

The organization of fractions instruction and teacher training in the context of the Mathematics Club¹

Organização do ensino de frações e a formação docente no contexto do Clube de Matemática

Organización de la enseñanza de fracciones y la formación del profesorado en el contexto del Club de Matemáticas

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ABSTRACT

This study aims to analyze the organizational process of teaching developed by participants of the Mathematics Club (CluMat) in working with the concept of fractions with a 7th-grade class, highlighting the formative learning produced in the study, planning, development, and evaluation process. Based on the theoretical assumptions of the Historical-Cultural Theory and the Teaching-Oriented Activity, an intentional space is organized to provide opportunities for the appropriation of mathematical knowledge related to the concept of fractions. Specifically, the Mathematics Club of the Universidade Federal de Santa Maria (UFSM) includes undergraduate students from Special Education, Mathematics, and Pedagogy courses, as well as teachers from Basic Education and Higher Education. Through an activity developed in a seventh-grade class of an elementary school, the importance of the study-planning-development-evaluation process is evident, considering the possibility of understanding teaching as a unified process. Thus, the Mathematics Club demonstrates its potential as an important formative environment in which collaboration, dialogue, and collective reflection become fundamental elements for the development of future teachers.

Keywords: Teachers who will teach mathematics; Teaching Oriented Activity; Fractions.

RESUMO

O presente trabalho tem como objetivo analisar o processo de organização do ensino desenvolvido pelos participantes do CluMat no trabalho com o conceito de frações com uma turma de 7º ano, destacando as aprendizagens formativas produzidas no movimento de estudo, planejamento,

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desenvolvimento e avaliação. A partir dos pressupostos teóricos da Teoria Histórico-Cultural e da Atividade Orientadora de Ensino, organiza-se um espaço intencional que visa oportunizar a apropriação de conhecimentos matemáticos relativos ao conceito de fração. Especialmente, o Clube de Matemática da Universidade Federal de Santa Maria (UFSM) conta com a participação de licenciandos dos cursos de Educação Especial, Matemática e Pedagogia, além de professores da Educação Básica e do Ensino Superior. A partir de uma ação desenvolvida em uma turma de sétimo ano do Ensino Fundamental, evidencia-se a importância do movimento de estudo – planejamento – desenvolvimento – avaliação, tendo em vista a possibilidade de compreender a docência em sua unidade. Assim, o Clube de Matemática evidencia seu potencial como um importante ambiente formativo, no qual a colaboração, o diálogo e a reflexão coletiva se tornam elementos fundamentais para o desenvolvimento de futuros professores.

Palavras-chave: Professores que ensinarão matemática; Atividade Orientadora de Ensino; Fração.

RESUMEN

Este estudio tiene como objetivo analizar el proceso organizativo de enseñanza desarrollado por los participantes del Club de Matemáticas (CluMat) al trabajar con el concepto de fracciones con una clase de séptimo grado, resaltando el aprendizaje formativo producido en el proceso de estudio, planificación, desarrollo y evaluación. Con base en los supuestos teóricos de la Teoría Histórico-Cultural y la Actividad Orientada a la Enseñanza, se organiza un espacio intencional para brindar oportunidades para la apropiación del conocimiento matemático relacionado con el concepto de fracciones. Específicamente, el Club de Matemáticas de la Universidad Federal de Santa María (UFSM) integra a estudiantes de pregrado de las carreras de Educación Especial, Matemáticas y Pedagogía, así como a docentes de Educación Básica y Superior. A través de una actividad desarrollada en una clase de séptimo grado de Primaria, se evidencia la importancia del proceso de estudio-planificación-desarrollo-evaluación, considerando la posibilidad de comprender la enseñanza como un proceso unificado. De esta manera, el Club de Matemáticas demuestra su potencial como un entorno formativo importante, en el cual la colaboración, el diálogo y la reflexión colectiva se convierten en elementos fundamentales para el desarrollo de futuros docentes.

Palabras clave: Profesores que impartirán matemáticas; Actividad de orientación didáctica; Fracciones.

1 Introduction

Understanding fractions is not always the easiest or most accessible concept, either for teachers who plan lessons or for students in the process of learning. It is of the utmost importance that teachers have a solid theoretical understanding of what they will be teaching, as this is the only way students will have the opportunity to master this cultural construct—in this case, fractions.

