

A GEOMETRIC AS A CARRIER BAG OF FICTION: THE HELPLESSNESS AS A POSSIBILITY

Uma Geometria Como Teoria Da Bolsa De Ficção:
O Desamparo Como Possibilidade

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ABSTRACT

In this essay, we fable an geometry as a carrier bag of fiction. It is not a search for explanations and possibilities of institutionalized geometries for mathematics teacher education or for the mathematics school classroom. It is about tasting things, life stories, concepts, ideas, geometric inventions, when it is placed inside a carrier bag, in an inventive movement, in an attempt to operate helplessness. Then, we go through some investigation works that invent geometries, use works of art and make use of headlines as modes of possibilities and transfigurations of our gaze and our body. We also flirt with the geography of maps, with which we destabilize geometric colonialities. In a Circuit of Affections, data were collected through helplessness in the face of geometric educations and placed in our fiction bag. Among visualities, decrystallizations and map productions, we invented (always in a draft) a scholarship geometry that presents itself as a possibility to inhabit professional practices of math educators, from Kindergarten to Graduate courses. Thus, a geometry as a carrier bag of fiction happens in a possibility of other schools, having the helplessness as constitutive of a political project.

Keywords: Circuits of affects, Descrystalize, Visualities, Carrier Bag of Fiction

RESUMO

Contexto: Neste ensaio, fabulamos uma geometria como bolsa de ficção. Não se trata de uma busca de explicações e possibilidades de geometrias já institucionalizadas para a formação de professores ou para a sala de aula de matemática. Trata-se de degustar com coisas, estórias de vida, conceitos, ideias, invenções geométricas, quando são colocadas dentro de uma bolsa em um movimento inventivo, em tentativas de operar o desamparo. Percorremos, então, alguns trabalhos que inventam geometrias, utilizamos obras de artes e nos valem de manchetes como modos de possibilidades e de transfigurações de nosso olhar, nosso corpo. Flertamos também com uma geografia dos mapas, com as quais desestabilizamos colonialidades geométricas. Em meio a um Circuito de Afetos, os dados foram coletados por meio do desamparo frente a educações geométricas e colocados em nossa bolsa de ficção. Entre visualidades, descrystalizações e produções de mapas, inventamos (sempre em um rascunho), uma geometria bolseira que se coloca como possibilidade de habitar práticas profissionais de educadores matemáticos, desde a Educação Infantil até os cursos de Pós-Graduação. Assim, uma geometria como bolsa de ficção acontece em uma possibilidade de escolas outras, tendo o desamparo constitutivo de um projeto político.

Palavras-chave: Circuito dos afetos, Descrystalizar, Visualidades, Bolsa de ficção

1 PREAMBLE

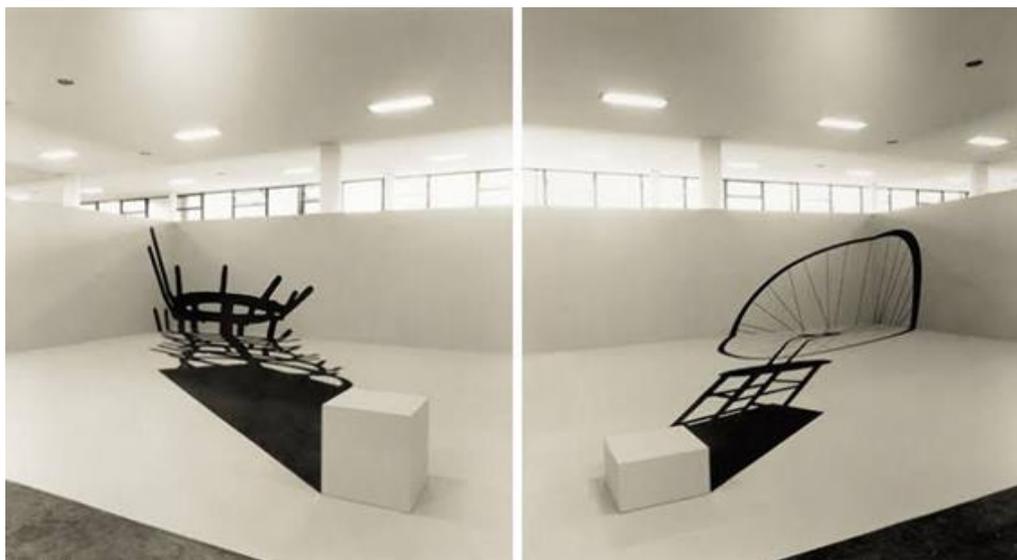


Figure 1: In absentia (Silveira, 1983)

If, on the one hand, Plato said the famous phrase: “Let no one ignorant of geometry enter here!” Dieudonné, in a reactive and institutionalizing movement of a way of thinking, proclaimed his famous: “Euclid must Go!”. Many of those who produced explanations and possibilities in geometric education movements engendered ideas, concepts and experiments between these two emblematic phrases. The power of geometric knowledge, both in visualizing worlds, specializing looks, building narratives, logic and axiomatics, in different adjectives, whether in Euclidean, hyperbolic, taxi geometries, among others, used some of the effects of these two phrases. In a punctual way: geometries enable constructions of humanities. Therefore, we must build possibilities to humanize our students in school contexts with geometries.

One temporality of these movements is that of expectation: I anticipate or distance myself from something that interests me; or I create a representation so that this something can be replicated or moved in another space, time, matter. Part of our lives takes place in this temporality of expectation, constitutive at school, in our view, by the verbs: explain something, teach something, learn something. This something could be a geometry. In this temporality, two affects that operate and offer possibilities for the production of lives are fear and hope. From Plato to Dieudonné, these verbs are structuring, and in many school contexts, they happen, reverberate and invent themselves in other guises. The modern school is the school of expectation, of projecting something “good” and avoiding something “bad”.

