



## Teacher Creative Insubordination: potent for overcoming negative beliefs about mathematics

### Insubordinação Criativa Docente: potente para superação de crenças negativas sobre a matemática

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#### Abstract

From perspectives of Creative Insubordination, this article presents reflections on memories of mathematics classes in Basic Education that students with a Degree in Pedagogy narrated. The objective is to discuss overcoming negative beliefs in relation to mathematics to contribute to the initial training process of future teachers who will work in the early years of Elementary School. Data were produced and analyzed in qualitative research with a narrative design. The results showed that actions of Creative Insubordination and creativity are potent for mobilizing critical reflection on experiences lived with the school education of future teachers, which contributes to the discussion about their teacher training and professional development.

**Keywords:** Initial teacher training, Creative Insubordination, Creativity, Narratives.

#### Resumo

A partir de olhares do conceito de Insubordinação Criativa, este artigo apresenta reflexões sobre memórias de aulas de matemática na Educação Básica que foram narradas por estudantes de um curso de Licenciatura em Pedagogia. O objetivo é discutir a superação de crenças negativas em relação à matemática para contribuir no processo de formação inicial de futuros professores que irão atuar nos anos iniciais do Ensino Fundamental. Os dados foram produzidos e analisados em uma pesquisa qualitativa com desenho narrativo. Os resultados apontaram que ações de Insubordinação Criativa e criatividade são potentes para mobilização de reflexão crítica sobre experiências vividas com a educação escolar de futuros professores, o que contribui para a discussão sobre sua formação e desenvolvimento profissional docente.

**Palavras-chave:** Formação inicial de professores, Insubordinação Criativa, Criatividade, Narrativas.

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## Introduction

In the research discussion we present in this article, we associate creativity in Mathematics Education with the creative actions of teachers to subvert what is set or established for them; that is, we reflect on it from the perspective of Creative Insubordination (also called responsible subversion), as conceptualized by Brazilian researchers Beatriz D'Ambrosio and Celi Lopes (2014 and 2015).

Acts of creative insubordination are part of the teacher's identity when they promote actions to improve student learning and the conditions for it to occur (Lopes, D'Ambrosio & Corrêa, 2016). By positioning themselves this way, teachers choose to "exercise their profession in a dignified, responsible and committed way to improve human life" (D'Ambrosio & Lopes, 2015, p. 07). "If the teacher is subversively responsible, he/she will always choose to give voice and listen to the students, with an ethical attitude and committed to the full realization of this individual" (D'Ambrosio & Lopes (2014, p. 80). As teachers, to participate in developing a "future citizen capable of being creative to solve the problems of humanity, we have to resize the mathematics we work on in human formation" (D'Ambrosio & Lopes, 2015, p. 13).

In the perspective presented above, Creative Insubordination is a theme that underlies the studies and justifies the research we carry out at the Center for Studies and Research in Educational Technology and Mathematics Education (NEPESTEEM), a group linked to the Graduate Program in Education (PPGE) and the Graduate Program in Science, Mathematics and Technology Teaching (PPGECMT) of the State University of Santa Catarina (UDESC). As examples of these studies, we cite those that resulted in the dissertations of Girardi (2021) and Silva (2022) and in the writing of this article, in which we present the results of research that was carried out during the teaching internship experienced by the first two authors, under the guidance of the third author, in the doctoral course of the PPGE of UDESC. PPGE Normative No. 006/2020 (2020, p. 1) explains that the teaching internship is "an integral part of the postgraduate student's training, aiming at preparing for teaching and qualifying undergraduate teaching."

The research participants were academics from a mathematics discipline of the Pedagogy Degree course who shared their memories of school time and discussed what actions of Creative Insubordination can be taken to face and overcome negative beliefs concerning mathematics. The data were produced in two meetings during the classes and later analyzed through the paradigmatic analysis of narratives (Bolívar, 2002).

Our objective was to develop, together with the participants, insubordinate and creative strategies to overcome negative beliefs related to mathematics. Having as a general theme the initial training of teachers who teach mathematics, the research is justified by the importance of such debate in the field of Mathematics Education.

We start the article with an introduction to the main themes, move on to the presentation of the research methods and practice, and then share the conclusions we have

drawn based on our interpretations of the research data. We conclude with final considerations about our trajectory in this research and how achieving the objective can contribute to Mathematics Education studies on Creative Insubordination.

## **Creative insubordination in the face of negative beliefs about mathematics and its role in initial education in Pedagogy**

Initial teacher education is an essential topic of debate in Education and Mathematics Education from different perspectives among teachers, researchers, policymakers, and managers. Imbernón (2011) states that

Initial training is crucial since the set of attitudes, values, and functions that students of initial training give to the profession will undergo a series of changes and transformations in line with the socializing process that occurs in this initial training. It is there that certain habits are generated that will affect the exercise of the profession (Imbernón, 2011, p. 57).

The association that Imbernón makes between the habits created in the teacher training course and the exercise of the profession is related to Nóvoa's (2009, p. 38) speech when he discusses the issue and makes us reflect that "we teach what we are and that, in what we are, much of what we teach is found," showing how the personal and professional dimensions are interconnected and that acts of self-reflection and self-analysis are structuring axes of the process of constitution of the teaching identity. In a discussion within the scope of Mathematics Education, D' Ambrosio (2015, p. 02) warns that education's goal is "to support, encourage and create opportunities for all children, youth and adults to reach their human potential." We understand, therefore, that due to its objectives and scope, teacher training (both initial and continuing) is a process with a substantial impact on society.

