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Powers of mathematics class: about the plot of a sustainable science fair

Los poderes de las clases de matemáticas: sobre la trama de una feria de ciencias sostenible

Les pouvoirs du cours de mathématiques : à propos de l'intrigue d'une expo-sciences durable

Potências da aula de matemática: sobre a trama de uma feira de ciência sustentável

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Abstract

This article presents excerpts from a workshop related to mathematics and the organization of a sustainable science fair, produced and developed with elementary school students at Professora Herondina de Medeiros Zeferino Municipal Elementary School, located in Florianópolis (SC), Brazil. The objective is to problematize the mathematics involved in the production process of a sustainable fair and, at the same time, emphasize its power as a support for decision-making, discards, choices, and strategies. Cartography is the theoretical-methodological approach that supports the study. The aim is to trace paths that focus on interrogation, on doing with, and on the complexity of shared experiences, with the goal of building paths that can make mathematics a place for critical thinking exercises.

Keywords: Mathematics, Mathematical workshops, Sustainability, Cartography.

Resumen

Este artículo presenta extractos de un taller sobre matemáticas y la organización de una feria de ciencias sustentables producido y desarrollado con estudiantes de escuela primaria en la Escuela Primaria Municipal Maestra Herondina de Medeiros Zeferino, ubicada en Florianópolis (SC), Brasil. El objetivo es problematizar la matemática que tiene lugar en el proceso de producción de una feria sustentable y, al mismo tiempo, enfatizar su poder, en tanto opera como soporte para la toma de decisiones, descartes, elecciones y estrategias. La cartografía es el enfoque teórico-metodológico que sustenta el estudio. Con ello se pretende trazar caminos que se centren en la interrogación, en el hacer con y en la complejidad de las experiencias compartidas, con el objetivo de construir caminos que puedan hacer de las matemáticas un lugar para el ejercicio crítico del pensamiento.

Palabras clave: Matemáticas, Talleres de Matemáticas, Sostenibilidad, Cartografía.

Résumé

Cet article présente des extraits d'un atelier sur les mathématiques et l'organisation d'une expo-sciences durable réalisé et développé avec des élèves du primaire de l'Escola Básica École Élémentaire Municipale d'Herondina Medeiros Zeferino, située à Florianópolis (SC), Brésil. L'objectif est de problématiser les mathématiques qui ont lieu dans le processus de production d'une foire durable et, en même temps, de souligner sa puissance, car elle fonctionne comme un support pour la prise de décision, les rejets, les choix et les stratégies. La cartographie est l'approche théorico-méthodologique qui soutient l'étude. Il s'agit ainsi de tracer des chemins axés sur l'interrogation, le faire avec et sur la complexité des expériences partagées, dans le but de construire des chemins qui puissent faire des mathématiques un lieu d'exercice critique de la pensée.

Mots-clés: Mathématiques, Ateliers mathématiques, Développement durable, Cartographie.

Resumo

Este artigo apresenta recortes de uma oficina relacionando a matemática e a organização de uma feira de ciências sustentável produzida e desenvolvida com estudantes de Ensino Fundamental da Escola Básica Municipal Professora Herondina de Medeiros Zeferino, localizada em Florianópolis, SC. O objetivo é problematizar a matemática que acontece no processo de produção de uma feira de ciências e, ao mesmo tempo, enfatizar sua potência, na

medida em que opera como um suporte para a tomada de decisões, descartes, escolhas e estratégias. A cartografia é a abordagem teórico-metodológica que aporta sustentação ao estudo. Com isso, visa-se traçar percursos que apostam na interrogação, no fazer *com* e na complexidade das vivências partilhadas, construindo caminhos que possam fazer da matemática um lugar para o exercício crítico do pensar.

Palavras-chave: Matemática, Oficinas com matemática, Sustentabilidade, Cartografia**.**

Powers of Mathematics Class: Inventing a Sustainable Science Fair

In a classroom at the Professora Herondina de Medeiros Zeferino Municipal Elementary School in the city of Florianópolis (SC), Brazil, a group of 6th-grade students, a math teacher, and an apprentice cartographer are conducting workshops with the goal of creating a science fair focused on sustainability. They aim to use mathematics as a strategic tool to develop critical thinking skills[1]. This is an exercise in invention and creation that poses a challenge: *to address*[2] the urgent and complex need to question the impact of consumption habits on life and the planet in the present day. For the students of the aforementioned school, fairs (science, math, and knowledge fairs) are common school events. So, in essence, there is nothing new in organizing a fair, although the term "sustainable" may seem strange to some, which should therefore prompt their thinking.

The theoretical and methodological approach of this work is based on cartography, a research "method" that is not based on a defined procedure but rather relies on fluidity (Passos et al., 2016). Instead of following a linear path of investigation, cartography encourages the construction of maps that represent processes, relationships, and movements, bringing to light the complexity of the object of study and favoring a more open, dynamic, and participatory approach. Considered a strategy in intervention research, it is a tool that helps to explore and intervene in the world in a creative way, opening space for the sensitivity and multiple dimensions of its object of interest and study, which is experience (Idem). It is about a way of thinking and acting in research that values experimentation, connection, and transformation.

