






# Alice's in Wonderland Creations: Math Teachers Research Ethnic-Racial Relations

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## Abstract

This article is part of a broader research project that addresses the relationship between the teaching of mathematics and art, both in teacher training and in schools. Drawing from the viewpoints of French philosopher Gilles Deleuze, the study frames learning as experiential and meaningful, characterized by transversal and unpredictable pathways. Additionally, it highlights art's role as a catalyst for meaningful signs. Lewis Carroll's book *Alice in Wonderland* was used to shake up the traditional and overly mathematical teacher training. To achieve this, mathematics educators, in both initial and continuous training, engaged in research to design workshops centered around themes related to logic and nonsense, the concept of time, the Industrial Revolution, the Victorian era, and ethnic-racial relations. This article focuses on the latter, that is, on issues related to racism, and for this purpose, the painting titled *Cam's redemption* was also incorporated into the study. The Experiment allowed linking the study of mathematics and logic with the paradoxes and racism that arose at the time Carroll wrote the book.

**Keywords:** logic, nonsense, ethnic-racial relations, Alice in Wonderland, learning as experience, art, mathematics



## **Criações com Alice no País das Maravilhas: Professoras de Matemática Pesquisam sobre Relações Étnico-Raciais**

### **Resumo**

Este artigo faz parte de uma pesquisa mais ampla que aborda relações entre educação matemática e arte tanto na formação do professor como na escola. O estudo se baseia em Experiências Formativas pautadas em perspectivas do filósofo francês Gilles Deleuze, entendendo a aprendizagem como experiência e sentido, transversal e imprevisível e a arte como um disparador de signos. O livro *Alice no País das Maravilhas*, de Lewis Carroll, foi utilizado para movimentar a formação tradicional e excessivamente matemática das professoras. Para tanto, professoras de matemática em formação inicial e continuada realizam pesquisas e propõem oficinas focalizando temáticas associadas à obra: lógica e nonsense, noção de tempo, revolução industrial, era vitoriana e relações étnico-raciais. O presente artigo se concentra nesta última, ou seja, em questões atinentes ao racismo e, para isso, também toma uma obra de arte, o quadro denominado *A redenção de Cam*. A Experiência permitiu vincular o estudo da matemática e da lógica com os paradoxos e o racismo emergente na época em que Carroll escreveu o livro.

**Palavras-chave:** lógica, nonsense, relações étnico-raciais, *Alice no País das Maravilhas*, aprendizagem como experiência, arte, matemática

## **Creaciones de Alicia en el País de las Maravillas: los Profesores de Matemáticas Investigan las Relaciones Étnico-Raciales**

### **Resumen**

Este artículo forma parte de un proyecto de investigación más amplio que aborda la relación entre la enseñanza de las matemáticas y el arte, tanto en la formación del profesorado como en la escuela. El estudio parte de Experiencias Formativas basadas en las perspectivas del filósofo francés Gilles Deleuze, entendiendo el aprendizaje como experiencia y significado, transversal e imprevisible, y el arte como desencadenante de signos. El libro *Alicia en el País de las Maravillas*, de Lewis Carroll, se utilizó para sacudir la formación tradicional y excesivamente matemática de los profesores. Para ello, los profesores de matemáticas en formación inicial y continua realizan investigaciones y proponen talleres centrados en temas asociados a la obra: la lógica y el sinsentido, la noción del tiempo, la revolución industrial, la época victoriana y las relaciones étnico-raciales. Este artículo se centra en estas últimas, es decir, en las cuestiones relacionadas con el racismo, y para ello toma también una obra de arte, el cuadro titulado *La redención de Cam*. El Experimento permitió vincular el estudio de las matemáticas y la lógica con las paradojas y el racismo que surgían en la época en que Carroll escribió el libro.

**Palabras clave:** lógica, sinsentido, relaciones étnico-raciales, *Alicia en el País de las Maravillas*, aprendizaje como experiencia, arte, matemáticas

## Introduction

This article is part of a broader project that addresses the relationship between education, science, mathematics and art in schools and in teacher training. The project is called *New approaches to Science and Mathematics at school: itineraries in Art Education*. We worked with Formative Experiences, which we also called workshops, as an alternative to content-based training, with the aim of encouraging something different in math classes and thus escaping repetition and lectures. The proposal is an alternative to traditional teaching, which is still dominant in mathematics classes, in which the teacher is at the center and the student is passive and peripheral, with the idea of learning through the transmission of knowledge prevailing (Oliveira, 2009).