Among the possibilities of discussion about how what we teach relates to what we are in the exercise of our teaching profession and how this impacts students' lives, we chose to start from the study in the field of Mathematics Education in which Nacarato, Mengali, and Passos (2019) discuss the relationship between the way teachers act in the classroom and the experiences they have had in their student life. Two conclusions presented in this study were very relevant when we discussed, in our research group, the initial training in Pedagogy courses of teachers who teach mathematics: first, that, not infrequently, academics "bring deep marks of negative feelings concerning this discipline [mathematics], which often imply blockages to learning and teaching" (Nacarato, Mengali & Passos, 2019, p. 21); second, that "the students' experience of teaching in the classroom is essential for them" (Nacarato, Mengali & Passos, 2019, p. 21). 21); second, that "professional teacher training begins from the first years of schooling" (Nacarato, Mengali & Passos, 2019, p. 20), that is, from when teachers were still students in Basic Education.

The reflections provoked by Nóvoa (2009), Imbernón (2011), and Nacarato, Mengali, and Passos (2019) had a lot of strength in the trajectory of the research we present here. They were essential for the choice of a research design that moved us around the desire to promote

a discussion about Creative Insubordination (D'Ambrosio & Lopes, 2014, 2015; D'Ambrosio, 2015) that would reveal meanings of teacher creativity as a power to overcome negative beliefs about mathematics, those that, once present in initial teacher education in Pedagogy, can create blockages in the construction of knowledge about the teaching profession and teaching.

When talking about the challenges of the 21st century, D'Ambrosio (1993) emphasized that teacher training should contribute to and foster the constitution of teachers who take actions with a critical stance and with a sense of responsibility for the construction of students' mathematical knowledge, in a way away from the idea of what would be traditional teaching. On this, Oliveira and Alencar (2008, p. 297) positioned themselves by stating that "traditional teaching needs to change and become a creative teaching," characterized by situations in which "teachers use their creative potential in their classes, leading students to acquire strategies that allow them to deal with challenges and unforeseen events." This is because, according to them, "contemporaneity requires creative teachers" (Oliveira & Alencar, 2008, p. 297) who, "using creativity to energize their classes," are responsible for "contributing to the formation of these new citizens of contemporaneity" (Oliveira & Alencar, 2008, p. 304), also creative students.

Thus, we see that the statements made by D'Ambrosio (1993) almost three decades ago and by Oliveira and Alencar (2008) nearly fifteen years ago still say a lot about the challenges of the teaching profession and the school in the present times, when we have already advanced more than twenty years in the 21st century. That means that changes are still desired in the field of Education, particularly Mathematics Education.

In a more recent study, Rosa and Dantas (2020) consider it essential to invest in teacher training so that creativity actually occurs in schools. The authors share the following proposal that, according to our perception, responds to the challenges posed by D'Ambrosio (1993) and Oliveira and Alencar (2008): "One should first observe the attitude of the teacher, regarding his/her creativity in the classroom, as this is initially and empirically seen as fundamental for the creation of a favorable locus for the promotion of creativity" (Rosa & Dantas, 2020, p. 2).

We return to the concepts of Creative Insubordination because we believe that an insubordinate and creative pedagogical practice can contribute to the "act of being" of the student's creative potential in order to form critical citizens who are aware of their actions in the world, since creative insubordination can be considered as a process of "provoking creativity and the daring to think differently, to educate a generation of people who are capable of reinventing, and not becoming replicas of set and standardized models" (D'Ambrosio & Lopes, 2014, p. 57).

In an article published by Barbosa (2021), it is presented an interview that was conducted with Professor Celi Lopes, who says: "Creative insubordination is a word that links two actions: you insubordinate yourself and you create. Moreover, you create to oppose

a rule because you have a clear objective, which is to generate a benefit to the other". (Barbosa, 2021, p. 77).

Creative insubordination aims at "breaking with the pre-established to create new work dynamics" (D'Ambrosio & Lopes, 2015, p. 13). However, as stated by Barbosa (2021, p. 84), "It is not enough just to insubordinate or take risks; it is necessary to be creative, ethical and responsible when promoting creatively insubordinate actions to ensure the learning or well-being of students, teachers, school community and research participants."

As creative insubordination challenges the established authority when this authority "opposes the good of the other, even if unintentional, through incoherent, excluding and/or discriminatory determinations" (D'Ambrosio & Lopes, 2014, p. 19), the action of creating, as said by Celi Lopes, is significantly related to the following consideration by Rosa and Dantas (2020, p. 06): "creativity will only exist if there is a movement of the creative potential so that the power ceases to be just a possibility and passes to the act of being." Moreover, according to Oliveira and Alencar (2008), through the creative attitudes of teachers, the classroom environment becomes an environment that enhances creativity.

The context in which we deal with Creative Insubordination is the initial training of pedagogues, that is, teachers who are in the process of training to teach mathematics in the early years of elementary school, in addition to early childhood education. Mathematics Education is concerned with establishing a debate on this topic because there are many challenges related to training in Pedagogy courses considering different issues. Among them, we chose to discuss, together with the research participants, insubordinate and creative strategies aimed at overcoming negative beliefs related to mathematics.