This article does not intend to analyze and discuss the final results of the exercises proposed in the workshops, to reach a truth in relation to the teaching of mathematics, or to prove an educational fact or trend. Nor does it aim to present and explore specific mathematics content through a particular methodological approach. The intention is to explore the process of what happens when a group of students is challenged to plan and organize a science fair that values the principles of sustainability. It also aims to weave a written plot with threads that affect and inspire us to write and weave.

It is important to note that the proposed activity in the form of a workshop is more of an attempt to create or establish a space for the possible, the random, and the unexpected. From this perspective, workshops are seen as a "space where one can engage in an exercise or activity.

[1] This activity proposal took place in the second half of 2023 and is part of a Final Course Work defended in the Mathematics Degree Course at the Federal University of Santa Catarina, Brazil.
[2] A metaphor that we use in our research for teaching mathematics which refers to the act of pausing, observing, or paying attention to something in order to teach the subject.

The workshop is a place where one can invent and produce something with others. In it, relationships with people, materials, and oneself occur" (Kerscher, 2018, p. 74). For us, "we understand that workshops are a practice in terms of experience, exercise of thought, and rehearsal: *experimentation*" (Kerscher-Franco & Flores, 2023, p. 378). In other words:

> [...] the workshops are set up as a space for exhibition, for being exposed to events, for affectation, for experiencing sensations, and stopping time, feeling the event, since the event is neither a state nor a thing. Therefore, it is not produced amid definitions but always in the moment in which it happens, in the happening. (Kerscher-Franco & Flores, 2023, p. 380).

In this way, by engaging "with knowledge in a continuous process of exploration, multiplicities, relationships, and connections" (Ludvig et al., 2023, p. 5), workshops open space for experimentation, enabling the monitoring of processes, transformations, and ordinary events that are often neglected in the search for major events and results.

After all, what happens when 6th-grade students are challenged to organize a sustainable science fair? What ways of seeing the world come into existence in workshops with mathematics? What mathematics happens in this space?

About a way of researching: the cartographic stance

Cartography is the theoretical-methodological approach that supports this study. It is not about cartography as a science dedicated to the representation of geographic space and its mapping through study. It is about a way of conducting research that is based on a critical eye that observes and describes relationships, affects, and trajectories that are traced throughout the research. Cartography, in its research approach, does not view methodology as a set of fixed rules but as a fluid form. It is an "activity guided by a guideline of a nature that is not strictly epistemological, but ethical-aesthetic-political" (Passos et al., 2016, p. 9). In this sense, cartography is not concerned with following technical prescriptions, but rather "concerns itself with constructing clues as an indication of the effective validity of the investigation" (Passos et al., 2016, p. 9).

Among the clues that support this research method, two are worth highlighting: monitoring the process and inhabiting an existential territory. In the first, one learns that in cartographic research, the notion of process is correlated to procedurality through a perspective that aims to investigate processes of production of subjectivities, moving away from a practice that assumes the collection and analysis of data and information. In the second, one understands that *cartographic research* requires, among other things, "inhabiting an existential territory"

(Passos et al., 2015), cultivating and engaging in it. By inhabiting a territory, the researcher becomes an apprentice-cartographer whose attentive and sensitive gaze allows for the acceptance of surprise and the unpredictable, understanding that the phenomenon studied is a broad, diverse, and moving universe, and that the path of research is formed in the process. Therefore, approaching a research territory and inhabiting it was one of the first steps in developing this cartography.

By moving away from research methods that seek representations of a fixed reality, cartography allows researchers and students to navigate through multiple possibilities, connecting ideas, experiences, and feelings, and perhaps even to investigate the experience itself in a flexible and creative way. Therefore, adopting cartography as a theoretical and methodological strategy opens up space to consider that there are other ways to teach mathematics, which allow the production of other worlds, questioning crystallized concepts and opening up gaps so that other ways of studying, teaching, and learning become possible.

Visiting the school

The Professora Herondina de Medeiros Zeferino Elementary School is the largest school in the Florianópolis municipal education network, currently with 2,061 students enrolled in 66 classes. Located on the island, in the Ingleses neighborhood, the school serves a very diverse school community, as the northern region of the island is home not only to the local population but also to many foreign families. In 2024, it had 70 foreign students from different continents who sought to live in Brazil, especially in Florianópolis.

The school was visited a few months before the workshops were held. The first time the apprentice cartographer entered the school gates, on a hot April day, she encountered many students rushing into the school, excited and talkative, at the beginning of the afternoon class period at 1:30 p.m. It didn't take long to realize that we were in a place that had a lot to provoke us, to challenge us. The first tour of the school invited us to observe its appearance, what it offers, and what it is: a large, spacious, well-planned, well-maintained school divided into two blocks and three floors (ground floor, first floor, and second floor). It has a large cafeteria where around 450 lunches are served daily to students who participate in after-school projects. In addition, there is a sports gym, a vegetable garden, comfortable classrooms, laboratories, and several other spaces for teachers, teaching staff, and management.