However, this knowledge does not always materialize in Basic Education, hence the need to provide specific knowledge to future teachers who will teach mathematics

during their initial training. After all, to perform their future profession—that of a teacher—they must elevate their level of theoretical understanding, since, according to Talízana (2009), the teacher's goal is to ensure the complete and solid assimilation of knowledge.

Recognizing that the curriculum frameworks of teacher training programs for mathematics teachers do not always cover all the knowledge to be taught, and aiming to provide more sophisticated knowledge, the Mathematics Club (CluMat) was created in 2009 at the Universidade Federal de Santa Maria (UFSM). Since then, various initiatives focused on mathematics education have been developed.

Over the years, CluMat has organized initiatives from a dual-training perspective; that is, all participants develop as they engage with more sophisticated knowledge, understood as the theoretical knowledge that enables the development of maximum human capabilities. Higher education and K-12 teachers participate in the research, teaching, and outreach initiatives, as well as students in the Bachelor's programs in Special Education, Mathematics, and Pedagogy, and staff from the Graduate Program in Education (PPGE/UFSM) and the Graduate Program in Mathematics Education and Physics Teaching (PPGEMEF/UFSM).

Through its various activities, CluMat has established itself as a space for reflection on the organization of mathematics education, with a focus on knowledge sharing. In this vein, this paper aims to present the process of organizing instruction developed by CluMat participants, focusing on the teaching of fractions to a class of students in the final years of elementary school.

To this end, we will briefly present the theoretical assumptions that underpin the actions carried out and the organization of CluMat, followed by the methodological approaches, and then describe the process of organizing instruction. Finally, we will offer some concluding remarks.

2 Theoretical foundation: contributions to the organization of CluMat

The Math Club, the setting in which this work is structured, is based on the principles of Historical-Cultural Theory, as articulated by its leading proponent, Vygotsky (1982). These principles are also adopted by the Study and Research Group on

Pedagogical Activity at the Universidade de São Paulo (GEPAPe/USP), where the club was initially established.

In 1998, at the School of Education, Professor Manoel Oriosvaldo de Moura launched the first Mathematics Club, which began as an internship project in the area of Mathematics and Science Teaching Methodology. This initiative aimed to facilitate a collective process of planning, developing, and evaluating the work of interns in the Pedagogy and Mathematics programs (Borowsky, 2017). These activities are systematized by Lopes (2009, p. 24) as follows:

- Planning: This is a collective, shared process organized by work groups and discussed in meetings with all interns, the coordinator, and staff members of the Math Club. It initially covers a semester-long period, with opportunities for re-planning as needs arise.
- Interaction with the children: carrying out planned activities and initiatives with the children for two hours per week, with each group of interns working with approximately 16 children from a single grade level;
- evaluation: this is collective and shared with both the group of interns and the other members, taking place at various times: at the end of each day, following interaction with the children; at the end of each module, on a morning when the children have no activities; and at the end of the semester. In addition, there are written reports, which include descriptions of the day's events, prepared in two formats—one individual and one collective—that also contribute to the evaluation.

In 2009, two other institutions established their own Math Clubs under this model: the Universidade Federal de Santa Maria (UFSM), coordinated by Professor Anemari Roesler Luersen Vieira Lopes, Ph.D., and the Universidade Federal de Goiás, led by Professor Wellington Lima Cedro, Ph.D. Over time, other institutions began to join this initiative, namely: the Universidade Federal de São Paulo (2011)⁵; the Universidade Estadual de Goiás (2017)⁶; the Universidade Federal do Rio Grande do Norte (2019)⁷; the

⁵ Coordinated by Professor Vanessa Dias Moretti, Ph.D.

⁶ Coordinated by Professor Maria Marta da Silva, Ph.D.

⁷ Created by Professor Halana Garcez Borowsky, Ph.D. Currently coordinated by Professor Maria Jucimeire dos Santos.

Universidade Federal do Rio Grande do Sul (2019)⁸; Instituto Federal do Espírito Santo (2020)⁹; and Universidade Federal de Uberlândia (2022)¹⁰.