## **The Research: procedures and practice**

The research was carried out during the teaching internship period of the doctoral course in Education at UDESC experienced in 2022 by the first two authors, under the guidance of the third author. The theme of the investigation was teacher training, and the research field was the mathematics discipline of the Pedagogy Degree course, with the participation of twenty-two academics. Our objective was to develop, together with the research participants, insubordinate and creative strategies to overcome negative beliefs related to mathematics. We chose this objective because we believe it can broaden the debate on two points that we consider essential for Mathematics Education: the place of creativity in teacher education and how this education is affected by the negative beliefs of teachers in training in relation to mathematics.

The study had a qualitative approach (Sampieri, Collado & Lucio, 2013, p. 376), as "we seek to understand the participants' perspective [...] on the phenomena that surround them, to deepen their experiences, points of view, opinions, and meanings, that is, the way participants subjectively perceive their reality". The data were collected during the realization of a practice that developed in eight hours of class of the discipline, in two days, in the regular schedule, and the morning period. We used methodological procedures for the

constitution of written narratives, as we believe that they can be "taken as a training strategy, research and intervention practices, recognized through the potentialities in the personal and professional development of teachers" (Gatti, Barreto, André & Almeida, 2019, p. 195).

The study by Nacarato (2010) showed the power of self-writing for/in initial education in Pedagogy. According to the author, the situations experienced by students need to be problematized and reflected on at this stage of their professional constitution "since these undergraduates will teach mathematics, which poses the challenge to the trainer to break with the beliefs and cultures of mathematics classes built throughout their student trajectories." (Nacarato, 2010, p. 906). Agreeing and inspired by Nacarato, Mengali, and Passos (2019) and Nacarato (2010), our research put into perspective the memories related to mathematics from the participants' school time. Nóvoa (2009, p. 40) emphasized that "the written record, both of personal experiences and professional practices, is essential for each one to acquire a greater awareness of their work and their identity as a teacher."

The data constituted were analyzed through the paradigmatic analysis of narratives, which "consists of looking for common themes or conceptual groupings in a set of narratives collected as baseline or field data" (Bolívar, 2002, p. 12). In the process of analyzing the narratives, we adopted the search for convergence in the statements that were related to the research objective, that is, manifestations of negative memories about mathematics. Such statements were isolated from the textual corpus and organized into categories - which we named "beliefs about mathematics" -which were later interpreted in the light of ideas about Creative Insubordination (D'Ambrosio, 2015; D'Ambrosio and Lopes, 2014, 2015) and about attitudes of creative teachers (Fleith, 2001).

Ethical issues in research were observed throughout the practice following the recommendations of good practice contained in the studies on Ethics and Research in Education of the National Association of Graduate Studies and Research in Education - ANPEd (Anped, 2019). All participants agreed to participate in the research and agreed to the disclosure of their data and results, expressing this by signing specific documents for this purpose that our research group kept.

### *The carried out practice*

In order to awaken the memories of the Pedagogy course students and to enable the recording of the narratives of these memories, we carried out a practice in the form of a focus group which, according to Sampieri, Collado, and Lucio (2013, p. 433), is a data production method that happens when "we gather a group of people and work with them concerning the concepts, experiences, emotions, beliefs, categories, events or themes that interest in the formulation of the research." In planning and carrying out this practice, we assume a role from the perspective of Creative Insubordination as education professionals, as characterized by D'Ambrósio and Lopes (2015):

An Education professional who seeks to form ethical and solidary students should not conceive teaching as the transmission of concepts already elaborated and constructed and should not limit his teaching practice only to previously determined objectives

without considering the context in which his student is inserted. In this way, teaching performance will depend on its sensitivity to perceive and respect the process of intellectual and emotional development of students (D'Ambrosio & Lopes, 2015, p. 04).

Inspired by D'Ambrosio and Lopes (2015), we organized the room differently than usual on the first day, arranging the chairs in a circle so that everyone could look at each other while talking and listening. We broke with a situation so common in Basic Education and also in Higher Education, which has the teacher at the front of the room, speaking to students lined up. To support the awakening of memories, we used colorful printed figures (size 15 cm X 21 cm) taken from free internet databases, which represented Basic Education situations and alluded to moments, spaces, people, and materials common in school. We arranged these figures on the floor, in the center of the room, on a colored blanket. We asked the students to observe them and choose to pick one that referred to their memories concerning mathematics. Once the choices were made, each student described the figure, justified their choice, and reported which memory(s) it related to. Once the narratives were made, we asked the participants to record on paper, through writing, which negative and positive memories about mathematics were awakened. Subsequently, these reports were read by those who produced them in the socialization of the focus group. As the academics reported their memories, we presented them with the concept of Creative Insubordination to mobilize a discussion that would awaken the proposition of other modes of teaching action, modes that broke with the prescriptive curriculum and that considered students and their knowledge at the center of the educational process.

As a result of this first day of focal group, we realized that negative memories were more present in the reports than positive ones. We also realized that some of the situations narrated individually aroused memories in common among all participants, generating moments of empathy and solidarity in the exchange of experiences.

At the end of the activities, we asked the students to organize themselves into groups to participate in the next meeting and choose a negative memory that had been narrated by one of the group members, and propose, together, a creative insubordinate strategy to overcome the situation, answering the following question: given these reported situations, how could you act in an insubordinate and creative way to provide these students (which in this case were you) with positive memories in relation to mathematics? We left the choice of the form of presentation free, exemplifying that they could narrate, stage, or use drawings.