Well, in this fable we break the temporality of the expectation that rested on a supposed development of geometric knowledge (from the simplest to the most sophisticated, from the concrete to the abstract), formerly on a supposed way of how to teach and learn this knowledge (in pedagogical sequences, explorations, manipulations, visualizations, intuitions, interesting didactic activities). Colonial ideas such as improvement, development and progress, instituted in a modern school project (by the way, a project of coloniality), sustain this school that happens in our days. Faced with this and with this school, we fabled a geometry as a carrier bag of fiction: with traces of other geometries; in a time logic and non-linear writing; taking the abyss of helplessness as a possibility. Art and headlines are stuff placed inside our bag of geometric fiction. It is not about a search for explanations and possibilities of already institutionalized geometries for teacher training or for the mathematics classroom, but about tasting with things, life stories, concepts, ideas, geometric inventions, when they are placed inside a bag in an inventive movement, in attempts to operate the helplessness.

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| <p>Journal of helplessness Since 1856-A newspaper in contingencies Columnists: Claudia Flores and Monica Kerscher Someday, 2019, No. 4032 - www.jounalhelplessness.br</p> |  |
| <p>Let's go through the encounters and bring movements: they are fragments of things that break through the middle and make something emerge that forces our thought to think again, and again, to transform itself. Thus, something makes you think, drives you to think. Thinking with shapes, with colors, with textures, with the senses, with mathematics, with art, <i>with</i>.</p> | |

Figure 2: Headline 1 (The Authors)

In this fable, we abandon the myth of the hero, which is established at school, in at least two ways: 1) methodological strategies in movements to enhance the processes of teaching and learning mathematics; 2) methodological strategies in movements to enhance the processes of teaching and learning mathematics as a possibility for political discussions, both from the point of view of government policy and from the point of view of the interests that organize social groups. We also abandoned the myth of the hero that is established with a supposed universality and importance of learning this universal geometric knowledge: Euclid; Hilbert; Dieudonné, Geometric Mathematics Educator, among others. Thus, stories are created not as heroes, but only as possibilities for life stories. They are not stories to learn something, but rather to taste and operate in contagions, reverberations, life experiences. With Le Guin, /.../ science fiction does not refer to the future nor is it tied to

prediction, but consists of a dive into contingency: "and if..."

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| <p>Journal of helplessness Since 1856-A newspaper in contingencies Someday, 2018. n. 4032 - www.jounalhelplessness.br</p> |  |
| <p>The mathematics of Euclides, Hilbert and Dieudonné constitute themselves in the temporality of expectation, that is, they invent a world to leave things as they are.</p> | |
| <p>Development, improvement, and progress (concepts very present in school) are invented in narratives of modernity, that is, narratives of a coloniality of ways of life.</p> | |

Figure 3: Headline 2 (The Authors)



Figure 4: A child's Möbius Strip in an experiment workshop (Kerscher and Flores, 2019)

2 THE CARRIER BAG THEORY OF FICTION

Ursula L. Le Guin (1929-2018), American writer of speculative fiction and current inspiration for several researchers of the so-called New Materialities movement (Donna Haraway, Anna Tsing, to name a few), invents herself in a short text, published in Portuguese, with the following title: The Carrier Bag Theory of Fiction. In this book, even with a preface and an afterword that produce other developments of the author, there is a movement to enmesh lives in different ways. With this entanglement, we invent a geometry or, to be more precise, we invent tracks and traces, effects and cracks, ideas and other times: developments and who knows possibilities of other schools.

Juliana Fausto (2021, p. 7), author of the chapter of the book, A Bolsa de Le Guin, states that “/.../ The Carrier Bag Theory of Fiction proposes the abandonment of the hero myth and its war structure in favor of of life stories, in which there may be conflict, but in which this is not the main element”. This would be a first stop of interest in our discussion,

because in disguised, explicit or camouflaged ways, the hero myth populates discussions in mathematics education. There are absences, problems, ills and failed narratives in schools. So we heroic mathematics educators present a solution to these dilemmas. Sometimes close to teachers and students, other times more distant, but always in a position of privilege, established in a heroic and salvationist narrative of the world. It is worth noting that most of the hero mathematics educators have a very specific plan of action: teaching and learning processes of colonial Eurocentric mathematics, in the production of potential for these processes to be implemented in schools. Racism, sexism, economic inequalities, hunger and food insecurity, climate crises, algorithmization/homogenization of human lives with and through mathematics, among other contemporary themes, are not part of the list of demands that the powers of the Mathematical Educator Superhero can solve. These, among other demands, are for math educators what kryptonite is for Superman.

The hero myth is instituted not only as content, but also as form (our discussion operates in this superficial binarity only as a didactic strategy, to offer a potential of our argument). Our congresses, our publications, our lives are very close to the idea of individuality as a production power: a speech for many to listen to; at congresses we have guests (few) to speak to the participants (many); the articles are nominated by two or three individuals, even though they use countless others to write their ideas and discussions. For a master's or doctoral student, finding one of his references at a conference is like a joy, a joy when meeting a hero: photos; stories, clicks for feedback on a hero-making and maintenance narrative. Of course, we also have, in congresses, spaces for the stories of heroes, which are camouflaged in reports of experiences.

An offshoot of this is a production of homogeneous narratives and logics and in a few details of the complexity of a classroom, a school, the school community and, at the end, of lives. If there are heroes, we have to follow them and replicate their powers in solving problems in our lives. The problems are the same and we poor mortals, at least sometimes, can be like a hero. On social networks, for example, when there is a post of a normal saying with a hero, a logic that operates is that this normal saying is also like a hero, at least in that photo. Together with the heroes, in processes of individualization and the homogenization of life's complexities, we have a mathematical content to be taught at school: the content to be taught to many children and adolescents. This reproduction has as its march and path movements of the affects of fear and hope (as we will discuss later).