Formative Experiences are associated, as an option or variation, with what is often called “teaching methodologies”. This is because this expression has an affinity with the technicist proposals of Brazilian education in the 1970s, in which, in the face of the wide-ranging education reform introduced shortly after the 1964 military coup, the disciplines of the pedagogical field are seen as techniques for teaching content (Tacon, 2010). The proposed training experiences escape the idea of a teaching methodology applied to content or the technique for transmitting it. The content-method dichotomy is not maintained and classes are developed, in this case, with experiences, the latter being understood as “what happens to us, what happens to us, what touches us. Not what happens, what happens, or what touches” (Larrosa, 2002, p. 21).

This article will look at practices carried out by teachers, the authors of the article and members of the project team which can create new learning opportunities, such as visits to museums, exhibitions, science and astronomy centers, contact with the visual arts, literature and other cultural productions. These experiences encourage teachers to offer the same types of experiences to their students. In teacher training, associating the study of mathematics with the arts is not only aimed at an attractive cultural approach, but also at questioning teaching based solely on the values of the exact sciences, whose thinking is demonstrative and objective. In this sense, Kessler (2002) points out, the *habitus* of the math teacher favors the rational, the quantifiable and what can be verified. On the other hand, it “devalues elements of the sensitive order, such as emotion, intuition and imagination.” (Kessler, 2002, p.6) We agree with Fisher (2008) that emotions and feelings - which seem alien to the activity of working with mathematics and impertinent to the exact sciences - are essential to a teacher's training and performance.

Our proposal does not consider art to be a solution or a superior domain. Instead, it believes that its presence in the educational context can favor practices that value creative actions that open up new ways of thinking. Art, included in the workshops, aims to liberate signs, to allow events to happen, since it makes it possible to experiment with other ways of being in the classroom. It is an attempt to free education from its structures of thought and action centered on hegemonic tendencies.

Among the Experiences developed in the research, this article will focus on the study of the book *Alice in Wonderland*, by Charles L. Dodgson (1832-1898), who taught mathematics at Oxford University and used the pseudonym Lewis Carroll to sign his literary works. This work

by Carroll was chosen because it explores a worldview of logic and nonsense, which is very relevant to the training of mathematics teachers, in which a philosophical education can be contemplated. In Alice we can make the principles and rules of classical logic explicit and also come into contact with non-logical and fantastic elements, which are nevertheless absolutely comprehensible (Vilela & Dorta, 2010). Carroll's work, in our work that has been carried out in initial and continuing teacher training, has been open to associations with transdisciplinarity, as we will see throughout the text, considering the context of the time in which the book was written. In this book, Carroll portrays Alice as a girl who, with the curiosity and strangeness typical of her age, questions the standards imposed by the society of her time.

In fact, Carroll's work gives us multiple perspectives, opening up some of its possible "layers" when approached, as mentioned in the brochure for the Santander Lighthouse exhibition (2022). In this sense, through an extensive literature review, the following themes were related: logic and *nonsense*, the notion of time, the industrial revolution, the Victorian era and ethnic-racial relations.

The notion of time takes us back to Deleuze's "Proust and the Signs" (1987) and we mentioned Eufrásio (2017) who discusses notions of time in Carroll's work. Researching the context of the time, based on Montoito and Garnica (2015), we outlined the proposal to study the History of Education, the Victorian Era and the English Industrial Revolution (Mendes, n.d.). Delving deeper into the latter topic, we saw a link between it and the issue of slavery, which culminated, just then, in the invention of the concept of race. We therefore included the ethno-racial perspective in our research.

The latter will be considered because of the topicality and relevance of ethnic-racial discussions in Brazil, since Law 10.639/03 makes it compulsory to study Afro-Brazilian and African history and culture in public and private schools. It is important to link the study of racism to the training of mathematics teachers, since this creates an opportunity to contemplate the discussion.