On the second meeting day, we started with a moment of welcome for the students, welcoming them with a snack. In the center of the room, we placed objects that referred to the experiences at school: rugs, cushions, books, and games. As agreed in the previous meeting, the groups presented themselves as they chose, discussing negative memories concerning mathematics and proposing creative insubordinate strategies to overcome them, that is, showing other ways of acting different from those related to negative memories.

After the presentations, we asked the students to think of a word or term that expressed their perception of the activities carried out in the two focus group meetings as a

result of the discussions on memories related to mathematics, Creative Insubordination, criticality, creativity, and teacher training. For registration, we asked them to enter these words in an online application accessed by each person's cell phone. In an interactive online way, this application generated a word cloud that was projected on the board of the room for socialization and debate. In Figure 1, we present the movement carried out in the classroom, and in Figure 2, we highlight the word cloud built from the records made by academics.



Figure 1 - The carried out practice on the second day of the meeting  
Source: researchers' collection (2022).

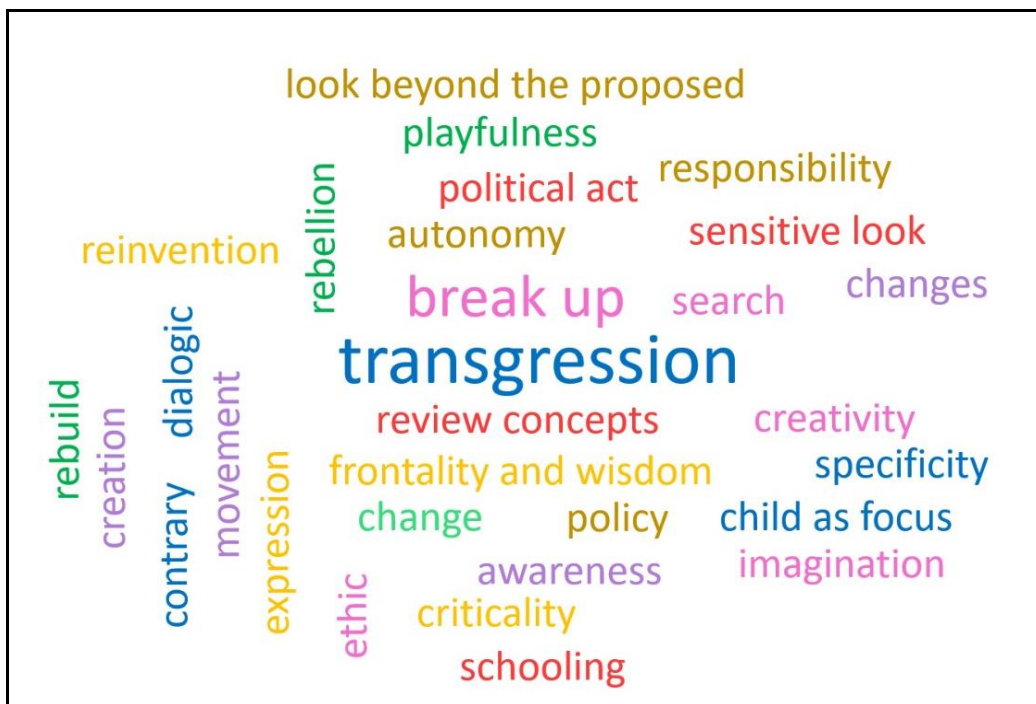


Figure 2 - Word cloud generated in the dialog about memories related to mathematics, creative insubordination, criticality, creativity, and teacher training.



From the word cloud, we realized which ideas the academics associated with Creative Insubordination, with "transgression" and "breaking" being the most cited. At the end of the focus group, such ideas were revealed as important for those teachers in training to overcome negative beliefs about mathematics in their professional development process as future educators.

In the next section, we present a discussion with the interpretation of the research results and presentation of insubordinate and creative strategies to overcome negative beliefs related to mathematics.

## Results and discussions

In analyzing the narratives constituted in the focus group, we realized that many participants had difficulties rescuing positive memories since most of the stories we heard and the records we read referred to negative memories. The few who narrated positive memories related them mainly to the practices of their teachers, which involved playful activities with concrete material and linked to everyday life. We exemplify with the narratives of academics E10 and E11:

The teachers often worked with golden material and playful activities (E10).

The pedagogical practices for teaching mathematics, such as cooking classes, were playful and fun. (E11).

The E14 academic also narrated a positive memory, highlighting the personal (fun) and professional (dedicated) profile of the math teacher and the attentive way he related to the students:

He (the teacher) was fun and dedicated. In addition to explaining to the class, he paid attention to those who had difficulties, which was my case." (E14):

He (the teacher) was fun and dedicated. In addition to explaining to the class, he paid attention to those who had difficulties, which was my case." (E14).

From the personal realities narrated by academics E10, E11, and E14, we interpret that the positive memories were related to the use of didactic and pedagogical playful resources for teaching mathematics and contextualization with reality through practice, as well as the affectivity manifested by the teacher.

