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DOSSIER

Ethnic-racial diversity, professional training and teaching work: asymmetries and symmetries at the present times

Diversidade étnico-racial, formação e trabalho docente: (as)simetrias do tempo presente

Diversidad étnico-racial, formación y trabajo de profesores: asimetrías/simetrías de la actualidad

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Abstract: The article aims to comprehend the relationships that professors in the Natural Science and Mathematics field establish among ethnic-racial diversity, professional training and work in the context of high schools of Acarape and Redenção, located in the Maciço de Baturité/CE. Methodologically, the qualitative approach investigation was used in the case study and developed through interviews with twelve teachers. The data set revealed possibilities of dialogue between the Education of ethnic-racial relations and the Natural Science and Mathematics field, which can contribute to the teachers to develop an emancipatory education, with a critical view of the professional training and their work in schools. The results also indicated the necessity to overcome issues related to prejudice and the different forms of discrimination, but also suggest possibilities. It is therefore of the utmost importance to favor an anti-racist pedagogy, the appreciation of the universe of traditional cultures and the fight against the various discriminatory practices.

Keywords: Professional training. Teaching work. Education of ethnic-racial relations. Natural Science and Mathematics.

Resumo: *O artigo busca compreender as relações que docentes das áreas de Ciências da Natureza e Matemática estabelecem entre diversidade étnico-racial, formação e trabalho no contexto de escolas de Ensino Médio de Acarape e Redenção, no Maciço de Baturité/CE. Metodologicamente, a investigação de abordagem qualitativa, utilizou-se do estudo de caso e desenvolveu-se por meio de entrevistas com doze docentes. O conjunto de dados revelou possibilidades de diálogo entre a Educação das Relações Étnico-Raciais e as áreas de Ciências da Natureza e Matemática, o que pode contribuir para que os docentes desenvolvam uma educação emancipatória, com visão crítica da própria formação e do seu trabalho nas escolas. Os resultados sinalizaram, ainda, a necessidade de superar questões ligadas ao preconceito e às diversas formas de discriminação, mas também sugerem possibilidades. Urge, portanto, o favorecimento de uma pedagogia antirracista, a valorização do universo das culturas tradicionais e o combate às diversas práticas discriminatórias.*

Palavras-chave: *Formação de professores. Trabalho docente. Educação das relações étnico-raciais. Ciências da Natureza e Matemática.*

Resumen: *El artículo busca comprender las relaciones que los docentes de las áreas de Ciencias Naturales y Matemáticas establecen entre la diversidad étnico-racial, la formación y el trabajo en el contexto de las escuelas secundarias de Acarape y Redenção, en el Maciço de Baturité/CE. Metodológicamente, la investigación de enfoque cualitativo utilizó el estudio de caso y se desarrolló a través de entrevistas con doce maestros. El conjunto de datos reveló posibilidades de diálogo entre la Educación de Relaciones Étnico-Raciales y las áreas de Ciencias Naturales y Matemáticas, lo que puede contribuir a que los docentes desarrollen una educación emancipadora, con una visión crítica de su propia formación y su trabajo en las*

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escuelas. Los resultados también señalaron la necesidad de superar los problemas relacionados con los prejuicios y las diversas formas de discriminación, pero también sugieren posibilidades. Por lo tanto, es urgente favorecer una pedagogía antirracista, la valorización del universo de las culturas tradicionales y la lucha contra las diversas prácticas discriminatorias.

Palabras clave: *Formación docente. Trabajo docente. Educación de las relaciones étnico-raciales. Ciencias Naturales y Matemáticas.*

Introduction

The training and the work of teachers inside the context of ethnic-racial diversity becomes an important issue to be discussed, considering the struggle for the democratization of the basic and higher public education in Brazil, considering the access, permanence and teaching excellence for everyone and social engagement in combating the various forms of discrimination and prejudice present in daily life.

More than one hundred and thirty years after the abolition of enslaved people in Brazil, the country still bears the marks of slavery, with the marginalization, inequalities and prejudice suffered by black people. Considering this context, the University for International Integration of the Afro-Brazilian Lusophony (Portuguese: *Universidade da Integração Internacional da Lusofonia Afro-Brasileira* - *UNILAB*) emerges as a possibility of expanding access to higher education, in a bold project to include African and Timorese students allied to the internalization of education, seeking to combat the historical deficit of minority social groups in the academic environment.