But if at school, in those that happen, who knows on the margins, in the middle, above, below, inside, close by, that is, in this school that is instituted with a heap of bodies,

values and relationships, another narrative could be invented? What if this school was like a pot, a bag, a form/content in which things, stories, shares, imaginations, ideas, concepts could be placed inside? Fabular could be a verb to be used more, with its possibilities of relating humans and non-humans. Transfiguring could be another, in its possibilities of inventing other bodies. Imitation, theatricalization, life in a possibility of “as if...” could be a gamble. From the hero who saves amidst catastrophes, from the conflict as a center of production, from the hierarchy of bodies as a measurement that guides us, from the expectations to be sought by those who are on the margins. Also, the contents to be learned, the strategies that are used to teach, the logic of the content (singular) for many children and adolescents (plural). With Le Guin,

we have heard all about all the sticks and spears and swords, about the things to crush and jab and hit, the long hard things, but we haven't heard anything yet about the thing you put things in, about the container for the thing received. This is a new story. This is the novelty (Le Guin, 2021, p. 19)

A school as a carrier bag of fiction, and in this case, a geometry as a carrier bag of fiction, is constituted as a possibility in which the form/content of the school is transfigured, which implies, as an effect, a transfiguration of human and non-human relationalities. In the bag we put things and stories; there are always spaces, just as there is always a possibility of getting lost (or forget, not find) things and stories that are in the bag. The signification and materialization processes of putting things in the bag do not happen from one individual (the teacher) to many individuals (students). It is precisely against this concept of the individual (often taken as a reference by the concepts of human, straight, white, normal) that schools like carrier bags of fiction want to distance themselves. In collective speculative fictions of humans and non-humans, or terrestrials, as we prefer to invent ourselves, carrier bag schools are invented.

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| <p>Journal of helplessness Since 1856-A newspaper in contingencies Columnist: Thiago Pedro Pinto Someday, 2018, n. 4201 - www.jounalhelplessness.br</p> |  |
| <p>Mathematics, as fictional and as real as anything else, can serve us in countless ways, as a delight, as a social school practice, as a possibility to think about other things. However, it is important to point out that school mathematics is just another game, a set of games, and its importance in society and the choice of this or that to be taught in schools needs to be discussed.</p> | |

Figure 5: Headline 3 (The Authors)

Teaching and learning remain on the margins and belonging (not that of Eurocentric mathematics in which an object is contained in a set because it has or enjoys a certain

property) presents itself as a possibility. Belonging is seen as a potential for producing relationalities, in which a political project of carrier bag schools brings together traditions, ancestry, disciplinary abstractions, in ideas and contents (such as mathematics, geography, biology) only as possibilities. Belonging as a power of entanglement between terrestrials in problematizations and inventions of common spaces, to which one life perseveres as productions of other lives, common others, terrestrial others. Belonging as escape and self-invention (this “self” being a fiction of this movement).



A Lição, 2002. Madeira, vinil e pintura automotiva, 80 m2. Galeria Brito Cimino, Coleção Pinacoteca do Estado São Paulo, SP, Brasil
A Lição, 2002. Wood, vinyl and paint, 80 m2. Brito Cimino Gallery, Pinacoteca do Estado de São Paulo Collection, SP, Brasil

Figure 6: The lesson.
Source: Silveira, 2002

Carrier bag schools (always in plurals, in multiplicities, which are invented in times-spaces-materials in searches and escapes from themselves) of belonging are made with this modern school, of teaching and learning contents. In our case of mathematics, and more specifically, with geometries of contents, forms and abstractions, between Plato and Dieudonné. In the crevices, in the gaps, in lines of flight, with what happens as a power of transfiguration of bodies, logics and narratives. And also, in demarcations and productions of other (always provisional) relationalities, such as some that follow: terrestrial as an unfolding of humans and non-humans; carrier bags as an unfolding of teaching and learning processes (as well as conflict as a central focus); helplessness as an unfolding of fear and hope; belonging as an unfolding of teaching and learning. In these lines and folds, in these entanglements, carrier bag schools happen. Again, with Le Guin.

A book keeps words. Words keep things. They carry senses. A novel is an amulet holding things in a particular and powerful relationship with each other and with us. /.../ In the end, it is clear that the Hero does not look good in this bag. He needs a stage or a pedestal or a pinnacle. You put him in a bag and he looks like a rabbit, or a potato. That's why I like novels: instead of heroes, they have people in them (Le Guin, 2021, p. 22).

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| <p>Journal of helplessness Since 1856-A newspaper in contingencies Someday, 2019, nº 5019 - www.journalhelplessness.br</p> |  |
| <p>A narrative is to believe that studying, knowing and, finally, mastering a mathematics (a geometry), it would be possible to act politically and economically in the world that presents itself.</p> <p>Another narrative is to believe that studying, knowing and, finally, mastering mathematics in situations that involve criticality, applicability and projectivity from other perspectives, it would be possible to act politically and economically in the world that presents itself.</p> <p>An expectation reigns in both and with it the paralysis of bodies already captured, naturalized and institutionalized.</p> | |

Figure 7: Headline 4
 Source: The Authors

3 CIRCUIT OF AFFECTS: HELPLESSNESS AS A POSSIBILITY OF OTHER BODIES

In an article published in XX in the journal *Perspectivas da Educação Matemática*, we defend the argument that fear and hope, affects of the temporality of expectation, participate in the ways in which we build mathematics education, particularly in the training of mathematics teachers, in a way that makes it impossible to the production of difference.

A criticism that we will develop in this text is that these affections capture us and tend to leave things as they are, favoring a feedback of modes of existence and logic that enhance exclusion, both in the initial training of future mathematics teachers and in basic education, with elementary and high school students (XX). A gap in this essay/experiment with a geometry is precisely to provoke a possibility of mathematical education that are not constituted by bodies affected by fear and hope, affections governed by the temporality of expectation. We will try to sustain that the affect of helplessness can embody new mathematical education, even if, a priori, this statement can be constitutive of an announced failure. Thus, before a more specific fable with helplessness, in carrier bag inventions, we present some elements of this Circuit of Affections based on the work of Brazilian philosopher Vladimir Safatle.

In the book "The Circuit of affects: political bodies, helplessness and the end of the

individual", the philosopher Vladimir Safatle (2015) seeks to problematize how politics not only deals with the rules for the circulation of goods and merchandise, but also determines the forms of circulation of affections. Safatle seeks to argue that, far from a psychological irrationalism, it is possible to understand the rationality of the circulation of affections. When we are afraid of something happening, we fear that in the near (or distant) future something bad will happen to us. When we are hopeful that something will happen, we hope that at some future time something good will happen to us. Therefore, these two affects have the temporality of expectation. It is the expectation that something bad or good will happen. It is precisely because they belong to this temporality that they end up being immobilizing affects, which prevent us from putting ourselves into a movement of transformation. Because leaving this temporality would be losing the expectation of something (bad or good) happening.