Even with similarities, each institution's organization is unique. Specifically, the Mathematics Club (CluMat) at UFSM began its activities as part of the Study and Research Group on Mathematics Education (GEPEMat/UFSM), also coordinated by Professor Anemari Roesler Luersen Vieira Lopes, together with Professors Regina Ehlers Bathelt and Ricardo Fajardo. Thus, it was registered as

[...] an extension project funded by the Extension Fund (FIEX/UFSM) at a K-12 school in the Rio Grande do Sul State School System, in which the project was carried out weekly during class hours by students in the Education program, with the participation of the homeroom teacher of the class for which the project was designed. Over time, the project became an important training opportunity for everyone involved, and in 2011, it also became one of the initiatives of OBEDUC/PPOE, expanding its scope to three other public schools, thereby enabling a larger number of individuals to participate in this training process. (Borowsky, 2017, p.84)

With this expansion, in addition to students from the Education program, the group now includes students from the Bachelor's programs in Special Education and Mathematics—that is, students from the university's three programs that train teachers who will teach mathematics. This integration among students from the different programs intensified in 2014 with the Interdisciplinary Mathematics Education subproject of the Institutional Program for Teaching Initiation Scholarships (PIBID/UFSM), which became part of CluMat/UFSM's activities.

With the incentive of teaching initiation scholarships, the project involved ten scholarship recipients, graduate students, and teachers from Basic Education and Higher Education, carrying out activities in two phases: the first at the university, involving study, planning, organization of materials, and evaluation of the activities; the second at the two public Basic Education schools partnering with the project, carrying out activities with the students.

The Teaching Oriented Activity (TOA) proposed by Moura (1996) is adopted as the theoretical and methodological framework. This framework allows for considering

⁸ Conceived by Professor Simone Pozebon, Ph.D., who, starting in 2022, joined Professor Anemari Roesler Luersen Lopes, Ph.D., as coordinator of the UFSM Math Club.

⁹ Coordinated by Professor Sandra Aparecida Fraga da Silva, Ph.D., and Professor Dilza Côco, Ph.D.

¹⁰ Coordinated by Professor Fabiana Fiorezi de Marco, Ph.D.

both the teacher and the student as active participants, since both “are bearers of knowledge, values, and affectivity, which will be present in the way they carry out actions aimed at acquiring new knowledge.” (Moura et al., 2016, p.11). Therefore, the TOA functions as a dual formative process, as both teacher and student develop.

In this vein, when a teaching and learning space is intentionally organized, it can function as a formative space when the individuals involved are engaged in activity, from Leontiev’s (1988) perspective. Based on the premises adopted by CluMat, it can constitute a shared formative space, as it “contributes to teacher training, leading to new perceptions, which allows for the awakening of other perspectives, creating new needs for pedagogical activity, and enabling the psychological development of the individuals involved” (Almeida; Lopes, 2023, p.16).

It is through sharing that individuals develop. When we specifically address teaching, this learning occurs primarily when the future teacher is allowed to experience the process of study, planning, development, and evaluation collectively. It is within this process that teaching can be understood, “for within this space of learning (and training), the organization of teaching is viewed as a guiding framework for action—that is, a set of ideas that will assist the participant in their teaching practice” (Marco; Lopes; Araújo, 2023, p.816).

It is formative for the individuals who are part of CluMat that their actions are organized. Here, even though the context addressed in this work is the UFSM setting, the theoretical and methodological framework brings the Math Clubs closer together, especially through the organization of teaching.

TOA, as an approach to teaching, presupposes the teacher’s intentionality within an organizational framework that enables students to internalize knowledge and human experiences throughout history. That is, a problem that captures the essence of the need that led humanity to create the concept being taught—the core of the concept to be internalized. This problem must address the human need that led to its development, and the solution will also encompass the ways in which people organized themselves to meet that need. (Moura; Sforzi; Lopes, 2017, p.91)

It is based on the understanding that knowledge is a cultural product and that teaching should spark the student’s need to make that knowledge their own that four key

stages in the organization of teaching are highlighted: Historical Synthesis of the Concept; Learning Trigger Situation; Synthesis of the Collective Solution; and Assessment.

The first is the teacher's responsibility, as it is through the study of the Historical Synthesis of the Concept to be taught that the teacher will understand the need that led humanity to use a particular body of knowledge, thereby identifying its essence. It is from this point that the teacher will assign an objective to their teaching, highlighting the learning outcomes to be achieved by the students.