Considering the theoretical part of the aforementioned project, the emphasis of the Formative Experiences is centered on problematizing a hegemonic notion of learning as the acquisition of knowledge. In this research we have reached broader reflections, which understand that learning is not restricted to formal environments and, therefore, it would be reductionism to consider learning complex phenomena through traditional instruments that clearly "minimize this complexity" (Hernández. et al, 2020, p. 22). In order to expand our understanding of learning, we used the philosophy of Gilles Deleuze (1925-1995), who stated that "You never know how someone learns" (1987, p.10). Teacher training is therefore in dialog with Deleuzian concepts, such as learning in line with experiences and the aesthetics of affections, thus opening up new possibilities for analysis.

The aim is to experiment with the Deleuzian reference both to study Alice and also to be used as a theoretical basis by carrying out activities with teachers, both those in training and those working in the state education system. In line with this philosophy, we do what we intend to teach by carrying out activities and practicing mathematics, integrating it with other areas of knowledge in a creative way. At the end of the day, teaching is a fold of the fold, because it's

really about thinking and living, as opposed to transmitting content.

We'll start by introducing *Alice in Wonderland*, the book that sparked our thoughts. We will also discuss aspects of Deleuze's philosophy used to discuss the book, as well as the notion of learning. Then, looking at the context of the time in which the book was written, we will revisit one of the workshops created, which discusses the theory of eugenics and ethnic-racial relations. In view of this, we considered approaching the theme in math classes, starting from *Alice*, but also, towards an endless cycle, using another work of art, a painting entitled *The Redemption of Cam*, from 1895, by Modesto Brocos.

In the conclusion, we will point out to what extent the experience with *Alice* allowed us to move through mathematics and art in a rhizomatic, non-sequential and predictable way.

## Theoretical background

What kind of experiences can reading a book provoke in in-service teachers and undergraduate math students? How can we learn by including affectations, beyond the obvious, in the proposed workshops? Initially, we observed that the training experience straddles the boundaries of mathematics, philosophy, history and logic. The training experience, on these frontiers, encourages perplexity. Can paradoxes, ambiguities and contradictions exist? The students ask after we explain the logical aspects and the *nonsense* in the work. What makes sense and what is *nonsense*? How do we deal with their existence in a class?" says the teacher with surprise and amazement. What makes sense and what is *nonsense*?

The *nonsense* of Carroll's works was a driver of philosophical experimentation for Deleuze. In the prologue to the book *Logic of Meaning*, Deleuze (2015) states that "Lewis Carroll's privileged place comes from the fact that he makes the first great account, the first great staging of the paradoxes of meaning, sometimes collecting them, sometimes renewing them, sometimes inventing them, sometimes preparing them". In this work, "Alice provokes a rebellion against a rational vision of the world and the conventional grids of desire" (Farol Santander, 2022, p.86). According to Sanches (2022), Carroll allows us to understand that meaning has a necessary relationship with *nonsense*, to the point of *not* existing without it:

This is not a dialectical relationship, as if we only know what is absurd by opposition or comparison with what makes sense; it is a constitutive relationship, where nonsense is itself the driving force behind the production of meaning. Meaning is not there ready-made, waiting to be discovered; it must be produced and its creation lies in paradoxes. (Sanches, 2022, p. 81)

In *Wonderland* or *Alice Through the Looking Glass*, *nonsense* is not the absence of meaning, but the subversion of reason that allows meanings to be inverted and multiplied (Sanches, 2022). *Nonsense* is not the opposite of meaning, but rather "the negation of a non-sense" (Malheiros & Meira, 2023, p. 188). "Is it because absolutely nothing makes sense in this universe that we are then able to understand it better?" (Slobogin, 2015).

If one can speak of a logic in Deleuze, it would be, according to Souza (2018, p.150), "a generalized logic", it would be irrational logics, but "not illogical. The mistake would be to see a

continuity between logic and reason”. The author goes on to quote *Deleuze*, Lapoujade’s *aberrant movements*: “in Deleuze, irrational is not synonymous with illogical” (Souza, 2018, p. 150). In a kind of reworking of the three principles of classical logic (identity, non-contradiction and the excluded third), Deleuze subverts them by replacing the principle of identity with the principle of difference; non-contradiction with contradiction and the excluded third with inclusion, generating multiplicity. Faced with the principle of identity, we highlight the foundation and subordination of conjunctions to the verb to be, aspects denied by Deleuze and Guattari, quoted by Souza (2018, p. 154):

The consequence of the “principle” of difference is the refusal of predication (S is P), since it is the identity of the concept that makes predication possible: it is no longer possible to say that A is A, or that A is B. Deleuzian logic dethrones the verb to be in order to “establish a logic of And, to reverse ontology, to dismiss the foundation, to annul end and beginning”.