Let us take an example from recent Brazilian cinematography. In *Provisional Measure*, director Lázaro Ramos presents us with a dystopian scenario of Brazil in the near future. The film begins with hope. Elenita, an elderly woman with *Melanina Acentuada*¹, is about to enter a bank to receive compensation from the state as a historical reparation for the process of enslavement of African peoples brought to Brazil. Elenita would be the first Accentuated Melanin person in the history of Brazil to receive such compensation. The scene takes place in front of a bank, with journalists taking pictures and filming Elenita's approach to the agency's revolving door. Everyone stopped in anticipation of the entrance. André, a character played by Seu Jorge, recounts the moment in a live broadcast on social networks, reinforcing the historical importance of this reparation to Brazilians from *Melanina Acentuada*. Everyone watches Elenita walk towards the revolving door. She tries to enter the bank, and the door sounds the alarm. She returns, places the metal belongings in the box so she can pass through the metal detector, and tries to enter again. Again the alarm sounds. The scene repeats itself until an official informs Elenita that she will no longer receive compensation, as the State has backed down. The expectation was then frustrated and, from this frustration, the plot of the film is entangled.

Economic compensation is replaced by Provisional Measure 188, edited by the newly created Ministry of Devolution. According to this measure, all people with Accentuated Melanin must be immediately returned to the African continent, as a form of reparation for the forced removal of their ancestors during the process of colonial slavery. This measure

¹ *Melanina acentuada* is an identity constructed in the film to designate a group of black humans or humans who have a skin color in a colorism closer to black skin.

is seen as an act of kindness and generosity by politicians and so-called white people.

If hope is the affection mobilized in the initial scene that keeps the characters in a certain immobility in the following scenes, immobility in the sense of not carrying out actions for an effective transformation of what happened, even because they seem not to believe in the events that result from this interdiction, fear arises when Provisional Measure 188 is announced and the capture of black bodies to be returned to Africa begins.

Focusing the analysis of fear on a specific character, Capitu, played by Taís Araújo, is a successful doctor, with *Melanina Accentuada*, married to Antônio, a lawyer, with *Melanina Accentuada*. After the announcement of Provisional Measure 188, she needs to return home, but with the persecution and capture of black people, she ends up running away and finding an afrobunker: a hiding place where other black people begin to reorganize their forms of resistance.

Fear paralyzes Capitu's actions, who, for a while, think only of returning to her husband. In addition, the fact that she recently found out that she is pregnant within this scenario of persecution, makes her constantly think about having an abortion. This expectation that only something bad can unfold from recent events makes Capitu inert, paralyzed. This inertia changes when a white man who infiltrates the afrobunker makes her publicly acknowledge that “we (blacks) do not need to be strong all the time, that we can recognize our weaknesses and frailties”. The strength of this speech of recognition of helplessness gives rise to another body, no longer melancholy by expectation, but a powerful black woman who decides to join her husband, to build her family, even in the face of the persecution scenario that is imposed. This trial scene is also a scene that de-individualizes the subjects, creating a collective political body that will help Capitu and reorganize forms of black resistance. Safatle, when proposing helplessness as an affection with the power to create new political bodies says: “Every political action is initially an action of collapse and only helpless people are able to act politically” (2015, p. 67).

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| <p>Journal of helplessness Since 1856-A newspaper in contingencies Columnists: Cláudia Flores and Monica Kerscher Someday, 2019, n° 403 - www.journalhelplessness.br</p> |  |
| <p>We came out of a paralysis - if one can think of it that way - of forms already given, taken as truths, already established, already organized to speak of a world and a reality, to explore and invent new meanings for thought, and transform up.</p> | |

Figure 8: Headline 3
Source: The Authors

To speak of fear as a political affection that individualizes bodies and immobilizes political action, Safatle refers to Thomas Hobbes' Leviathan. In this work, Hobbes creates the figure of the sovereign from an initial fiction: the war of all against all. According to Safatle, the figure of the Sovereign - who is represented in Hobbes's book as a giant king made up of small individuals - has the role of reminding the constant fear that, without the sovereign, the situation would be much worse, as we would be in a war against all other individuals. It is through fear that the Sovereign makes social transformation and the de-individualization of bodies impossible. It is as if he were saying: we have to remain in this political form, we have to support the (Sovereign) State, because without it there would only be chaos, war, everything would be much worse, there is no alternative.

It doesn't seem difficult to us to see that much of what is advocated in mathematics teaching discourses or even mathematics education operates in this same circuit. If we do not teach such content, the student will not learn that one. If we do not teach that, he will not get a job. If we do not learn this better, we will not form a better citizen. If we leave the School of Plato, the Mathematician's Garden, something much worse awaits us. It is no coincidence that the bodies of professors and students are increasingly melancholy, depressed, captured and governed by the affects of fear and hope that, unfortunately, seem to lack the capacity to produce new forms of existence, grammars of other affects.

On the other hand, helplessness, an affection that Safatle seeks in Freudian psychoanalysis, could be a form of non-melancholic implication. It would be the possibility of being affected in a temporality that is not that of expectation. Helplessness is not a demand for support or care. When assumed in its radicality, helplessness would be the "capacity to let to cause by what dispossesses the Other. In helplessness, I let myself be affected by something that moves me like a heteronomous force and that, at the same time, is profoundly devoid of place in the Other, something that abandons the Other" (SAFATLE, 2015, p. 40).

We ask ourselves, then, what it would be like to leave the temporality of expectation in (school) mathematics education. Would it be possible to practice a mathematical training based on helplessness? Outside of the logic that says, if we do not do this, then we will not have that? Out of the expectation of forming the mathematician? Or the math educator? Or the citizen? Would it be possible to abandon ourselves in the face of modernity? Would it be possible to practice mathematical education outside the logic of learning something, teaching something? Out of the logic of improvement? Would it be possible to disidentify ourselves with humanity and its thirst for dominion over nature, and become terrestrial?

Our non-linear endeavor, then, continues in an invention of a carrier bag geometry, having helplessness as an affection. Invention that started from the title of this essay. In the writing process of this essay, the affections and demands are constituted as potent in a transfiguration of our bodies. However, after all, as a possible failure. In between, perhaps there are the possibilities of entanglement of other grammars, other carrier bag geometries. We continue in our contagions with visualities and decrystallizations, to then invent a twist with the logics and narratives of map construction.