With the objective defined, the teacher will organize a Learning Trigger Situation (LTS), which

[...]it must address the origins of the concept—that is, its essence; it must explain the need that led humanity to develop the concept in question, how human problems and needs arose in a given activity, and how people devised solutions or syntheses through their logical-historical development. (Moura *et al.*, 2016, p.118)

It is LTS that will allow students to experience a process similar to humanity's as they acquire knowledge, one triggered by the problem presented in the situation. Thus, by engaging students—both individually and collectively—the teacher will facilitate the hypotheses they develop, guiding them toward the Synthesis of the Collective Solution. LTS can be presented to students in different ways; however, Moura and Lanner de Moura (1998) highlight three possibilities: the game, the emerging situation of daily life, and the virtual history of the concept.

When studying knowledge of fractions and organizing activities, we chose to engage students through games, which are understood as “an important ally in teaching, since they preserve the problem-solving nature of the activity, [...] what we must consider is the possibility of placing the child in a problem-solving situation similar to that experienced by adults when dealing with mathematical concepts” (Moura; Lanner de Moura, 1998, p.12). That is, through the game, we sought to engage students so they would feel the need to internalize the concept of fractions.

Following the implementation of the activities comes the evaluation phase. Beyond identifying what is correct and what is incorrect, reflections on the process of study, planning, and implementation are of paramount importance for future actions, since “there is a strong link between evaluation and planning; that is, without evaluation, there

is no way to plan or re-plan actions; and without planning, there is nothing to evaluate.” (Marco; Lopes; Araújo, 2023, p.816).

It is within this cycle of study – planning – development – evaluation that CluMat is organized and ensures that not only students in Basic Education acquire knowledge, but everyone involved in the project. To illustrate this process, we present an example of this cycle in the following subsection.

3 From Study to Evaluation: Learning Among CluMat UFSM Participants

As a space where activities are intentionally organized, CluMat provides participants with the opportunity to acquire knowledge that can lead to new skills. It is in this direction of providing opportunities for those involved—in this case, future teachers—to develop that this study aims to analyze the process of organizing instruction developed by CluMat participants when working with the concept of fractions with a 7th-grade class, highlighting the formative learning produced through the cycle of study, planning, development, and evaluation.

As previously mentioned, CluMat was registered as an extension project at its inception and, because it is linked to the Study and Research Group on Mathematics Education (GEPEMat/UFSM), has carried out research-oriented activities since its inception. With its organization and expansion, CluMat began to develop activities focused on the triad: teaching, research, and extension. From then until the present day, the project has focused on the teaching and learning of mathematics in elementary school, particularly with regard to creating a space for learning basic mathematical concepts and providing training for teachers working at this educational level.

In 2025, participants included students in the Bachelor’s Degree in Mathematics, staff from the Graduate Program in Education (PPGE/UFSM) and the Graduate Program in Mathematics Education and Physics Teaching (PPGEMEF/UFSM), as well as teachers from K-12 and higher education. The activities were carried out in two elementary schools, focusing on the early grades in one and the final grades of elementary school in the other.

In this study, we will present the study–planning–development–evaluation cycle of the second school, where activities were conducted with a 7th-grade class. Given the needs of Basic Education students and the participants’ interests, the concept of fractions was selected for study, and the cycle described above is presented in the following subtopics.

a) Research and planning

Based on the assumptions of the Historical-Cultural Theory and, as discussed by Perlin and Lopes (2013), the school is understood as a privileged social space for the appropriation of knowledge historically produced by humanity. In this vein, it is understood that mathematics instruction should take into account the historical development of concepts, enabling students to gain a more meaningful understanding of the knowledge covered in the classroom.

Thus, before implementing the activities at the school, the members of CluMat conducted a collective theoretical study on the origin and historical development of the concept of fractions. This study revealed that fractions arose from humanity's practical needs related to counting, measuring, and dividing quantities, especially in contexts such as commerce and surveying. As Boyer (2003) points out, historical records indicate that ancient civilizations, such as the Egyptian, developed ways to represent parts of a whole when dealing with situations where measurements did not result in whole numbers.