As the objective of our research involved dealing with the creative and insubordinate confrontation of negative beliefs concerning mathematics, we focused our gaze on the narratives that showed rescues of negative memories. From the process of paradigmatic analysis of these narratives, carried out according to Bolívar (2002), three categories would emerge: (1) fear of mathematics/being evaluated in mathematics; (2) memorizing mathematics; (3) lack of teacher didactics. We call these categories "negative beliefs about mathematics."

At this point, it should be noted that our understanding of the meaning of belief was sought in Matos and Jardimino (2016): an opinion, an assent that, without proof or rational justification, informs us what a person thinks or acts in a given context, which may be, for example, an idea, an object or a situation.

Regarding the first category, "fear of mathematics/being evaluated in mathematics," we observed that the memories of the classes were related to the fear of making mistakes, the fear of obtaining undesirable grades, the rigor of the teacher in the classroom, and the difficulty of learning, as exemplified by the following excerpts:

In the 5th grade, I lived a hate relationship because I had a teacher who explained math in a way that I did not understand; I remember that year I was terrible and almost failed. (E3).

I always had difficulty counting, and most of the time, I was nervous to do tests and assignments. (E4).

My teacher was lovely but at the same time with a furious expression. (E5).

My math teachers were always strict and very traditional. I never liked mathematics and had difficulty, so I believe the teachers did not help with this." (E13).

I remember my despair because it was the first time I had "failed," and, added to the nervousness of this condition, I was very unconcentrated with the lack of silence in the class in progress. It was pretty unpleasant. (E17).

Regarding the second category, "memorizing mathematics," there are the students' narratives about situations in which they did not see meaning in the way mathematics was taught because they understood that it was a stimulus to the action of memorizing formulas and procedures and not to understand concepts. The reports of E2 and E7 exemplify these situations:

I did not understand the content and found it torturous to have to memorize it. (E2).

It made no sense for me to memorize formulas without foundation, without understanding why. (E7).

The third category, "lack of teacher didactics," refers to the situations narrated in which associations are shown between the teacher's action in teaching practice and the fact that the student does not like or understand mathematics. Below, extracts from the narratives of E3 and E7 exemplify this:

I had a teacher who explained mathematics in a way that I did not understand; I remember that year I was terrible and almost failed. (E3).

In the early years, ludic was not present. Thinking mathematics was in charge of books and notebooks. (E7).

As a result of the analysis of the categories, we perceive the existence of the following **negative beliefs concerning mathematics: mathematics arouses fear** (the fear of mathematics itself and the fear of being evaluated in mathematics); **memorizing is a**

**principle of learning mathematics** (understanding mathematics depends exclusively on the ability to memorize and apply formulas, rules, and procedures); **the mathematics teacher lacks didactics** (due to the lack of contextualization with reality and the lack of use of differentiated didactic and pedagogical resources).

Alternatives to overcome these negative beliefs, through Creative Insubordination, were proposed by the academics participating in the research when they presented, in the focus group, answers to the following question: "Given these reported situations, how could you act in an insubordinate and creative way to provide these students (which in this case were you) with positive memories concerning mathematics?". The fifteen proposed actions are presented in Table 01.

Table 01 - Insubordinate and creative action to overcome negative beliefs about mathematics

Negative beliefs concerning mathematics	Creative insubordinate actions suggested by Pedagogy undergraduates
<b>Mathematics awakens fear</b>	Go to class ready to listen to what students already know and explain my reasons (as a teacher) for loving math to awaken students' curiosity for the exciting and enjoyable things about math.
	Give students the power of choice to go spontaneously to the board and encourage all students to go. Solve the questions collectively by making everyone participate, validating students' prior knowledge.
	In order to know the background knowledge of each student, on the first day of class, organize the classroom in the form of a wheel, explain that the objective is to know better their relationship with mathematics, and share yours. Meanwhile, present some logical challenge games for the rest of the class to socialize and try to solve while attending to students individually.
	Use different evaluative means for students who feel terrible at math tests. Give preference to a private assessment, as the participation of other students at the time of the assessment may make some students feel uncomfortable. To do this, use another assessment method, always considering the student's emotional and psychological state.
	Think of a more welcoming and procedural evaluation process, without so much focus on the grade but on effective learning, trying to understand why so many students did poorly in the evaluation.
	Using different evaluative means, carrying out diagnostic and procedural evaluations is a continuous process that does not only evaluate a situation that will be summarized in a grade. Do not use the test as a punitive element.
<b>Memorizing is a principle of learning mathematics</b>	Raise problems and issues that are part of the students' daily lives, factual and concrete problems, enabling a better understanding and perception of the importance of mathematics for our daily lives.
	Reconcile students' background knowledge with the mandatory content of the subject, using various concrete objects and materials to understand the activities.
	Think about other didactic strategies.
<b>Mathematics teachers lack didactics</b>	Explain differently the content that raises more doubts.
	Use a collaborative proposal in groups, in which the teacher could be the mediator, attending to the doubts of the groups individually.
	Work collaboratively by helping students with their colleagues' questions.
	Have an attentive and sensitive look at the singularities of each child, creating different strategies that meet this. For example: increase the time for the student to copy the content from the blackboard; print sheets with the content so that those who have difficulty copying from the board have another option; present the content in a ludic way using different methods; use resources such as games, games; occupy different spaces in the school.

Make use of ludic games and activities that respect the particularity of each child.
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Source: elaborated by the authors (2022).