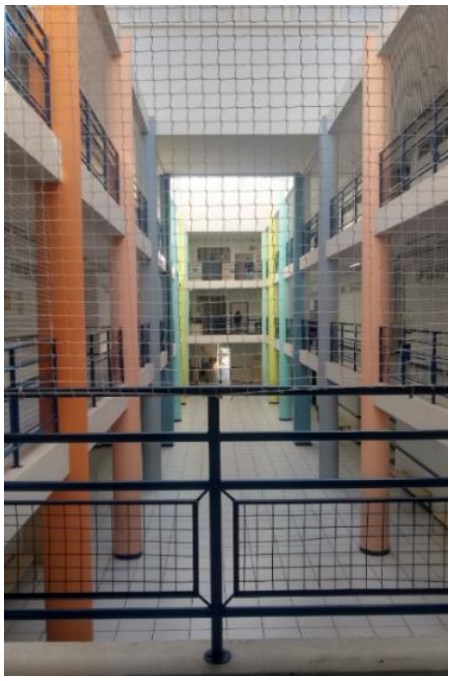

Figure 1.

Image of the 1st floor of the access block (Personal collection)

In particular, the math lab, which was well-organized and offered a variety of games and materials aimed at teaching math, invited us to a state of joy and well-being. It was not just a space, but through it, we could create, invent, and learn about many worlds. Upon entering, we encountered students who appeared to be interested in studying math. Mathematical formulas, elements, and figures were pasted on the entrance door, as if inviting those who entered. On one of the walls, a painting of "Einstein" mixed with images of equations and geometric elements seemed to express a desire, and perhaps an appeal, to materialize matter. In the space, there were long tables and benches for students to sit in groups[3]. On the floor of the room, a hopscotch board seemed to invite us to venture into the world of math.

[3] It is important to highlight that we were in one of the after-school projects, the IFSC Project, an extracurricular environment in which students participated on their own initiative in activities offered during this period aimed at studying the exercises that are part of the Institute's selection process test.

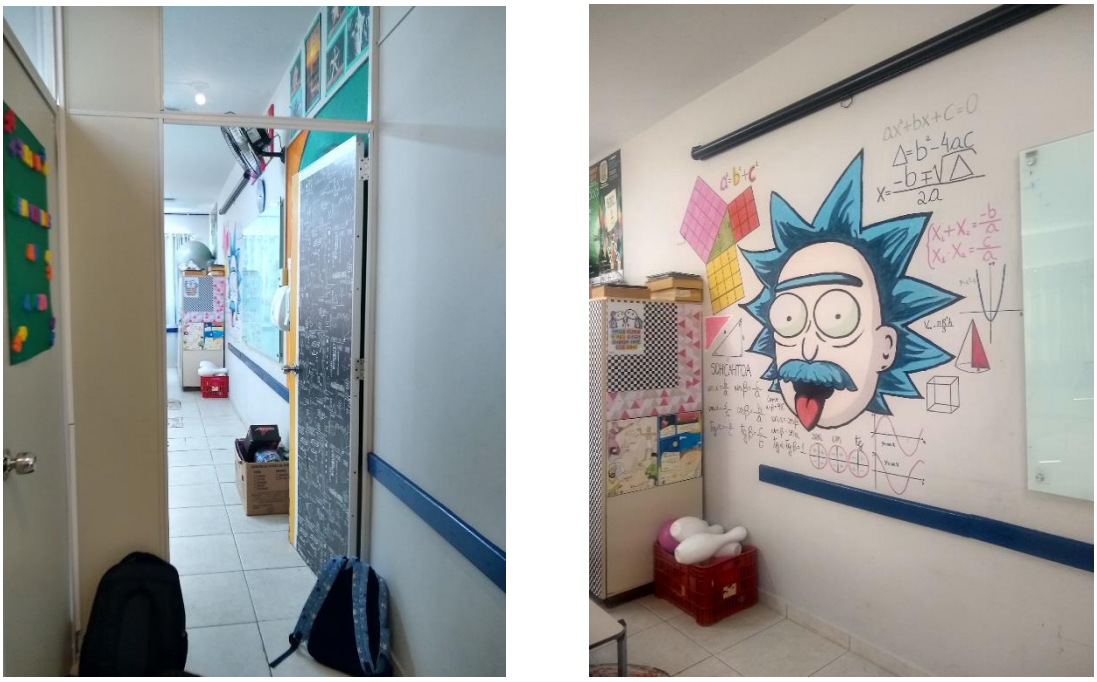

Figure 2.