To reject the principle of identity is to move away from the foundation, the fixity, the first cause and, therefore, to admit the return to infinity, the movement, the “collapse” (Souza, 2018, p.150). Without the foundation (root, origin), the model of the tree, of inflexible thinking, is replaced by the rhizome, an open, non-hierarchical system that explodes in all directions. Our proposal questions learning as the acquisition or appropriation of pre-defined content. Rather, we adhere to providing experiences, practicing mathematics from a transdisciplinary perspective, with curiosity and creativity. In such a way that strangeness generates life (Amaris-Ruidiaz & Miarka, 2021).

For Deleuze (1987), learning essentially refers to signs, in a personal, relational and temporally located and situated experience. A work of art - and, in the case of this research, the book *Alice* - can be worth more than a philosophical work when the signs it moves activate fields of intensity that are broader than the explicit meanings sought by philosophy. Learning signs corresponds to “living the experience from the inside” (Deleuze, 1987, p. 4).

In art, according to Favaretto (2010, p. 232), “experiments, propositions of all kinds, function as switches in perception, sensitivity and understanding; they function as a detour from what is known”. “A detour from the Eternal in order to learn the new” (Dias, 2012, p. 37). The unpredictability of art mobilizes thought and drives it towards the new. It is in this sense that the emphasis of formative experiences is on experience and creation, and not on content; it has as its reference that “to think is to experiment, to problematize, to find” (Kohan, 2002, p.127).

For Deleuze (1987), thought is not spontaneous and natural, but rather an unfolding of the violence promoted by concrete situations that drive us with determination. What violates us is richer than all the fruits of our good will or applied labor; and more important than thought is “that which makes us think” (Deleuze, 1987, p.30).

Inventive learning, according to Dias (2012, p. 32), is “open (...) because it can work by acting not by linear curricular rules, but by operating through the invention of what forces both the teacher and the student to think”. It is not predicting, but “being attentive to the unknown that knocks at the door” (Deleuze quoted by Dias, 2012, p. 37). Faced with the process of



teacher training, breaking out of stagnation “implies engaging in an experiment, taking risks, suffering tremors in certainty”, knowing that there are no guarantees (Rodrigues, 2010, p.255). Faced with the process of teacher training, we understand that breaking out of stagnation “implies engaging in an experience, taking risks, suffering tremors of certainty”, knowing that there are no guarantees of where we will end up (Rodrigues, 2010, p.255). We affirm, along with Dias (2012, p.33), that “opening up space and time to events as they happen” can produce involuntary thoughts, room for amazement and strangeness.

Opening up space and time to “lose time”. Lost time” (Deleuze, 1987, p. 17) refers to the time that has passed, but not only as “past time”, it is also the time that is lost, or even to be lost in time.

In opposition to the Platonic philosophy of transcendent truth, Deleuze (2015, p.1) states that *Alice* and *Through the Looking Glass* “deal with a very special category of things: events”. An event is characterized as *Kairós*, different from the incessant *chronos*, a time that has left linear time and opens up to experience; one that opens up to a unique experience and “making past and future coincide” Deleuze (2015, p.1). “The typical agitation of the capital world prevents us from memory, introspection, tranquillity and inner contact, distancing us from what the author means by experience.”

The Experience opened up the possibility of studying and experiencing different notions of time. Experiencing different notions of time is always the production of a collective, because difference is necessarily the result of a collective since it is the result of compositions of the forces that make up a given socio-cultural context; opening up to difference, says Dias (2012, p. 32), is “a constant exercise against practices of capturing life, which occur in everyday relationships”. They occur when we imprison a subject in a verb that acts by designating it, “the teacher is discouraged; the student is agitated...” getting out of this requires a certain boldness that can only be sustained in a collective. That’s why producing collectively is a working condition. Collective (...) as a process that creates a field of multiplicities, of possibilities” (Machado, 2012, p. 8). In the context of the collective, the notion of aesthetics that permeates the Formative Experience is clarified, an aesthetic that is not reduced to universal beauty, as stated by Bedore and Beccari (2017, p.492):

[...] but rather to what is felt to be beautiful at a given moment, which relates to our senses and knowledge of the world, generating satisfaction and pleasure, because they make us feel part of the world, with life, in a reciprocity, given that affectations do not occur unilaterally.