Following our analysis process, we associated the beliefs presented in Table 01 (and, consequently, the actions proposed by the Pedagogy undergraduates) with Fleith's (2001, p. 02) ideas about "creative teacher behavior" and D'Ambrosio's (2015, p. 07) discussions about Creative Insubordination actions. These associations are represented in Figures 3, 4, and 5, which show schemes where the colors and positions of the elements matter: in the square in the center are the beliefs (emerging categories in the paradigmatic analysis of the narratives); in the other squares, differentiated by colors, are the ideas of Fleith (2001) and D'Ambrosio (2015), and the semicircular areas bring together the ideas to their authors; the arrows show the relationships between the squares; in the circular crown, the indication of the references overlaps to represent the idea that CREATIVITY is a link between them and, therefore, between the narratives constituted in the research. Following each figure, we present an interpretation of its meanings.

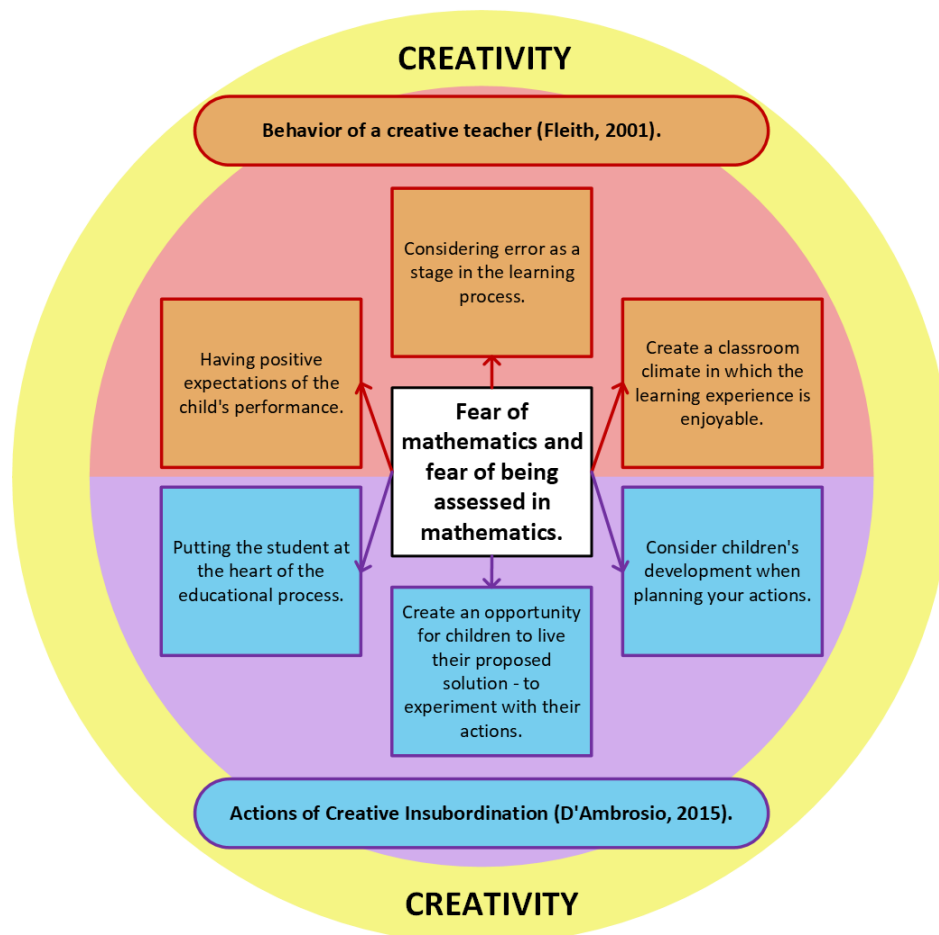


Figure 3 - Power of creativity for actions to cope with the negative beliefs of "fear of mathematics" and "fear of being evaluated in mathematics."

Source: elaborated by the authors (2022).

The confrontation and overcoming of students' negative memories, which lead to the constitution of beliefs linked to the fear of mathematics and the fear of being evaluated, can

be achieved with creative and insubordinate actions of teachers who are focused on the understanding that error and evaluation are parts of a process that depends on subjectivity. This means that making mistakes, getting it right, and being assessed are moments in a student's school life that are directly linked to their ways of being and being at school, as well as to the ways in which the teacher understands and acts in this particular and individual reality. Therefore, it is essential for the teacher to consider and adopt different didactic-pedagogical possibilities within a positive view of the evaluation process, both in terms of understanding that it is also a learning process and recognizing that the existence of error is an opportunity to get to know students better. It is also essential to make this vision clear to students so that they perceive themselves as agents of a process that is not punitive but instead focuses on learning mathematics while respecting individualities.

Such a vision and attitude of the teacher requires creative actions not only during the evaluation process but also in the moments that precede and follow it, including classroom activities based on experience, contextualization, individual development of each student, from a perspective that learning, teaching and evaluating mathematics can be pleasurable. This can be considered a creative action to overcome the different fears in relation to mathematics.