4 TRAVELING INVENTED GEOMETRIES: A CONTAGION WITH VISUALITIES AND DECRYSTALIZATIONS

The Research Group on Contemporary Studies (RGCS), a multidisciplinary group based at the Federal University of Santa Catarina, invents, over time, spaces, materials, in other fables that cover spaces and gaps between arts, mathematics, visualities, children, teachers, among other earthly relationships and feelings.

The concept of visualities appears as a power to transpose materialities and meanings, and, in this essay, we are interested in going through some of its adventures, in experiential workshops, invented by terrestrials who inhabit this research group. As Kerscher and Flores (p. 8, 2019) state: “We like the rips, the crumbs, tasting slowly, appreciating the smallest, the smallest, paying attention to the detail of what pulsates”. Go through crossings and taste ideas.

If, for a way of moving in mathematics education, we have works that seek to teach and learn mathematics through art, the works of RGCS are invented in another direction: to go through spaces, times, subjects with arts, mathematics, visualities. The entries that interest you. It is not about, from an institutionalized identity (mathematics or art), seeking learning from another. Not even operating under a regime of representation or replication of historically institutionalized knowledge. Perhaps, a movement of dizzying in whirls (Kerscher and Flores, 2019), a fluttering in questions (Wagner, Flores, 2020), a workshopping of *marthematics* experiences, as a linguistic-aesthetic-political twist. As in Kerscher and Flores (2021, p.27-28):

Learning Mathematics with Art thus leads us to envision a type of learning that occurs in between: between signs that affect the body, mind and thought. /.../ With the work of art, potency is increased, making possible the encounter with the world of signs. The act of deciphering signs can, therefore, arise in cutting, pasting, coloring, folding, looking, listening, and it is in the contingency of this encounter, the encounter with the

signs, through the unusual, and not through the representation or the always recognition of the same, which constitutes learning itself. (Flores and Kerscher, 2021, p.27-28)

Flores (2013) presents a demarcation for the concept of visuality, as a conjunction of discourses that form and inform how we see, allowing us to problematize the naturalized ways of looking at and representing things in the world. With this demarcation, we can enhance crossings with mathematics, arts and visualities. It is not a question of seeing relations between mathematics and art in a different way, but of suspending, putting in check, deconstructing movements and processes that institutionalize identities such as: mathematics, arts, geometries, perspectives, symmetries, among other ideas and/or concepts that are moved when we talk about these two invented activities.

Visuals and mathematics and arts (in infinite e,e,e,e,e...) can be stories to be placed in bags of geometric fictions. With the stories, characters, lives, relationships between terrestrials are also moved. In the experience workshops of the RGCS group there is a whole preparation to think about activities with art and mathematics, and that can operate as invitations for children and teachers. However, the invitations end when the preparation work comes to an end and an atelier workshop begins, a inventive possibility, a movement of glittering shards of underlined lines (Kerscher and Flores, 2019). In that, with that and from that, it is the affection of helplessness that takes over, because contingencies, especially with children, is a present movement and that occupies feelings, values, spaces, dreams, arts, mathematics, visualities. In the photo by Kerscher and Flores (2019), a contagion movement between arts, mathematics, visualities is possible: an inventive movement of a child, based on an idea of his invented Mobius Strip, hammered out with hands that touch each other between scissors, attentions, commitments, joys.



Figure 9: Möbius Strip
Source: Kerscher and Flores, 2019

With Wagner and Flores, to denaturalize, to disengage, to provoke thought, to disturb ideas, to cause discomfort, restlessness, to problematize. Propose thinking exercises. To invent, to give oneself in experience, to live. This is all in an attempt to get closer to the senses than to the meanings and explanations when we think about mathematics, mathematics in relation to art, above all, how this relationship happens and everything that happens along with it (2020, p. 17).

5 Between Carrier Bag Geometries, With Helplessness, With Visualities, With Mathematics, With Arts, With...

Another contagion in the crossings of a carrier bag geometry is with the idea of decrystallizing mathematics (geometries) characterized by Professor Thiago Pedro Pinto, from the Research Group History of Mathematics Education in Research (HMER), based at the Federal University of Mato Grosso do Sul. In a first demarcation, Thiago Pinto states: (2018, p. 347)

The crystallization /.../ may be related to ideas that become commonplace, speeches that compact and are disseminated without further questioning, until they become hard and practically impenetrable (unquestionable in our case), as, for example, , “there is only one mathematics, what changes is only the didactics”, “university mathematics is more sophisticated than basic education mathematics”, “flat Euclidean geometry is a body of common knowledge”, among many others that could enunciate here and that are easily heard in the academic and school context. (Pinto, 2018, p. 347)

Our ethics, defended conduct, is precisely to de-crystallize these discourses, that is, unpack them, understand and problematize how they are formed, proposing a panoramic vision for the theme: to go through the different uses, showing their similarities and differences.

This ethical-aesthetic-political movement in decrystallizing mathematics takes place in a way that flirts with a carrier bag geometry, in which different language games can be placed inside a carrier bag of fiction. The interesting thing is that, when admitting the possibility of a decrystallization of mathematics, an exercise of suspension, of putting in check and problematizing, it happens almost immediately, what matters, as an effect, when operating (and being operated on) by the affection of helplessness.

In an exercise to problematize the binary of fiction and reality as a power of other research in mathematics education, Pinto (2018a) invites us to produce, to entangle, to invent with a work by Magritte and another by Picasso, paintings that seem to us emblematic in their discussion.