Our ethical stance also stems from our perspective inspired by philosophy as a practice of life as opposed to philosophy as a doctrine, as expressed in Vilela (2019). We practice in the classroom what we intend to teach, in an exercise of experiencing challenging, unprecedented situations, opening up to “thoughts of a kind not restricted to the “reasoning or calculating or arguing” (Larrosa, 2002, p.21). Learning is transversal, it occurs “in the most diverse ways” (Roos, 2004, p. 8, p. 10) and thus prevents a simple explanation.

Next, we present the research carried out by math teachers in training. In order to approach the subject of eugenics and ethnic-racial relations, we started with characteristics of the Victorian

era and Alice's physical appearances to get to what was then unknown to us.

## Carroll and the Victorian era: values at the dawn of the industrial age

Delving deeper into the context in which Carroll produced *Alice*, we will highlight aspects of the author's interlocation with the racist facets of the period. Alice questions the values and moral and social issues of the period in which the story takes place (Mendes, n.d.). At the time *Alice* was written, hypocrisy permeated many aspects of life and social organization, such as architecture and dress. The marriage model was geared towards interests and religion.

On the one hand, Alice questions the hierarchy and social organization of 1865 England, which had a rigid structure with perfectly demarcated places and movements, clear and well-defined laws. A puritanical society that is apparently well organized and functioning properly. But, paradoxically, the king, queen and representatives with titles of nobility, despite knowing the rules, don't obey them; they act arbitrarily and unpredictably: "Cut off his head!" shouts the queen over and over again. Alice, watching the Queen's cricket match, points out that they behave absurdly, perverting the game by ignoring or rewriting the rules as they please.

On the other hand, in her questions, she also expresses the prejudices common at the time, for example, the idealization of women, gender and race, as will be discussed below. Coelho (1991) carried out an analysis of this in which he quotes some very striking passages from the book:

What may seem like a gratuitous joke is, in essence, a lucid analysis of the exaggerations to which the dominant conventions were subjecting men. [...] In fact, in *Alice in Wonderland*, Carroll provides a lucid critique of the customs or misconceptions of the civilization of his time, especially the failings of the current education system. (Coelho, 1991, p. 127)

During Queen Victoria's 63-year reign (1837-1901), children were seen and raised as mini adults who had to follow laws and rules, the same as adults in terms of social behavior. The rules were also in relation to social class, rigid, hierarchical and unfair, to guarantee luxuries and ostentations by exploiting the working class. With no chance of social mobility, members of the lower classes had to work in industries. At that time, upper-class women had to "be sweet, fragile, ornamental and dependent, with no function except to inspire admiration and bear children" (Brown, quoted by Terres, 2021, p. 43). Strong women were ridiculed by society and stereotyped as aggressive and transgressive. Alice is reproduced according to the standards of the time, with her angelic, blonde and white-skinned appearance. Gardner (2013 cited by Terres, 2021) states that, in Victorian England, there was a tendency to idealize beauty and the virginal purity of girls; in literature, authors highlighted the beauty of virgin girls, as they were considered pure by society and religion. On the other hand, Alice is questioning and intelligent. Her questions throughout the narrative can generate astonishment, given her childlike spontaneity.

During the Victorian era, the United Kingdom evolved economically and scientifically. During this period, scientific explanations gained strength and placed the figure of man in a position of intellectuality in order to create a position of power for him to occupy to the



detriment of women. There was also the industrialization process, which required the population to migrate from the countryside to the city to work in the factories. This polarized the different roles of men and women in social organization, as well as the division of roles between the sexes: women are responsible for the home, raising children, while men can work, vote and study.

Prejudice against women was extreme and prejudice against black people also began at this time. Santos and Marques (2012) analyze prejudice as the judgment of one dominant or majority group over another, which results in various forms of disrespect, such as sexism, homophobia and racism. At the beginning of this century, there was great competition between industries in Europe, which, coupled with market saturation, the risk of bankruptcy and the search for profits, led to the need to expand capitalism to other countries. In the meantime, the need for low-cost raw materials and consumers resulted in the invasion and domination of regions on the African continent, since Africa was a country rich in raw materials. As such, it was exploited and dominated politically, culturally and economically:[...] European governments used military force to subjugate and exploit the populations of the African continent. The imposition of European culture took place simultaneously with the devaluation of local culture (Santos & Marques, 2012, p. 8).