In this historical process, fractions initially represented relationships between whole numbers, later being understood as numbers belonging to the set of rational numbers. As Dias and Moretti (2011) highlight, understanding fractions does not necessarily mean understanding rational numbers in their entirety, highlighting the complexity of this concept in the teaching and learning of mathematics.

Thus, based on this line of study grounded in the historical-cultural perspective, the club members sought to understand the historical development of the concept of fractions as a way to inform the design of the teaching proposals developed at the school.

Following the establishment of the concept of fractions, three educational games focused on teaching fractions were developed, along with a diagnostic questionnaire used to assess students' knowledge of the content. It should be noted that the members of CluMat had already conducted other interventions at the same participating school; however, in these previous initiatives, the activities were carried out in a 7th-grade class at a public elementary school.

The first step taken by the group was to develop the diagnostic questionnaire, consisting of questions addressing different aspects related to the content of fractions,

such as definition, representation, equivalence, operations, and problem-solving. After the questions were drafted, the instrument was collectively reviewed by the Club members who would participate in implementing the program at the school, with the aim of verifying whether the activities were appropriate for the class's grade level and whether they met the intended objectives.

Subsequently, the process of creating the educational games to be used in the interventions began. This stage involved preparing the materials, printing, cutting out, and laminating the cards, since most of the games created consisted of manipulative card decks, requiring greater durability for classroom use.

b) Implementation of initiatives at the school

Once this preparatory phase was complete, the first session was held with the 7th-grade class, during which the diagnostic questionnaire was administered. During the activity, it was observed that the students showed interest in answering the questions. Part of the class managed to complete the questionnaire before the end of the two class periods allocated to the activity, while other students required more assistance from the group members, mainly because they had difficulty recalling certain concepts related to fractions.

After analyzing the responses obtained from the diagnostic questionnaire, a new intervention was conducted at the school, this time involving the first game developed by the group, called "Rouba Monte das Frações." The game was inspired by the traditional "Rouba Monte," but adapted to work with different representations of fractions. The game cards featured four types of representation: fractional, decimal, pictorial, and discrete. Students were organized into groups of three, and the objective of the game was to form the largest pile of cards by the end of the round. To steal a card from the center of the table or from another student's pile, a student needed to have a card that showed the same fraction representation, even if expressed differently.

Image 1: Game – Rouba Monte das Frações



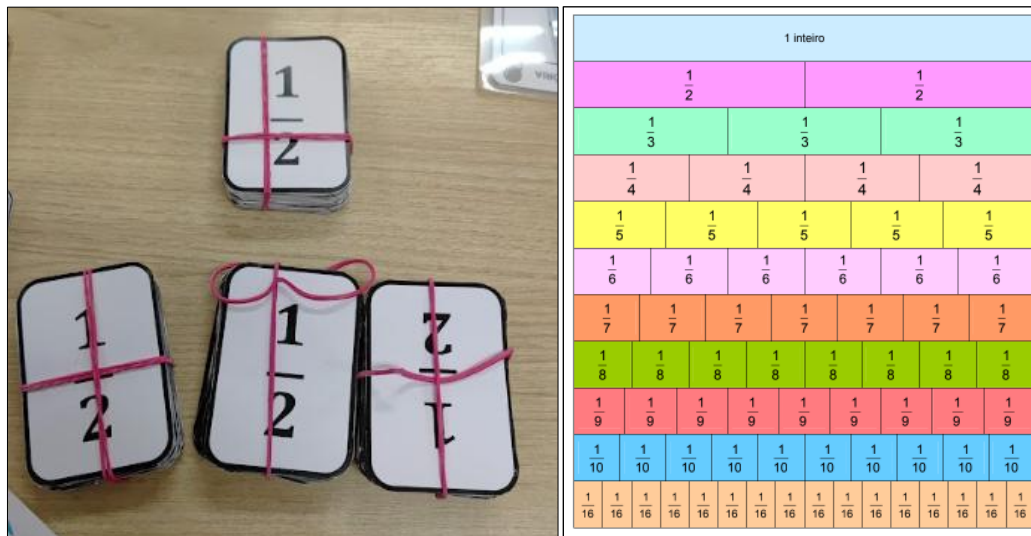
Source: CluMat Collection

During the activity, it was observed that students initially played in a more passive manner, seeking to understand the rules and how the game worked. Over time, however, they began to show greater engagement and competitiveness, expressing an interest in continuing the game and winning their classmates' cards.