The institution was created by the Federal Government, under the administration of the President Luís Inácio Lula da Silva, in the context of the expansion of the federal public network of higher education through Law No. 12.289, of July 20, 2010, linked to the Ministry of Education (MEC), along the headquarters and forum in the city of Redenção, in the Baturité Massif/Ceará (BRASIL, 2010b). Currently, in addition to the Campus of Liberdade and Auroras in the city of Redenção, UNILAB has the Academic Unit of Palmares, in Acarape, also in the Baturité Massif and the Malês campus, in São Francisco do Conde, Bahia.

That important university assumes the dual mission of international integration and regional loco development, seeking the training of its students through "interdisciplinarity, interculturality and learning located in the working world with a view focused over the integrated domain of specific knowledge of these disciplinary fields to the field of teaching knowledge with their didactics and contents" (UNILAB, 2015, p. 32).

The presence of UNILAB in the Region of the Baturité Massif/CE has brought a new panorama in the field of education which is configured, especially in the cities of Acarape and Redenção, with the presence of African and Timorese students in urban spaces, as well as in schools through research, extension and initiation activities to teaching or pedagogical disciplines, such as supervised internship, didactics and educational practices. In that regard, the article seeks to understand the relationships that teachers in the areas of Nature Sciences

and Mathematics establish between ethnic-racial diversity, training and work in the context of High Schools of Acarape and Redenção High Schools, in the Baturité Massif/CE.

The methodology focused on the qualitative approach, using the case study, combining documentary analysis and interviews with twelve teachers from five state high schools, located in the cities of Acarape and Redenção, which also have the three UNILAB campuses in the Baturité Massif/CE.

The text is organized into three sections. At first, we take a theoretical approach to the central categories of the study. Second, we present the methodological path, the locus and the research subjects, as well as the instruments used for data collection. The third section presents the results and the discussion on the findings.

Ethnic-racial diversity, training and teaching work: theoretical approaches

The transformations undertaken by multilateral agencies in the world economy in the 1990s, with the globalization and valorization of the capital, have had such an effect and continue to influence Brazilian educational policies, which cannot be analyzed dissociated from socio political and economic issues. And so, new demands have emerged and continue to appear, which implies a new look at teacher training and work in schools, considering the diversities which can be found in those places.

Ethnic-racial diversity and Natural Sciences and Mathematics Teaching

The black people identity, in its various individual and collective manifestations, through african religiosity and ancestry present at the candomblé grounds and quilombos, in the fraternities and senzalas (slave quarters), “was ensured as a heritage of the education of Afro-Brazilians”, enabling “[...] the dynamism of the culture and the process of resistance of the various Afro-Brazilian communities” (BRASIL, 2006, p. 14).

That assertion dialogues with Santomé's understanding (2008, p. 19) by stating that: “If cultural diversity is a valuable legacy, school institutions have to collaborate to maintain it, and it is necessary to encompass this cultural plurality in the curriculum contents working in classes and schools”. The Political Pedagogical Project of schools is a viable alternative to contemplate cultural diversity as the central axis of the curriculum, seeking to counter the hegemonic thinking present in pedagogical proposals that reinforce prejudice and racism.

Since the slave-owning period, clandestinely or not, some people who were enslaved sought to fight against the conditions in which they were, planning and executing escape to the quilombos and rebellions. Later, between the end of the 19th and 20th centuries, black people organized into associations, published specific magazines and newspapers, denouncing the various forms of abuse they used to suffer. It should be emphasized that “along the path taken by the Brazilian Black Movement, education has always been treated as

an instrument of great value for promoting the demands of the black population and combating social and racial inequalities" (BRASIL, 2006, p. 17).

It is also important to highlight, in the struggle for education, the performance of the Brazilian Black Front (FNB), which inserted black people into politics and created literacy classrooms for black workers. The Black Experimental Theater (TEN) has developed a work that deserves attention, because it has revolutionized by offering several classes of literacy and by forming interpreters of the black race that come from the low classes and even more discriminated, such as: workers without qualification, people from the candomblé grounds, domestics employees and others (BRASIL, 2006).