In 1865, the period in which Carroll wrote *Alice*, the United Kingdom was determined to promote the abolition of slavery throughout the world as part of its foreign policy, starting by imposing an end to the transatlantic slave trade. But let's see: not for a humanitarian cause, but for a competitive struggle. The United Kingdom had banned the slave trade in its colonies in 1807 and was committed to suppressing the trade throughout the world. As a result of this determination, the international pressure to end the slave trade echoed the growing abolitionist movement in Brazil. Slavery in Brazil continued until 1888, when the Golden Law was passed, officially abolishing slavery throughout the country. However, a policy of cancellation led the freed slaves to be left without land, housing, work, education and survival options, plunging them into poverty and inferior jobs, with low or no pay.

To justify this situation of exploitation, racism intensified during this period, an ideology in which one race believes itself to be superior to another. The term "race" came to be used to refer to the divergent phenotypical characteristics of individuals, as well as to justify the cultural and political domination of one people over another (Santos & Marques, 2012). Racist manifestations multiplied in the 19th century with the expansion of capitalism in this period, the depreciation of the working class became a policy that was ideologically justified. We would point out that Africans became part of the working class at the same time as racism was established in this sphere. notes that there are no different biological races among human beings, but that this term is nevertheless used socially as a political category.

In social relations studies, it is very important to understand the concept of ethnicity. Santos and Marques (2012) note that ethnicity is a word of Greek origin and refers to a people or nation. For the authors, based on Cashmore (2000), ethnicity refers to a group that has characteristics and cultures in common, i.e. "an ethnic group is more than a gathering of people, people must be added to their historical and cultural belonging" (Santos & Marques, 2012, p. 4). In

addition, they point out that the term has come to be used to refer to peoples of nationalities and characteristics other than those of the colonizer, such as native peoples, blacks, among others. Below, we illustrate both the invention of racism and the inferiority associated with black people, as expressed in attempts, including scientific ones, to eliminate black people in order to improve the Brazilian population.

### **Ethnic-racial relations in Brazil: the theory of eugenics in *The Redemption of Cam* (1895)**

Figure 1. *The Redemption of Cam* (1895) - Modesto Brocos



Source: Photo reproduction by César Barreto. <<https://enciclopedia.itaucultural.org.br/obra3281/a-redencao-de-cam>>.

The painting in the picture above was executed in a period shortly after the abolition of slavery and the establishment of the Republic in the country. In this context, Brazil sought to modernize and demonstrate its supposed progress, using white Europe as a reference model. However, it should be noted that the Brazilian population at the time was very mixed. Taking white Europe as a model, the so-called scientific theories of whitening emerged in the 19th century, according to Roncolato (2018). A proposal to increase the white population consisted of gradually miscegenating the black and white population, including European immigrants, with the aim of changing the country's racial profile.

Francis Galton (1822-1911) developed the theory of eugenics for the transition from a predominantly black population to a white population, and coined the term in 1883 (Castañeda, 2003). Eugenics aimed to “improve” the race by controlling marriages. Moral aspects and socio-economic influences are evident in the conception and belief of this theory, which proved to be unfounded. In eugenics, we highlight biological determinism, i.e. the assumption that individuals were born ready to be brilliant or stupid, brilliant or mediocre, healthy or sick (Cowan, 1977 cited by Castañeda, 2003, p. 903). Galton created a program, considered scientific, to artificially improve the human race, adopting the wealthy population of England as a parameter. It involved regulating marriage with the aim of encouraging individuals he considered physically and mentally superior to choose partners with similar characteristics. The supposed superiority of one race over the other, and an implied racial prejudice, were made explicit.

The painting *A Redenção de Cam* is a visual representation of this eugenics thesis. Stepan (2006, p. 142 cited by Lotierzo, 2013, p. 27) considers the painting to be a “dramatic representation of the Brazilian fantasy of racial regeneration in the tropics through whitening”.