In another session, the game “*Papa Todas das Frações*” was introduced, designed to facilitate comparisons between different fractions. The game consists of 50 cards featuring fractions, and students were organized into groups of five. Each player received ten cards, which were to remain in a face-down pile. In each round, all players simultaneously turned over the card on top of their pile. The student with the largest fraction won the round, taking all the cards played at that moment.

To aid in comparing fractions, students used a fraction strip chart, a manipulative that visually represents fractions in relation to the whole. This chart was intentionally designed so that it could be cut out and used as a sort of foldable ruler, allowing students to visualize and compare the sizes of the fractions. At the end of the game, the winner was the student who had accumulated the most cards.

Image 2: Game – Papa Todas das Frações



Source: CluMat Collection.

After providing guidance and observing student performance during the activities, it became clear that performance in the games was not necessarily related solely to the dynamics of the activities, but also to the composition of the groups formed within the class. In the last two activities, in which students were organized into groups of four and three, some students ended up being grouped together merely to fill out teams that had already been formed. It was observed that, in some of these groups, there was less interest and interaction with the activities, which ultimately harmed their performance. This observation is a relevant factor for future reflections on the organization of classroom activities, especially because it demonstrated that the way groups are organized can directly influence students' interest, participation, and engagement during the activity.

Finally, the game *Framória* was introduced, an adaptation of the traditional memory game, but using cards with equivalent fractions. In this game, students had to find pairs of cards representing the same fractional quantity, even if expressed in different ways. The winner of the game would be the student who managed to form the greatest number of pairs of equivalent fractions..

Image 3: Game - Framória



Source: CluMat Collection.

During the development of the activity, it was observed that the students showed great interest in the activity. However, at the beginning of the activity, the class had some difficulty understanding the equivalence relationships between the fractions. In light of this, an adjustment was made to the activity: initially, students were asked to turn over all the cards and visually identify which ones represented equivalent fractions, so that they could later begin the game following the traditional rules of memory. Overall, the activity was well received by the students, with only two students showing no interest in participating in the game.

It is worth noting that all the games developed were accompanied by a reflection sheet, handed out after the games ended. This sheet included a prompt question related to the game, allowing students to record their reflections on the activity. These records made it possible to observe evidence of the development of students' mathematical reasoning, as well as their thinking strategies while solving the problems presented by the games.

c) Evaluation

The activities carried out as part of the Math Club made it possible to design and implement teaching strategies focused on fractions in a 7th-grade class. Based

on a theoretical study of the logical-historical development of the concept of fractions, we sought to organize teaching situations that would allow students to feel the need to understand the different ways of representing this concept, thereby promoting an understanding of the relationships between part and whole, equivalence, and comparison of fractions.

This return to the university reflects not only on the activities that were developed but also on the formative process triggered in the participants. To highlight this process, we used scenes, as these seek to express the phenomenon through small parts, much like in a film, where “the viewer is invited to experience, as an editor, a set of situations that, when all the chosen scenes are considered together, gradually shape their vision of the community being portrayed.” (Moura, 2000, p. 70). This is presented in the table below:

Table 1: Reflections from CluMat Scholars

Scene 1: In the plan developed and shared by all CluMat participants, the scholarship recipients and collaborators shared their reflections on the activities involving fractions conducted with the 7th-grade class. Here is an excerpt from that writing.
Scholar 1: Both as a scholarship recipient and as a student teacher, my teaching placements at Margarida Lopes School were my first since I began my Bachelor’s degree in Mathematics. That said, these were my first experiences where I had the opportunity to be in a classroom as a teacher rather than as a student. Now that I have more experience as a student teacher, as well as having participated in other teaching placements, I cannot deny the extreme importance of these first classroom experiences. First, I would like to emphasize how important the development of the first worksheet was, as it allowed us to assess the students’ prior knowledge of the content. [...] Collaborator 1: Regarding the activities carried out in the Math Club, we realized that the experience was essential both for the students’ learning and for our own professional development as teachers. The preliminary study on the concept of fractions highlighted its complexity, which guided the development of activities that explored different representations and meanings. The importance of teacher mediation became evident, as it was necessary to adapt activities and intervene constantly in response to students’ difficulties. Games fostered engagement but demonstrated that they must be linked to a clear pedagogical purpose. Also noteworthy is the use of fraction strips, incorporated as an adaptation for the class. This resource aided in the visualization and comparison of fractions, contributing to understanding, especially regarding equivalence. Finally, we emphasize the importance of collective work in planning and evaluating the activities. As an area for improvement, we highlight the formation of groups and the need for more time to explore basic concepts before the activities.