Figura 01 – La trahison des images
Fonte: René Magritte (1929)

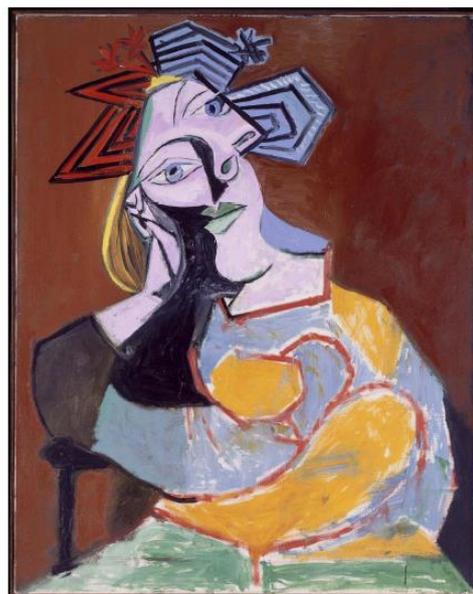


Figura 05: Mulher sentada apoiada sobre os cotovelos.
Fonte: Pablo Picasso (1939). Disponível na internet: < <http://www.dionisioarte.com.br/nossas-10-obras-favoritas-do-picasso/>>

Figure 10: On the right: The Treachery of Images. On the left: Woman sitting on her elbows
Source: Magritte, 1929; Picasso, 1939

When questioning himself about the contradiction between the figure of a pipe and the writing “this is not a pipe”, Pinto invites us to a range of possibilities of readings and productions with these works, of different language games that can be played in a different way. constitutive of a materiality and significance between terrestrials. On the other hand, (in this case on the right side of Magritte), Pinto invites us to problematize an emblematic

phrase by Picasso, in which he expresses a tension between a supposed fiction and another supposed reality: “I do not paint things as I see them, but as I think them”. There are other surroundings, labyrinths, abysses, depths of relationalities between seeing and thinking, as well as between looking at a picture of a pipe and reading the sentence “this is not a pipe”.

As an effect of these problematizations by Pinto, we place ourselves in keeping within a carrier bag geometry this movement of decrystallization, as suggestive and potent for constructions of carrier bag geometries of helplessness. Along with the concept of visualities, decrystallizing mathematics, painters' canvases, students' production processes of meanings, language games, among other ways of establishing entanglements between terrestrials in the day by day, it seems opportune to be contagious with these inventive productions.

In a work on Euclidean geometries established in two textbooks, Moreira and Pinto (2020) present us with a bibliographic therapy, being a movement analogous to philosophical therapy. The authors place two books on Euclidean geometry on a couch on which they go through the language games that make up these books, in a movement to look for similarities, differences. In the table below, prepared by the authors, it is possible to see the differences between the language games of the two books.

| REZENDE and QUEIROZ (2000) | | BARBOSA (2006) | |
|----------------------------|-----------------------------------------------------------------------------------------------------------|----------------|--------------------------------------------------------------------------------------------------------------|
| Postulates | Description | Axioms | Description |
| 1 | Given two distinct points, there is a unique straight line that contains them. (First Euclid's Postulate) | I_1 | Whatever the straight line, there are points that belong and points that do not belong to the straight line. |
| 2 | On any straight line, there are at least two distinct points. | I_2 | Given two distinct points, there is a unique straight line that contains them. (First Euclid's Postulate) |
| 3 | There are at least three distinct non-collinear points. | II_1 | Given three distinct points on a straight line, one and only one of them lies between the other two. |

Figure 11: (Moreira and Pinto, 2020, p. 10)

According to the authors,

./.../ our bibliographical therapy allowed us to show family resemblances between these games and a diversity of dissimilarities, allowing a more panoramic view of Plane Euclidean Geometry, or, as we prefer now, Plane Euclidean Geometries. Again, this does not mean that these geometries do not dialogue, on the contrary, family resemblances reinforce their similarities, however, we begin to see how apparently identical things keep their particularities and that these must be respected and, as far as possible, highlighted in the classroom. We went from Euclidean Plane Geometry to Euclidean Plane Geometry language games - each with its characteristics (2020, p. 16)

An exercise of decrystallization in a philosophical therapy in two books of flat Euclidean geometry pushes us towards the production of multiple Euclidean geometries, as the authors indicate. From the idea of a single, neutral, universal, fetishized mathematics that produces normalities and violence, it is possible to produce different and multiple language games, which obliges us to have a broad political discussion, together with terrestrials that are part of these spaces, times, common production materials. Why this school and not another? Why this geometry and not another?

Decrystallizing, in a movement close to that of unpacking, problematizing, going through different uses, highlighting similarities and differences, in productions of multiple panoramic views, presents itself as another verb to be operated in school contexts in a political, economic movement of the invention of an education carrier bag, operated by the affection of helplessness.

Between carrier bag geometries, with helplessness, with decrystallizations, with different language games, with arts, with...

6 DIVES IN CONTINGENCIES: MAPS AND OTHER GEOMETRIES

In a given space-time-matter, with the geographer Gerhard Kremer, better known as Gerhard Mercator, an idea of a world map is invented that is characterized as a way of visualizing the continents, the planet earth, in order to highlight the European continent as the center of the world. This production, marked by a Eurocentric view, uses projective mathematics that presents itself as neutral, while at the same time producing a colonialist narrative of the world.



Figure 12: World map - Mercator projection
Source: <https://www.bbc.com/portuguese/curiosidades-37864328>

On the map, Europe has a central position, located in the upper quadrants and, proportionally to the actual size of the continent, the European continent appears much larger than it “really” is. Not only the choice to place Europe in the upper quadrant, but also the size of the continent, crosses our cultural horizons in relation to dominance and hierarchies, such as: global north; a north is needed; first world countries and third world countries; developed and underdeveloped countries; the civilized and the savages. Not only Latin American countries, but also eastern countries are also invented on this map with the same arguments in relation to African countries. They are on the margins.

Our torsion with a school geometry, a point of attention is in relation to the visualization of geometric shapes, being, this, a recurrent theme of research and work in schools and universities. How to enhance ways of visualizing geometric ideas and objectives? How are these geometric constructions instituted in colonial logics of desires, customs and cultural horizons? Both the production of maps and the ways of viewing them do not occur in neutral ways, not even outside a political, ethical, philosophical and economic context. A mathematical educator's geometry, even one that is engaged in a movement to build critical and responsible humans with the world that happens to them, lacks a deconstruction of this school mathematics that flirts, even after centuries, with colonizing narratives such as those of Euclid, Hilbert and Dieudonné.