[...] *Cam's Redemption* is an unusual example of a public display of the “clandestine, illicit nature” of interracial relations; by inserting this image among sources that elucidate the construction of femininity in Victorian culture, the author concludes that “the mulattaroon performs as an iconic sign of miscegenation, whose signification summarizes otherwise unrepresentable, unspeakable acts”. This latter perspective, which seems to be made possible by a view based on the rational binary classification adopted in the United States (...). (Brody, 1998 as cited in Lotierzo, 2013, p. 28)

The title of the work - *The Redemption of Ham* - evokes the biblical myth of Noah's curse on his son Ham. According to the story, Noah fell asleep drunk on wine, and Cam mockingly exposed his father's nakedness to his brothers. As a result, Ham was the target of Noah's curse, which was addressed to Ham's son Canaan and all his descendants. This curse condemns all of Ham's descendants to be “servants of servants”. There are versions of this myth that depict Canaan and the descendants of Ham as black.

According to Lotierzo (2013), the widely disseminated biblical myth of Noah's curse has its context in the so-called Modern Age, a period in which European Christianity sought to justify the practice of enslaving people from the African continent under the aegis of Christianity.

Reading the picture, we see, from left to right, a black lady, barefoot on a dirt floor, raising her hands and eyes to the heavens in a gesture of thanks. Next to the black lady is a lighter-skinned woman holding her white baby on her lap. And there is a white man on her right. The three characters - grandmother, mother and baby - represent the three generations needed for Brazil to become a white country. The white man on the right, the woman's husband and the child's father, looks at the child with admiration. He, according to Roncolato (2018), is the link that allows the whitening of the descendants of the lady, who may be a slave, and thus her salvation. This refers to whiteness, that is, the different ways of perceiving the world that manifest the prerogative that being white is a privilege.

The biblical text about the *redemption of Ham* is a reinterpretation of the myth of Noah's

curse which, following the theories of the time, points out that the salvation - or “redemption” - of Ham’s descendants would take place through their extinction, through castration, sterilization and the effect of bleaching. According to Lotierzo (2017), the press of the period, in articles by renowned intellectuals such as Olavo Bilac and Coelho Neto, recurrently brought up the idea that death could be seen as a redemption for black people, implicitly suggesting their extinction, even through whitening. This would be a path towards emancipation, expressed in this violent way. Lotierzo (2017) also points out that Brocos (1852-1936), the author of the painting, a Brazilian-born Spaniard who became director of the National School of Fine Arts, uses a perverse mechanism by attributing a supposed voluntarism to black women, portraying them as active agents in the process of whitening, as if they were celebrating this possibility.

According to Lotierzo (2017), the prevalence of these perceptions and their implications represent one of the most obvious aspects of racism in Brazil, requiring urgent action to promote awareness and redress racial inequalities. Thus, promoting situations for anti-racist education, in order to value all ethnicities, respecting the diversities existing in the social body, to, in fact, democratize society.

## Ethnic-racial relations at school

These situations experienced during the period of colonialism still reflect the way society is constituted today. In this context, Bispo (2021) reminds us of the importance of discussing ethnic-racial issues with students as early as Kindergarten, because even in the 21st century there are still structural patterns reproduced by society as consequences of colonialism and imperialism. The author points out that Brazil is a society built on Eurocentric ideas. Thus, throughout history, conceptions have been established that point to the colonizers as heroes, while the native peoples and savage blacks are deprived of identities and, therefore, inferior to whites. Given this panorama, structural racism accompanies the entire history of the black and Afro-Brazilian population, among others, which leads to an experience saturated with marginalization and oppression.

Lewis Carroll’s novel is a children’s book with great educational potential. At the beginning of the story, Alice didn’t know herself as the same old Alice, with changes in size. We could say that she was going through an existential crisis and couldn’t see herself as a single being. In the midst of this situation, she began to wonder who she really was, and this led her to think of her friend Mabel. At that moment, as Silva and Tavares (2020) point out, she also expresses the negative view of the poor, who lived in “miserable little houses” and were deprived of material goods (toys): “I must be Mabel after all, and I’ll have to go and live in that miserable little house, with hardly any toys to play with, and oh, always so many lessons to study! No, I’ve made up my mind: if I’m Mabel, I’m staying down here! (Carroll, 2010, p. 21)”.