Mathematics Laboratory (Personal collection)

The first visit to the school was not directly related to the research. We were there to collaborate with a workshop that was part of a research project related to the Institutional Scientific Initiation Scholarship Program (PIBIC), conducted by another student linked to the Group for Contemporary Studies and Mathematics Education (GECEM)[4] and the research project entitled: "Cartographic Essays in a Mathematics Atelier: teaching and learning with children and teacher-researchers."[5]

About two months later, we returned to the school. When we got off the bus, dozens of students were waiting at the crosswalk to cross the SC-403 highway and head to the gate. We walked through the crowd of children and teenagers, following the flow of people until we reached the school entrance. We had never walked that distance before, but the students' school uniforms indicated the way.

[4] This is a multidisciplinary research and study group that involves teachers, students, and researchers from the areas of Education, Exact Sciences, Pedagogy, History, and Arts. GECEM's work is part of the postgraduate sphere, training doctors and masters, and of the undergraduate sphere, with supervision of monographs and scientific initiation. The group's activities are linked to culture and history to investigate problems inherent in Mathematics Education. The research problems that permeate it focus on the production of mathematical knowledge, the processes of teaching and learning mathematics, and teacher training.

[5] Approved by the Department of Teaching Methodology of the Center for Educational Sciences of the Federal University of Santa Catarina (No. 202204907), by the Ethics Committee of UFSC (No. 59201822.6.0000.0121), and by the Ethics Committee of the Joana de Gusmão Children's Hospital (No. 59201822.6.3001.5361). The objective of the project is to implement and map an experimentation plan developed in an atelier that brings together children with learning disabilities and delays, a group of teacher-researchers, and mathematics.

When we arrived, we waited for the pedagogical coordinator of the after-school projects, Professor Jussara Brigo, who accompanied us to the classroom and introduced us to the math teacher, as well as to the 6th-grade class. The students were very receptive and seemed curious about our presence. The classroom was very busy. While the activities from the previous class were being corrected through the exercises reflected on the projector, the teacher was busy observing the students' notebooks on the desks, checking them.

The correction of the activities continued, as did the parallel conversations. On the slides, we saw an activity related to the Sieve of Eratosthenes[6]. The explanations about a concept and the directions regarding activities set the tone of the class, creating a sense of familiarity. There was an impression that some things were repeated in various schools and classes, as well as in many classrooms. Soon, a class began:

> A second equation on the board. An exercise. We are given the time to do it ourselves. Someone lets out a sigh, everyone starts, time's up, someone dares to ask for more time, he gives us more time. (Masschelein & Simons, 2012, p. 31).

Immersed in the midst of the events, questions began to invade our minds: How can we awaken students' interest in studying mathematics? What exercises should we bring to the classroom to open up the world of mathematics? And also, how can we make the mathematics taught in school a link of cultural consonance, a common and public object, a political desire for equality?

The next day, we returned to school. Between one conversation and another, we presented the workshop proposal to the teacher, who gave us some ideas and suggestions according to the profile of the class. We took the opportunity to introduce ourselves, announcing to the class our intention to conduct research with them. In front of the students, a mixture of fear and excitement took over the apprentice cartographer's body. On one hand, the workshops were being planned, but on the other, it was impossible to predict or anticipate what would happen when we joined the students to make it happen.

The emergence of a workshop

After the presentation and debate of a preliminary proposal for the workshops with GECEM, they took on new contours. A question about conscious consumption mobilized the

[6] "With all of the natural numbers arranged in order, one simply strikes out every second number following the number 2, every third number (in the original sequence) following the number 3, every fifth number following the number 5, and continues in this manner to strike out every nth number following the number n. The remaining numbers, from 2 on, will, of course, be primes" (Boyer, 1968, p. 144).

dynamics of the workshops, which initially suggested organizing the students into groups. Regarding the preparation of the materials: a box containing several images placed inside envelopes made of recycled material was intended to explicitly denounce consumption and the production of waste. Next to the envelopes, a script of suggestive questions such as: What do you see in the image? What impact does the image have on the planet? What does the image make you think? Does the image make you think about conscious consumption? Which images represent objects or things of greater value? And which represent a lower cost?

Figure 3.

Set of images given to students (Personal collection)

In the second part of the workshops, we invited the students to organize a sustainable science fair, generating as little waste as possible and at the lowest possible cost, whether financial, environmental, social, or economic. The science fair is a tradition at the school and is part of the school calendar. Therefore, involving them in this process seemed like a challenge to them, which put them in the position of protagonists. Thinking about and producing a fair, even a fictitious one, involves responsibility and the construction of strategies related, in this case, to sustainability and conscious consumption. In this sense, what was at stake was the construction of strategies that valued critical thinking, especially about our consumer choices, prioritizing sustainable, ethical products that cause the least possible impact on the environment. This involves considering the necessity of purchasing certain products, avoiding waste, and choosing durable items, thereby showcasing responsible attitudes and a commitment to life and the planet. Furthermore, the students should organize committees that could share tasks and take care of the organization of the fair. This was an initiative that came from them, from which the following committees emerged: awards, decoration, presentations, food, souvenirs.