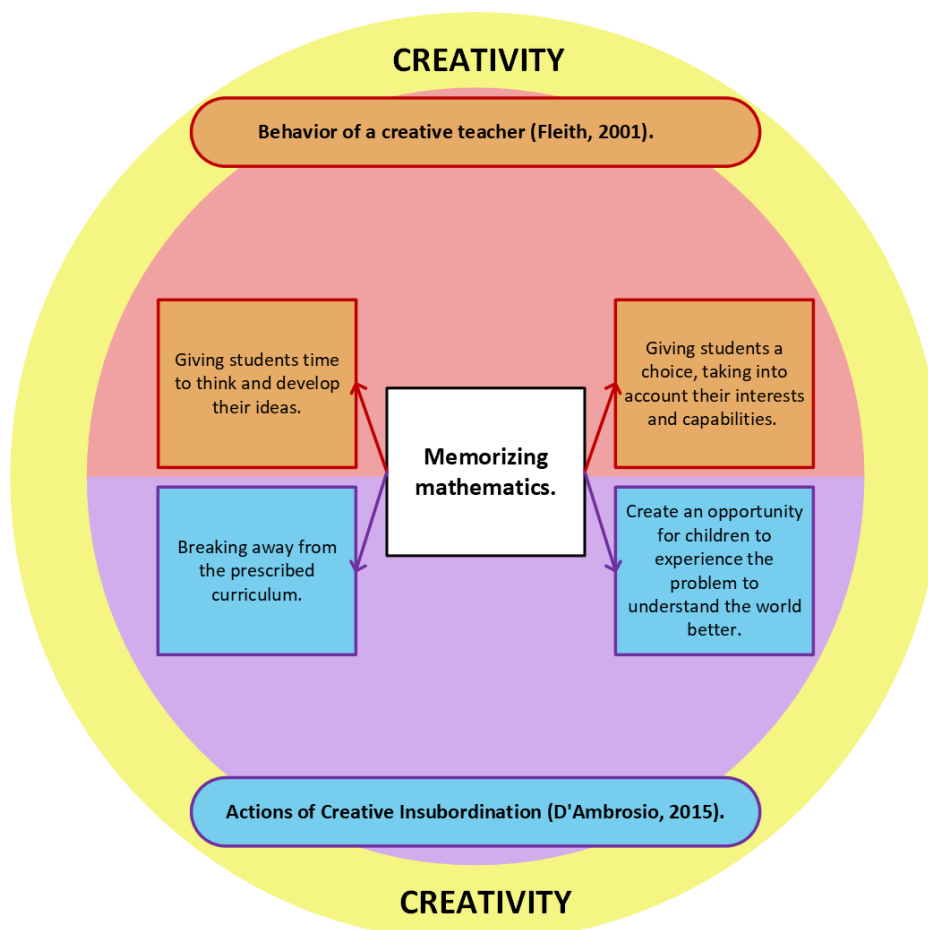


Figure 4 - Power of creativity for actions to address the negative belief "memorize mathematics"

Source: elaborated by the authors (2022).

There is a belief, therefore an idea based on common sense, that learning mathematics means memorizing mathematics. This belief becomes negative when students accept that their role in class is to memorize and not to engage in actions linked to mathematical thinking, i.e., understanding concepts, establishing relationships, and drawing conclusions. In overcoming this belief, the teacher assumes a creative and insubordinate position when he gives students time, space, and conditions for their learning to develop without even considering the idea of memorizing mathematics. Often, this implies breaking norms, curricula, and practices established both at the local level - the school context - and at the global level.

Getting away from rote learning also implies offering creative and personalized opportunities for students to choose how to experience reality to learn mathematics. The reading of the world for a critical understanding of what surrounds us depends to a large extent on the opportunities to access mathematical knowledge. Memorizing does not do the trick. Moreover, as teachers, we cannot accept that students say they do not know or want to know mathematics because they cannot memorize it.