Source: CluMat Collection.

Although this was an individual reflection by the CluMat participants during the planning phase, it also emerged within the larger group. Two points stand out from this assessment: the opportunity for school placement and the focus on planning.

The first point is evident in both accounts. *Scholarship Recipient 1* highlights the importance of their first placement, noting that, as a student in a teacher education program, they were able to have this experience. *Collaborator 1* highlights the learning process for teaching, from study to classroom placement. In other words, even though other opportunities in initial teacher education foster learning for teaching, at CluMat, the activities provide opportunities to go beyond simply “applying” content, as this setting offers initial teacher education.

[...] It is understood as a process that enables participants to understand their role as teachers based on their own experiences; in other words, a training program that goes beyond a mere understanding of the content taught and the methodologies used, and seeks to address the unique concerns and insecurities of each teacher in initial training. However, even though this reflective and critical process regarding one’s own teaching practices is individual, research points to the importance of sharing experiences among participants and the mediation of a supervising teacher, justifying its collaborative structure.(Marco; Lopes; Araújo, 2023, p.807).

Through the diverse experiences among different participants that the activities at CluMat provide, future teachers are allowed to engage with more experienced peers in the program as well as with practicing teachers. It is these shared experiences that enable future teachers to internalize individual lessons about teaching, thereby fostering new qualities for their future social practice—that of being a teacher.

It is in this direction that we approach the second point, as shared reflection allows us to perceive what the other colleague/teacher identified. That is, the perception of *Scholar 1* differed from that of *Collaborator 1*, who had already highlighted additional elements regarding the activities carried out at the school. This may be due to the fact that *Collaborator 1* had already had other classroom experiences, whether at CluMat or in other projects.

It is these opportunities to reflect on the activities carried out, as well as on the organization of planning and the materials used, that can enhance the development of the individuals involved, as they will come to understand the teaching activity within their school. In this process, one comes to “understand assessment as part of the

process that contributes to the teacher's teaching activity and drives student learning" (Fajardo et al., 2024, p.373).

Based on this cycle of study-planning-development-assessment, CluMat can become a shared learning space. Such experiences contribute to the acquisition of knowledge that can enhance the teaching quality of all participants, including both future teachers and currently practicing teachers.

4 Final Considerations

The activities carried out within the Mathematics Club highlight not only the learning of elementary school students but also the importance of this space as a training environment for future teachers. By enabling participants to experience the entire process of organizing instruction—which involves theoretical study, planning, development, and assessment—the Mathematics Club serves as a shared training space.

In this context, the study of the historical development of the concept of fractions not only supported the development of teaching proposals but also helped student teachers broaden their understanding of mathematical knowledge and the ways to teach it. This process reinforces the importance of training that integrates theory and practice, enabling future teachers to understand the foundations that guide their pedagogical actions.

Furthermore, the experiences gained during school placements enabled participants to confront real-world situations in teaching practice, such as the need for constant mediation, adaptation of activities, and decision-making in the face of students' difficulties. These elements are fundamental to the development of a reflective and investigative mindset, which is essential for future teaching practice.

Another relevant aspect concerns the collective nature of the Math Club. The collaborative work among teacher candidates, elementary school teachers, and higher education faculty fosters the exchange of experiences, the sharing of knowledge, and the joint construction of pedagogical understanding. This approach contributes significantly to the professional development of future teachers by enabling them to learn from and about one another.

By allowing future teachers to experience the process of organizing instruction—from studying concepts to analyzing classroom interventions—this space contributes to the development of an investigative and reflective approach to teaching practice. Thus, the Math Club demonstrates its potential as an important formative environment, in which collaboration, dialogue, and collective reflection become fundamental elements for the development of future teachers.

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