A video camera had been placed on a tripod in one of the strategic corners of the classroom. Under the tables, recorders captured voices, sounds, and noises. The workshops were attended by the researcher, the class teacher, and a colleague from GECEM.

In this way, through this gesture of sharing and making known, we were opening spaces for small events. By activating the cartographer mode, we allowed ourselves to get involved with the plots produced by the students of class 65, exploring a world where there is no longer a way to separate the inside and outside of research, but rather "only a way to follow the singularities that construct and invent scenes" (Moehlecke, 2012, p. 168). And it is for this reason that we view the workshop as a:

> tool for research, in which we extract singularities from multiple experiences, focusing on meaning and variation. When faced with minor chaos, a narrative discards prior knowledge and embraces a sense of freedom, risking an overabundance of analysis. We can explore the relationship between the experience and its impact on the knowledge of the participants and researchers. This interaction creates a dynamic between form and force, with actors and co-authors contributing to an inventive process. (Moehlecke, 2012, p. 166).

From the intersections of mathematics in a sustainable science fair

The purpose of holding the workshops was not to teach any specific mathematics content. In fact, we did not propose or require the presence of mathematics during the production of a sustainable science fair, although we were aware of the possibility of its presence and dialogue, since the strength of its subject could emerge in the workshops as a knowledge that permeates and produces other knowledge. In addition, we propose workshops in mathematics classes with the participation of the subject teacher and an apprentice cartographer who is a student of the Mathematics Degree course. It was, rather, an attempt to deviate from the notion of learning that governs schools today, which understands most of the time, "the classroom becomes a learning environment, the subjects become learning units, the teacher becomes a learning facilitator, the school becomes a learning device (effective, meaningful, and, of course, measurable), and the student becomes a learning machine (and learning to learn." (Larrosa, 2019, p. 133)[7].

The idea of workshops is an effort, an attempt to create a time and space that favors a period of training, a place to exercise thinking, because "in school, knowledge requires practice,

[7] ["La sala de aula en entorno de aprendizaje, de las materias de estudio en unidades de aprendizaje, del profesor en facilitador de aprendizaje, de la escuela en un dispositivo para el aprendizaje (eficaz, significativo y, desde luego, mensurable) y del alumno en una máquina de aprender (y de aprender a aprender)."].

but not application. A geometry exercise does not need to solve a concrete and real problem. It is, rather, an opportunity for formative practice" (Carvalho, 2016, p. 47).

Therefore, conducting research through workshops in schools, focusing on mathematics and involving students, aims to create a space for problematization, opening up opportunities for the invention of alternative teaching methods, learning approaches, and ways of engaging with the subject. This challenges the traditional notions of teaching and learning that are often rigidly established in classrooms. It is also about allowing oneself to inhabit territories, learn from the collective, and produce meanings and affections that do not bow to the interests of the immediate and the solutionist logic that seeks, at all costs, to solve the problems of the world (Kerscher-Franco & Flores, 2023).

The following threads reveal fragments of an experience with students at school in the form of workshops. They shed light on the production of a sustainable science fair and discussions on mathematics and financial education from the perspective of 6th-grade students.

Let's play a game?

With the intention of distributing souvenirs at a fair, a group of students came up with the idea of using sunflower seeds wrapped in recycled paper:

> - And how many seeds will you need?
> - Oh, teacher, a lot...
> - We thought we need about 3,200 souvenirs because there are 2,100 students at the school. So, if everyone participates and brings someone to school, we can add 1,100 more.
> - And how did you calculate the amount of seeds?
> - We considered 5g of seeds per envelope, so we need 16 kg of seeds. To find the cost, we searched online and found that it costs 160 reais for the seeds.
> - How will you deliver these seeds?
> - We are going to play a game.
> - Yeah, we're going to ask questions, and the first one to get it right will win this surprise envelope.
> - We will ask questions about environmental problems, such as recycling trash and how to take good care of nature. The person who answers correctly will win.
> - And the paper, where will it come from?
> - It will be made from recycled magazines, just like the teacher did with the envelopes and the box where the images were.

The activity mobilizes knowledge that predicts quantities and values, estimates the cost of the operation, and helps students make decisions and choices. The composition of a way of thinking values precise answers, while at the same time making approximations to

mathematical possibilities, opening space for students to deal with everyday situations to which there is not always an exact answer, and stimulating creativity and confidence in their abilities.

In a workshop that involves creating a science fair, the production of meanings comes into play as students use their imagination to generate ideas and thoughts that aim to predict what might happen. It is the sense that something is unfolding, and in this process, mathematics is utilized to help construct potential solutions for specific situations. Mixed into this plot is a way of thinking that follows logical steps to help solve problems, starting from already known premises that confirm or serve as evidence of the original ideas. In this process, the playful sense and precision weave a plot, opening up worlds and exposing, in the same situation, the possibility of constructing strategies that circulate between the algorithm of proportion, intuitive sense, and deductive thinking.