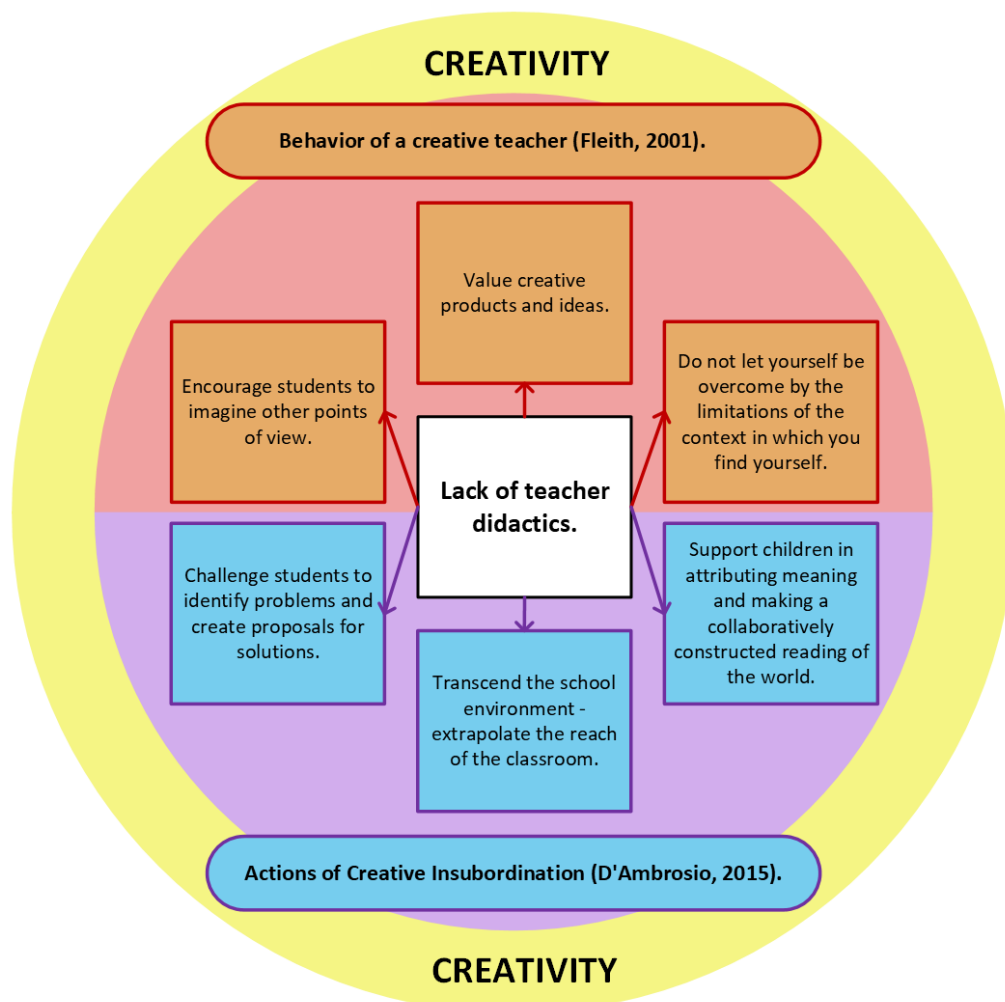


Figure 5 - Power of creativity for actions to address the negative belief of "lack of teacher didactics."

Source: elaborated by the authors (2022).

The "lack of teacher didactics" speech is used daily in different contexts to justify most negative memories regarding mathematics. Indeed, it has also become a belief in the school and academic environment. Overcoming this belief, starting from creativity is within reach of the teacher who teaches mathematics when he sees himself as the potential agent of actions that stimulate students' reasoning, which challenges them to solve problems creatively with a focus not only on classroom situations but also - and especially - outside it so that they can read the world critically with the collaboration of those around them.

These proposals can mean breaking away from what is usually called the traditional classroom, which is closely linked to the belief that the teacher who teaches mathematics lacks didactics and, therefore, people do not learn and do not like mathematics. The challenge for teachers in this context is circumventing their working conditions to put all this into practice. Creative insubordination is a powerful key that opens this door.

From the set of our interpretations on figures 3, 4, and 5, based on the empirical interlocution with the narratives of the Pedagogy undergraduate students and on the theoretical interlocution with Fleith (2001) and D'Ambrosio (2015), we believe that Creative Insubordination actions are essential to overcome negative beliefs concerning mathematics, and creativity is a force capable of making this possible.

Therefore, we conclude that creativity is powerful in making the actions of an insubordinately creative teacher, in addition to having their critical role in teaching focused on student learning, support both the overcoming of negative beliefs and the construction of positive beliefs concerning mathematics.

## **Final considerations**

After the research, we realized that narrating is not limited to the socialization of memories. By sharing their stories concerning mathematics, the participants (re)constructed understandings about what they lived, reflected on the present, and envisioned the future. In addition, by listening to the narratives of colleagues and the different positions within the focus group, they were able to analyze, raise questions, understand what happened, and think of strategies to face negative beliefs. In this way, by critically reflecting on their own and others' memories, they recognized different ways of teaching and learning and, in specific situations, realized the need to do it differently when performing their future profession in mathematics teaching. We realized how creativity and Creative Insubordination were crucial in thinking of new acting methods. As this was a situation linked to their initial training to exercise the function of teachers and pedagogues in the future, the (self) reflection on the memories of what was experienced in Basic Education will matter for the constitution of their teaching identities.

We believe that we had attitudes of Creative Insubordination in the act of research because we broke with the established by causing modifications in the planning of the undergraduate discipline with the insertion of the teaching internship, in the reorganization of time and classroom space, as well as promoting the debate of a sensitive theme for teacher

education, which is the discussion about how negative beliefs impact on the choice of a profession and its doings.

According to Nacarato, Mengali, and Passos (2019), these beliefs concerning mathematics are historically constructed, and it is in teacher training that these experiences can be discussed and transformed. The process of reflection on the facts experienced is essential to contribute to the training of academics since "it is important to stimulate, with future teachers and in the first years of professional practice, practices of self-training, moments that allow the construction of narratives about their own personal and professional life stories." (Nóvoa, 2009, p. 39). Therefore, we conclude that the use of narratives in spaces and moments of initial teacher education enables the construction of different perspectives on the profession, including those that are insubordinately creative, since "being subversively responsible professional stems from the professional identity constructed by each teacher" (Lopes, D'Ambrosio & Corrêa, 2016, p. 299). In the rupture of what is put to us by daily life, by beliefs, or even by the norms that govern a given context, we cannot forget that creative insubordination must be an attitude that goes beyond the action of going against: it is a posture of innovation, creativity, and responsibility.

Thus, we believe that the act of reflecting and rethinking negative memories will be fundamental for the professional development of all research participants, including our own, because we understand, from what was done, that the research contributed to the training of all the people involved: the academics, in their initial training process to teach mathematics in the initial years of elementary school (in addition to early childhood education), the doctoral students in their continuing education processes and the advisor/teacher of the discipline in her constitution as a teacher trainer of teachers who teach mathematics. We hope that, with creativity and insubordinately creative actions, we will be able to provide our students with positive memories concerning mathematics.

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