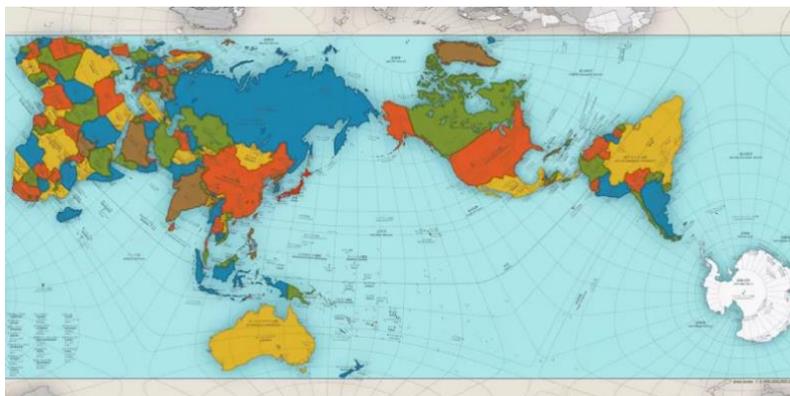


Figure 13: World Map - Projection by Hajime Narukawa
Source: <https://www.bbc.com/portuguese/curiosidades-37864328>

When we come across, for example, another map production structure, such as the one produced by the Japanese Hajime Narukawa, a first discomfort and strangeness is to identify the continents or even the countries on the map. Where is Europe? Where is Africa? Narukawa produces the maps respecting the proportions of the countries and the extensions

of the oceans. It is easy to see that the supposed global north is not established with its grandeur, centrality and importance, as in Mercator's map. Other narratives, logics and relationalities can be produced with this Marukawa map, and a geometry is constitutive of this process. This is not an evolution of the production of maps in a process of sophistication in terms of technological devices, placing colonial Eurocentric mathematics as neutral in this production. It is about decolonizing the geometries, mathematics, politics, power relations that are constituents of this movement. The imperialism of the countries that colonized the world still operates on our ways of life. An example of this is that, to this day, the world map naturalized in schools, as well as in our imagination, is the Mercator map.

The example of the maps provides us with an inventive possibility of creating other possibilities, in grammars of affections that circumscribe our relationalities. What would a world map, in geometric contours, of the devastation of Gaia look like? What would the scales of the maps look like if they were constituted by the use of non-renewable energy sources? What if, at school, geometric visualization was transfigured into an invention of other worlds?

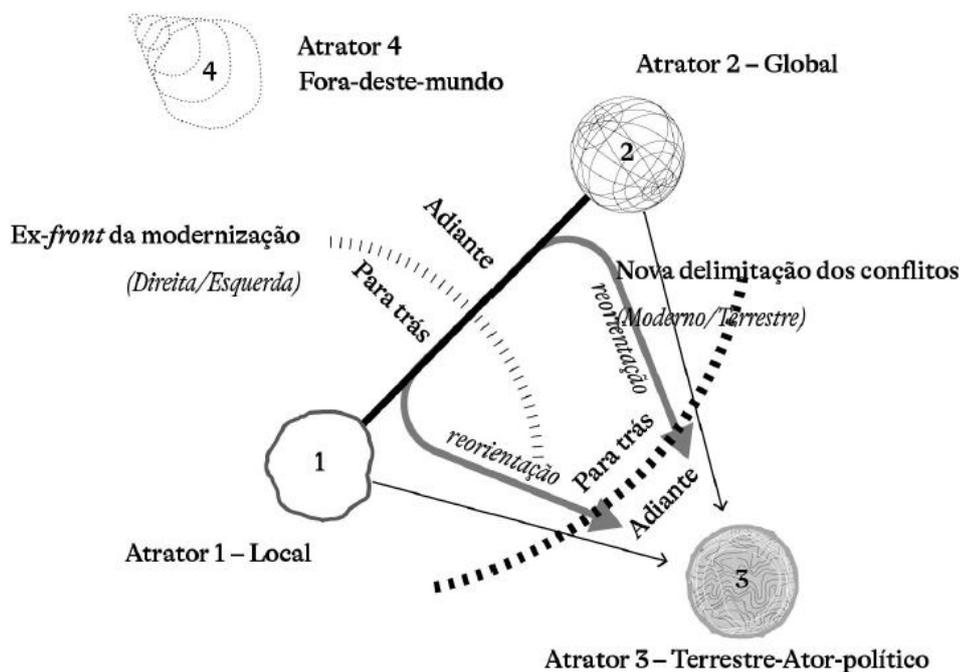


Figure 14: "A new game of alliances"
Source: Bruno Latour, 2020

What if we could look at the world not just as world maps try to represent it, with its geospatial locations, but look at the world, the Earth, as a political actor with which we also

need to dialogue to make decisions about our ways of life . In figure 14, taken from the book “Down to Earth: Politics in the New Climatic Regime”, by Bruno Latour, we see the attempt to present a new battlefield in the production of life forms. No longer the battle between the local (attractor 1) and the global (attractor 2) that takes place on the modernization front, but a battle between those who have realized the limits and flaws of the modernizing ideology, and now want to turn to the Terrestrial, for the possibility of building collectives of humans and non-humans aimed at forms of life that reduce the process of degradation of human and non-human living conditions on Earth.

It is worth mentioning that our narrative is not placed in a heroic structure of showing what must be done, to the detriment of what is done. This fable traverses, transfigures and destabilizes some possibilities, somehow captured, naturalized and institutionalized, in a mathematics education. Ultimately, our entanglement in a space-time-matter poses as our helplessness in the face of some possibility, which, in principle, has already failed. To write about a geometry of helplessness is to establish this impossibility. However, a life happens and with it some effects of a geometry of helplessness as well. In this inventive movement, we fable a disembodiment of one type of organization and embody another.

7 FOR A GEOMETRY AS A CARRIER BAG OF FICTION: HELPLESSNESS AS A POSSIBILITY

Fabing a geometry as a carrier bag of fiction with the affection of helplessness as a possibility is seen as an inventive movement in which there is no way to prepare for, not even in a modus operandi of engendering something a priori to be written and presented in an essay. A writing-invention process was a constitutive part of this movement. A carrier bag geometry takes place among and with the writings, images, headlines and work of fellow mathematics educators who have affected us.

Images and newspaper headlines appear between the paragraphs of our discussions. These crossings were intentional and constitute strategies for building our argument. A non-linear device in an essay that, in order to exist, requires linearity (a writing from top to bottom, from left to right)

A carrier bag geometry takes place in this essay from the title to our last bibliographical reference. However, it does not end and never closes, because in another direction (not opposite) the essay is placed in a movement of openings to new possibilities.