How much does an apple cost?

Meanwhile, the food group was creating a list of foods to be offered to participants in a sustainable space. Among other products, apples were the ones that provoked the most questions:

- How much does an apple cost?
- At the supermarket, I saw that it was 5 reais.
- A kilo of apples?
- Yeah, I think it was a kilo.
- How many apples fit in a kilo?
[…]
- How much does an apple weigh?
- Oh, it weighs about this much. [pointing to the pencil case]
- And how much does this weigh? More than a kilo?
- I don’t think so.
- I think it should be about 5.
- So, how many kilos of apples do we have to buy "to feed all these people"?
- A lot of apples, teacher.
- Come on, then… Is everyone going to eat apples?
- I think about 200 people eat apples.
- So, how many apples do we need?
- 200, right, teacher.
- And how much is a kilo of apples?
- It fits 5 apples.
- That’s it. So, how many kilos do we need?
- Do we have to divide it by 5, teacher?
[…]

A way of thinking organizes and establishes a relationship between the quantity of apples per kilo, the quantity of apples per person, the total quantity of people, the weight of the apples, the price per kilo of apples, and the distribution of apples.

- Come on, you said that 3 times 5 is…
- 15, teacher.

A student decided to do math on his desk. "Calculations" were scribbled on the desk, which in turn served as a blackboard. The student's hands moved, drew paths, created strategies, wrote, and erased. Did they erase what was written and what was thought? The eraser is another thread in the plot, whose function goes beyond the act of erasing and makes one wonder: what is the role of the eraser in the learning process? Is it to erase? To deny it? Writing and erasing. Erasing until we forget what should not be left. Is learning only about what is considered correct? It seems in vain to us because mathematics seems to live a full life in the body of the one who learns. After all, who said that we learn only when we get an answer or a calculation right? And why not through signs, in the "waste of time," and in the distancing from the logic of assimilating objective content? (Deleuze, 2003).

As for mistakes, what should we do with them? Erase them? Forget them? Erasing them to forget or deny what should not remain. By forgetting or denying, we run the risk of repeating the mistake. In repetition, we invent, reinvent, produce deviations, start over, inaugurate other movements, experience other events. Perhaps only in school can the eraser be used because making mistakes and correcting them is a fundamental part of the learning process. Making mistakes in school is different from making mistakes in other places. In school, making mistakes is a part of the learning process. There is – or should be – room for errors, corrections, repetition, and improvement.

If, on the one hand, making a mistake helps to identify concepts that need to be revised or reinforced in the learning process, on the other hand, it presents an opportunity to encourage a questioning stance, provoking the reasoning that making mistakes is part of the journey. The journey, in turn, represents construction and invention, which have and make history. It would be full of humanity, life, and culture.

The calculations are then restarted, now no longer on the desk, but on a sheet of paper. Marks and underlining are written on the paper in an attempt to express one's thoughts, or even a way of presenting the materials that exist in the school, marked in the form of student records:

- What is the next number in the multiplication table?
- 3 times 6 is 18.

- How much do you need to add to 15 to get 18?
- Three.

Persistent, the student kept erasing and writing, with the aim of producing a multiplication table that would help him and bring him success in calculations. A *again* opens up space for a new attempt, another possibility. How many kilos of apples do I really need? But what is this calculation?

How big will this medal be?

Meanwhile, in the other corner of the room, the group responsible for the award was brainstorming a strategy to transform something recyclable into a medal:

- I think it's possible to make the medal out of EVA.
- We could buy EVA and make a circle and write things on the EVA.
- Each sheet costs 8 reais.
- Wow, is that just one sheet?
- How many sheets will we need?
- How many medals do you intend to make?
- I think about 30.
- Are these medals for just one class?
- No, I think there should be first, second, and third place.
- And that will give a lot of medals.
- I think about 100.
- There are classes that have more than 30; I think there should be about 35 per class.
- And how many medals will that give in total?
- If there are 35 students in a class, how many are there in three classes together?

For a moment, an awkward silence fell over the group. A student scribbled on a sheet of paper and attempted to calculate.

- I think 90.
- Let's think together: 35 plus 35 equals how much?

The awkwardness of silence returns. The student falls silent and the researcher does the same. A "calculation error" takes center stage and prompts us to think. It's a multiplication by three. That's it: multiply by three. And the correct answer comes to us breathlessly. It's a relief and comfort: 105.

- How big will these medals be?
- I think like this. [Makes a circle gesture with his hand]

And with their hands, they draw a circle in the air. Mathematics happens through calculations, observations, thoughts, drawings, and movements that involve manipulating the fingers, hands, and the entire body. Mathematics that involves the body:

- How many of these circles can fit on a sheet of EVA?
- How big is the sheet?