In addition, the authors Silva and Tavares (2020) write about authoritarianism and emancipation in the work entitled “Alice’s Innocence in the Antithesis between Authoritarianism and Emancipation”, in which they reflect on children’s books that are situated at extremes:

In some works, aimed at children, dreams, fantasy and nonsense are used to subvert the rational world of adults. In others, however, the reflection is on social issues - racism,

misogyny, class differences, etc. What we have is the production of an adult for a child in which the ideas of elders about what children should be and how they need to think are materialized. We have a binary system, whereby children's books sometimes draw the dream of childhood and sometimes emphasize the intention of formation (Silva & Tavares, 2020, p.34).

The authors also warn about the role of education in this context, when it shows children something ready-made and unchangeable: the *status quo*. Therefore, if the work is analyzed from an emancipatory perspective, it is possible to problematize the Eurocentric patterns present in *Alice* and develop a critical perspective in children.

To address racism in schools, Bispo (2021) uses the ideas of Munanga (2005), pointing out that racist attitudes are often consciously and unconsciously ingrained in society. To exemplify these ideas, the author discusses the decorative panels in schools and the use of textbooks, as these have little representation of black people and, when they do appear, they are in an inferior position. Furthermore, in schools, black culture is addressed briefly and pejoratively as opposed to the emphasis on Eurocentric culture: "The representation of the black population in the textbook is under the gaze of subalternity and inferiority. From this perspective, the policy of whitening was strengthened in society through the process of stigmatization and inferiorization of the 'other'" (Bispo, 2021, p. 103).

Bispo (2021) states that it is vital to develop this perception in students from an early age, because: "[...] it is in early childhood education that colonized behaviour is reproduced and propagated, excluding and making invisible peoples who were here and who arrived here, causing ethnic, cultural and religious diversity (Bispo, 2021, p. 99)".

The vast bibliography above opens up possibilities for further study on topics that have only been suggested, such as racial issues in Brazil at the time, the effects of Cam's redemption on our ethnic reflection, among others. To close the text, we present some of our theoretical framework.

## **Final considerations: structural racism in education school**

The book *Alice in Wonderland*, written in 1865 by a mathematician, is relevant because of the transdisciplinarity it makes possible and the logical-mathematical aspects it contains. The book is also valid for contemplating the limits of rationality, which are important in the training of mathematics teachers:

In the tension between the forces that favor the maintenance of a stable, fixed and identitarian way of life [or of a predictable and equal class] and a field of forces made up of sensitive reality, which keeps affecting our bodies, asking for irreversible changes in the current cartography. (Rodrigues, 2010, p. 247).

The objective of the Formative Experience in initial and continuing teacher training achieves creativity in collective work with workshops in which it was possible to move through mathematics and art in a rhizomatic way. The inventiveness, the art, the associations that manifest themselves in the research described yielded a different kind of engagement and



involvement, as they resonate beyond the time of the face-to-face meetings. As a teacher who has taken part in this and other workshops, I can say that the themes and experiences transcend the classroom and lead us to imagine, wander and formulate questions.

With this in mind, in this article we problematize teacher training in terms of cultural and specialized training within mathematics, which influences their view of mathematics, the classroom and the objectives of teaching. With Carroll's work as a trigger for meaning, the creation of workshops and the research that supported them allow us to reflect in depth. In this case, the issue of racism linked to the mathematics classroom, as seen in Brocos and *Cam's Redemption*, permeated by the theory of eugenics. A prejudiced and false theory, but one that displaces us from the conventional math class, taking us to "the unthought (or little thought) by inhabiting some territory of knowledge that is beyond its original domain" (Rodrigues, 2010, p. 247).

From Deleuze's philosophy, which underpins this investigation, we highlight the use of art in the above account: Carroll's literature and, within one of the workshops, Brocos' canvas, in a process of "unfolding" the cycle, regressing to infinity, of "indefinite proliferation" of meanings (Deleuze, 1987). It was possible to escape chronological time and be distracted from rationality, to imagine and make things happen in the encounters. In fact, admitting that "one never knows how a person learns" (Deleuze, 1987, p. 22), affects are not determinable and here we express a little of what happened to us in this experience:

You never know how a person learns; but in whatever way they learn, it is always through signs, wasting time, and not through the assimilation of objective content. (...) We never learn anything from the dictionaries that our teachers and parents lend us [...]. You never learn by doing as someone else, but by doing with someone else, who has no similarity to what you learn (Deleuze, 1987, p. 22).



## Final declarations

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