A political writing with helplessness requires this attitude. It is as if even before we start to affect ourselves with these ideas and imagine our discussions, a failure in terms of possibilities already inhabits our bodies. The disciplinary body that constitutes many geometric educations operated in school contexts is related to fixed identities, temporalities of expectation, hope and fear as more present affections.

A body that transfigures itself, transmuting itself into different textures, colors, smells and shapes, needs to be invented in carrier bag geometries.

Le Guin inspires us to move from the sword, from things to kill, from conflicts and heroes, to stories, life journeys, to things inside, to common everyday characters. Like Juliana Fausto, she calls our attention

.../ If someone is almost an accidental concatenation of a bunch of things coming together and becoming an entity for a period”, it is also necessary to respect the dignity of the stones, entities with histories and stories older than us and that will certainly last beyond us. What does the carrier bag of stars hold, after all? (Faust, 2021, p.15)

There is still a need to go through other spaces, times, subjects and to fable a geometry as a carrier bag of fiction of the stars. Who knows about the myths? What do you know about lullabies?

Among visualities, decrystallizations and map productions, we invented (always in a draft) a scholarship geometry that presents itself as a possibility to inhabit professional practices of math educators, from Kindergarten to Graduate courses. Fabulous fissuring and transfiguring our bodies has emerged as a movement of resistance and, at the same time, of existence. It is worth remembering the dystopia not far from Lázaro Ramos' film. “How did we let this happen?” is an emblematic speech by André, a character played by Seu Jorge.

Thus, and just as a comma of our essay, the insurgent Deputy Commander Galeano declares:

The Cat-Dog meowed barking: "We still do not know."
And then it barked meowing: "Those who call themselves social scientists should learn to say those five words."

REFERENCES

Flores, C. R. (2013). Visualidade e Visualização Matemática: Novas Fronteiras para a Educação Matemática. In: Flores, C. R & Cassiani, S (Eds.). Tendências contemporâneas nas pesquisas em Educação Matemática e Científica: sobre linguagens e práticas culturais. (Pages 91-104). Mercado de Letras.

- Flores, C. R. & Kescher, M. M. (2021). Sobre Aprender Matemática com a Arte, ou Matemática e Arte e Visualidade em Experiência na Escola. *Boletim de Educação Matemática. BOLEMA*, 35(1), p. 30-48. Recuperado de: <https://doi.org/10.1590/1980-4415v35n69a02>
- Kerscher, M M. & Flores, C. R. (2019). Ecos Abstratos))) Experiências sensibilizadas com matemática e com arte. *REVEMAT*, 14(1), p. 4457. Recuperado de: <https://doi.org/10.5007/1981-1322.2019.e61848>
- Latour, B., Vieira, M., & Costa, A. (2020). Onde aterrar?: Como se orientar politicamente no Antropoceno. *Bazar do Tempo*.
- Le Guin, U. (2021). *A teoria da bolsa de ficção*. n-1 edições.
- Magritte, R. *The Treachery of Images (La trahison des images)*. Oil on canvas. 63.5 x 93.98. Los Angeles County Museum of Art, United States.
- Moreira, P. G. S., Pinto, T. P. (2021). Jogos de Linguagem e Geometria Euclidiana Plana: Uma Terapia Wittgensteiniana. *REAMEC - Rede Amazônica de Educação em Ciências e Matemática*, 9(1). Recuperado de: <http://dx.doi.org/10.26571/reamec.v9i1.11143>
- Picasso, P. (1939) *Woman sitting on her elbows*. Museo Nacional Centro de Arte Reina Sofia. Spain.
- Pinto, T. P. (2018). Isto é (ou não é) um cachimbo? *ALEXANDRIA (UFSC)*, 11(3), p. 183-205. Recuperado de: <https://doi.org/10.5007/1982-5153.2018v11n3p183>
- Pinto, T. P. (2018). É preciso descrystalizar a Matemática. *PERSPECTIVAS DA EDUCAÇÃO MATEMÁTICA*, 11(3), p. 335-350.
- Safatle, V. (2015) *O Circuito dos Afetos: Corpos Políticos, desamparo e o fim do indivíduo*. Cosac Naify, 2015.
- Silveira, R. (1983) *In Absentia*. Látex sobre piso de cimento e painéis de madeira. 10 x 20 m. Bial de São Paulo, Brasil.
- Silveira, R. (2002) *A Lição*. Madeira, vinil e pintura automotiva. 80m². Brito Cimino Gallery Pinacoteca Collection of the State of São Paulo. SP, Brazil.
- XX Formação de Professores de Matemática e Circuito de Afetos: O desamparo como possibilidade para formações sem intenção de formar. *PERSPECTIVAS DA EDUCAÇÃO MATEMÁTICA*, 12 (3), p. 612-635. Recuperado de: <https://periodicos.ufms.br/index.php/pedmat/article/view/9617>
- Wagner, D. R. Flores, C. R. (2020). (Re)inventando a relação matemática e arte: exercícios de pensamento, exercícios de olhar. *REVEMAT*, 15(1), p. 01-19. Recuperado de: <https://doi.org/10.5007/1981-1322.2020.e67911>

NOTAS DA OBRA

TÍTULO DA OBRA

A Geometric As A Carrier Bag Of Fiction: The Helplessness As A Possibility

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Não se aplica

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Coleta de dados: J. Viola. J. Correa

Análise de dados: J. Viola. J. Correa

Discussão dos resultados: J. Viola. J. Correa

Revisão e aprovação: J. Viola. J. Correa

CONJUNTO DE DADOS DE PESQUISA

Todo o conjunto de dados que dá suporte aos resultados deste estudo foi publicado no próprio artigo.

FINANCIAMENTO

Não se aplica

CONSENTIMENTO DE USO DE IMAGEM

Não se aplica.

APROVAÇÃO DE COMITÊ DE ÉTICA EM PESQUISA

Não se aplica.

CONFLITO DE INTERESSES

Não se aplica.

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Universidade Federal de Santa Catarina. Grupo de Pesquisa em Epistemologia e Ensino de Matemática (GPEEM). Publicação no [Portal de Periódicos UFSC](#). As ideias expressadas neste artigo são de responsabilidade de seus autores, não representando, necessariamente, a opinião dos editores ou da universidade.

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Recebido em: 18-05-2023 – Aprovado em: 06-06-2023