Body language precedes verbal language. Restless fingers trace imaginary circles on the desk. Thinking students engage with mathematics, contemplating how to run a sustainable fair. Their thought process is accelerated:

- I think you can put 10.
- So, how many sheets will you need?
- So, if each sheet costs 8 reais, we will have to spend 80 reais just on EVA sheets.
- I think EVA will be too expensive; we can make it out of cardboard.
- Cardboard is brown, right? Will the medal be brown?
- We can paint it.
- Yeah, and the paint is cheaper, or we can get it from school.

The creation of cardboard medals with string and painted with gouache paint traces a path that is woven and constructed along the way with the students. Choices are guided by estimates of values, quantities, and size. Sustainability is intertwined with the mathematics of producing medals in the context of the school, with its 66 classes.

To (in)conclude: we are not going to buy anything!

In the context of a science fair, a workshop generates interventions in lived experiences and a desire for a world in creation. Crossed by provocations, concerns, doubts, knowledge, and ignorance, a plot formed by gestures, actions, and words promotes the encounter between consumption, mathematics, and financial education, instigating thinking, even if incipiently, about the possible resonances of our choices and actions in the world we inhabit. Mathematics operates as a tool but also as a place that allows one to explore, make choices, experiment, feel, estimate, scribble, and build worlds.

The group responsible for organizing the materials for the science fair was in full swing. As soon as they began their research, a solution emerged:

- We won't buy anything!
- We can borrow everything from school.
- My mom works at the supermarket; she can get cardboard boxes. I can ask her to bring them for me.

Choosing *not to buy anything* is a firm and decisive statement that addresses two contemporary themes covered in the skills of the curricular components in the National Common Curricular Base: consumer education and financial education (Brasil, 2018).

When addressing the thematic unit focused on *Numbers* for the final years of Elementary School, the BNCC guides the study of basic concepts of economics and finance, aiming at the financial education of students through a perspective that discusses "topics such as interest rates, inflation, financial investments (profitability and liquidity of an investment), and taxes" (Brasil, 2018, p. 269). The cultural, social, political, psychological, and economic dimensions are, within the scope of the document, possibilities for the development of an interdisciplinary work that dialogues with issues related to consumption, work, and money (Brasil, 2018).

In other words, financial education, across the board, including mathematics, leads to something that goes beyond learning concepts and reproducing calculations. In the game of whether to buy or not to buy, what comes into play are the behaviors and values linked to a way of being and living that guide choices. In this game, it is believed that "educating financially" and "educating for consumption" are roles of the school, especially of the teacher who, among so many responsibilities:

> is called upon to educate students based on a series of values prescribed for the formation of a governable citizen who knows himself and acts in his reality consciously with regard to his actions and decisions in the neoliberal economic sphere (Souza, 2021, p. 17).

By focusing on this issue, we do not want to deny the prescriptions set forth in the document, nor do we want to say that this way of educating is wrong and then immediately offer another to replace it. Nor do we want to dictate what should or should not be purchased from a moralizing perspective, disregarding everything that involves the personal choices and decisions of each individual. However, this method of proposing or suggesting financial education raises a question and an alarm: What kind of "financial education" do we introduce in math classes? What possibilities exist for students based on the mathematical practices we promote in schools? How do our practices and *ethos* incorporate financial education and education for consumption?

If we consider that school practices are intrinsically related to broader cultural and social movements, we cannot ignore the fact that consumption is significantly present in our culture. Subjects are produced in them on a daily basis, and the relations of knowledge and power that establish ways in which they can see and produce themselves and the world are inscribed. The integration of mathematics into the discussion of these contemporary issues adds additional

meaning and dimensions, transforming it from a mere tool for calculations to a method for providing numerical solutions to complex problems. In other words, in addition to quantifying, measuring, comparing, and interpreting information, the aim is to make it a power to think critically, creatively, and analytically. It is a tool to act more effectively in the world, to understand it and transform it, or even to invent other worlds.

The creation of workshops in a school can be seen as a territory in constant transformation, where ideas and practices are mapped and reconfigured, producing creative "lines of flight" that deviate from traditional paths, opening space for new connections and possibilities. From this perspective, mathematics ceases to be just an abstract discipline and begins to operate as a living tool, helping students understand, visualize environmental issues, plan solutions, and think critically about the impact of their actions. The workshops function as a space for cartographic experimentation, where students explore different "territories" of knowledge, producing strategies that help them navigate complex themes in a more creative and engaged way. This process allows them to become authors of their own maps, creating new ways of thinking and acting in the world. They are a time of distracted attention on things, an adventure that encourages thinking about "a cartographic *ethos* that is put into practice, in which writing and reality are produced through thought, in the event, in the very moment in which the senses happen, that is, in the workshop" (Kercher-Franco & Flores, 2023, p. 273). Thus, the sustainable science fair is not just an event but a living cartography of critical thinking and creativity in action with mathematics.

In this way, along paths that are made by walking, we choose to trace a route that focuses on questioning, on doing with, and on the complexity of shared experiences, pursuing alternatives that make it possible to invent worlds. In short, a path without haste, because we have no set destination.

