in solving a problem. Within these learning-triggering situations, we have three strands: games, virtual history, and emerging situations. I am somewhat curious about these emerging situations because they are intended to focus on the interests students bring into the classroom, situations that occur or that we perceive through the students' perspectives, and from this, the teacher attempts to incorporate mathematical knowledge or content based on what the student has brought. (Final reflection, 08/10/2022)*

In the excerpt extracted from Bruna's record, a reflection on her understanding of Learning-Triggering Situations can be observed. The participant expresses her concerns regarding the appropriation of the concepts involved, as well as the possibilities for their use in the classroom. This reflective movement — encompassing both advances and difficulties — constitutes a fundamental element in the process of teacher education, since it enables the improvement of pedagogical practices and the deepening of theoretical understanding.

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In this sense, Moura et al. (2010, pp. 16–17) state that

> [...] the activity is orienting, in the sense that it is constructed through the interrelationship between teacher and student and is related to the teacher's reflection, who, throughout the entire process, feels the need to reorganize their actions through the continuous evaluation they conduct regarding whether or not the results achieved by their actions coincide with the proposed objectives.

When reflecting on situations emerging from everyday life, indications can be observed that Carla and Bruna simultaneously demonstrate both interest in and difficulties with understanding this reference of the TOA. Such complexity stems from the fact that these situations are characterized as problems arising from students' daily lives, which are brought into and re-signified within the classroom context, carrying within themselves the real needs of the subjects (Moura; Lanner de Moura, 1998). From this perspective, it becomes essential for the teacher to know their students and the context in which they are situated.

Overall, this scene reveals indications of the participants' initial process of appropriating concepts related to the Teaching-Orienting Activity, as they engaged in discussions and began to mobilize these concepts within their reflections. It is also evident that this process did not occur linearly, but rather was marked by challenges, especially when participants sought to articulate theoretical readings with their classroom experiences.

Thus, the scene highlights not only the beginning of the process of appropriating fundamental TOA concepts, but also the complexity inherent in the relationship between theory and practice in teaching. These moments of reflection, although challenging, proved to be important for deepening the understanding of the TOA and for the learning of teaching practice.

5 Final Considerations

In this study, we analyzed the contact and familiarization of prospective Mathematics teachers with the Teaching-Orienting Activity within the context of the CluMat/UFU. Based on the analysis of written records and recordings, it was possible to identify both the challenges faced and the strategies of theoretical appropriation that emerged within this space for the learning of teaching practice.

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We highlighted the participants' first contacts with the theory, as well as their initial difficulties, curiosities, and understandings, emphasizing the role of the teacher and their relationship with the Teaching-Orienting Activity. When confronted with such challenges, these participants were encouraged to critically reflect on their future teaching practices, which contributed to the constitution of a formative space that values the sharing and collective appropriation of knowledge.

Furthermore, the participants' familiarization with the concept of the Teaching-Orienting Activity not only enriched the experience of the CluMat/UFU, but also fostered reflection on future teaching practice.

By fostering a space in which theory and practice are intertwined, the Mathematics Club is configured as a dynamic and collective space for the learning of teaching practice, encouraging prospective teachers to become active subjects in the construction of their formative trajectories. In this sense, the importance of learning spaces that contribute to overcoming the distance between university and school is emphasized, while simultaneously promoting collective reflection.

Finally, we consider that the participants' experience within the scope of CluMat/UFU strengthened extension activities by articulating the education of prospective teachers and practicing Basic Education teachers through discussions, reflections, and the collective development and implementation of teaching proposals. Thus, we infer that CluMat/UFU was configured as a relevant formative space, contributing to the strengthening of the relationship between the university and Basic Education schools.

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