References

Alvarez, J., & Passos, E. (2012). Cartografar é habitar um território existencial. In E. Passos, V. Kastrup & L. Escóssia (Orgs.), *Pistas do método da cartografia: pesquisa-intervenção e produção de subjetividade* (pp. 131-149). Sulina.

Barros, L. P., & Kastrup, V. (2012). Cartografar é acompanhar processos. In E. Passos, V. Kastrup & L. Escóssia (Orgs.), *Pistas do método da cartografia: pesquisa-intervenção e produção de subjetividade* (pp. 52-75). Sulina.

Brasil. Ministério da Educação (2018). *Base Nacional Comum Curricular.* Brasília. http://basenacionalcomum.mec.gov.br/images/BNCC_EI_EF_110518_versaofinal_site.pdf .

Boyer, C. B., & Merzbach, U. (1968). *A history of matemathics* (3a ed.). John Wiley & Sons, Inc.

Boyer, C. B. (1974). *História da Matemática*. Edusp.

Carvalho, J. S. (2016). *Por uma pedagogia da dignidade: memórias e reflexões sobre a experiência escolar*. Summus.

Clareto, S. M. (2015, outubro). Sala de aula de matemática: pesquisa e enfrentamento do fora. In *37a Reunião Nacional da ANPEd*, Florianópolis. https://www.anped.org.br/sites/default/files/trabalho-gt19-4640.pdf.

Da Silva, M. T., & Tamayo, C. (2020). Aprender matemáticas: um encontro com signos. *Revista BOEM*, *8*(17), 281-296. https://doi.org/10.5965/2357724X08172020281.

Deleuze, G. (2003). *Proust e os Signos* (2a ed.). Forense Universitária.

Kerscher, M. M. (2018). *Uma martemática que per-corre com crianças em uma experiência abstrata num espaço-escola-espaço* [Dissertação de Mestrado em Educação Científica e Tecnológica, Universidade Federal de Santa Catarina].

Kerscher-Franco, M. M., & Flores, C. R. (2023). Oficinas como Experimentações com Matemática e Arte. *BOLEMA: Boletim de Educação Matemática*, *37*(76), 371-391.

Larrosa, J. (2019). Vindicación del estudio como concepto educativo: a propósito de aprender / estudiar una lengua. *Teoría de la Educación*, *31*(2), 131-151.

Larrosa, J. (2023). Aprender/estudar uma língua. In. F. Bárcena, M. V. López & J. Larrosa, (Orgs.), *Elogio do estudo* (pp. 75-107). Autêntica.

Ludvig, I. C., Flores, C. R., & Wagner, D. R. (2023). No cultivo de uma oficina com arte contemporânea indígena: a soberania de um saber da matemática na escola. *REAMEC: Revista da Rede Amazônica de Educação em Ciências e Matemática*, *11*(1), 1-17.

Masschelein, J., & Simons, M. (2012). *In defense of the school: a public issue*. ACCO.

Masschelein, J., & Simons, M. (2014). *Em defesa da escola: Uma questão pública* (2a ed.) Autêntica.

Moehlecke, V. (2012). Oficinar. In T. M. G. Fonseca, M. L. Nascimento & C. Maraschin (Orgs.), *Pesquisar na diferença: um abecedário* (pp. 165-168). Sulina.

Moraes, M. (2010). PesquisarCOM: política ontológica e deficiência visual. In M. Moraes & V. Kastrup (Orgs.), *Exercícios de ver e não ver: arte e pesquisa com pessoas com deficiência visual.* Nau Editora.

Passos, E., & Barros, R. B. (2012). A cartografia como método de pesquisa-intervenção. In E. Passos, V. Kastrup & L. Escóssia (Orgs.), *Pistas do método da cartografia: pesquisa-intervenção e produção de subjetividade* (pp. 17-31). Sulina.

Passos, E., Kastrup, V., & Escóssia, L. (2012). *Pistas do método da cartografia: Pesquisa-intervenção e produção de subjetividade* (1a ed.). Sulina.

Passos, E., & Kastrup, V. (2016). Sobre a validação da pesquisa cartográfica: acesso à experiência, consistência e produção de efeitos. In E. Passos, V. Kastrup & S. Tedesco, *Pistas do método da cartografia: a experiência da pesquisa e o plano comum* (Vol. 2, pp. 203-237). Sulina.

Pozzana, L. (2016). A formação do cartógrafo é o mundo: Corporificação e afetabilidade. In E. Passos, V. Kastrup & S. Tedesco, *Pistas do método da cartografia: a experiência da pesquisa e o plano comum* (Vol. 2, pp. 43-65). Sulina.

Rancière, J. (2002). *O mestre ignorante: Cinco lições sobre a emancipação intelectual*. Autêntica.

Trois, L. P. (2017). Escutar (ao lado das crianças). In L. B. Costa, L. V. V. Bandeira & T. M. Corrêa (Orgs.), *Estátuas de nuvens: dicionário de palavras pesquisadas por infâncias* (pp. 86-95). Sulina.