During the 1970s and 1980s, a period marked by collective organization and intense mobilizations, the black organizations are brought back again. In 1995 about thirty thousand people held the Zumbi of Palmares March against Racism, in favor of Citizenship and Life, denouncing racism and prejudice faced by black people, leading the former President Fernando Henrique Cardoso to recognize "the existence of racial discrimination and racism, with the implementation by decree of the Interministerial Working Group – GTI, that would stimulate and formulate policies to value the black population" (SILVÉRIO, 2002, p. 227).

Dealing with the fight against racial discrimination in Brazil we highlight the participation of several organizations in the "III World Conference against Racism, Racial Discrimination, Xenophobia and Related Forms of Intolerance", held from August 31 to September 8, 2001, in Durban, South Africa. This conference "marks the recognition by the UN of the enslavement of black human beings and their consequences as a crime against humanity, which strengthens the struggle of these peoples for humanitarian reparation" (BRASIL, 2006, p. 18).

Brazilian government agencies were urged to "[...] position themselves in the face of international pressure on racial inequalities – which persist in the country belying the myth of racial democracy – creating a context and institutional spheres that allowed black movements to denounce and propose policies" (SANTOS, 2006, p. 17-18). As important results, we have the promulgation of Law No. 10.639/2003, which includes the theme Afro-Brazilian History and Culture in the curriculum of the Education Network (BRASIL, 2003); Opinion CNE/CP 003/2004 (BRASIL, 2004a) and Resolution CNE/CP 1/2004 (BRASIL, 2004b), establishing the National Curriculum Guidelines for the Education of Ethnic-Racial Relations and for the Afro-Brazilian and African History and Culture Teaching; the Guidelines and Actions for the Education of Ethnic-Racial Relations (BRASIL, 2006); Law No. 12.288 of July 20, 2010, establishing the Statute of Racial Equality (BRASIL, 2010a); Law No. 12.289 of July 20, 2010, which provides about the creation of the University for International Integration of Afro-Brazilian Lusophony (BRASIL, 2010b).

Such legal mechanisms propose a concern with the Education of Ethnic-Racial Relations and search to minimize the suffering and exclusion of the black person and that is a reality which was not only during the official period of slavery, but still persists today with the various forms of slave labor which is still found in our country. It should be emphasized that between what is written and lived there is a distancing which is not different with the issue of ethnic-racial diversity, on the other hand that aspect encourages us to make sure that

such legislation is not configured as a dead letter and this could be a factor that motivates us to fight for the implementation of affirmative action policies, for the guarantee of education training for the professionals, because most of those who exercise the teaching did not have contact with this theme in their initial and/or continuous formation.

The Humanities and Social Sciences have stood out for putting diversity issues at the focus of the debate. Asymmetrically, studies in smaller quantities are observed when it comes to the Nature Sciences and Mathematics. On the other hand, "biology, mathematics, physics and chemistry stand out as disciplines that, integrated, are capable of deconstructing knowledge that affirm differences as inferiority and that mark the natural condition of individuals and interethnic groups" (BRASIL, 2006, p. 194).

Verrangia (2014) draws attention to the fact that the teaching of nature sciences, in a contextualized way, can and should dialogue with issues related to the education of ethnic-racial relations, thus contributing to the fight against racism. Complementing the author's ideas, mathematics can also interface with ethnic-racial diversity, because "mathematics is part of culture and therefore should be learned in a context situated from the particular to the universal" (BRASIL, 2006, p. 194).

It is necessary to highlight the work with Ethnomathematics, which favors an approximation and valorization with different cultures which can contribute to an emancipatory education, providing teachers and students with a more harmonious and humanizing coexistence, a critical view of their own history, questioning the Eurocentric view that is deeply rooted in us. According to D' Ambrosio (2009, p. 46):

> The pedagogical proposal of ethnomathematics is to make mathematics something alive, dealing with real situations in time [now] and in space [here]. And, through criticism that has the power to question what is happening here and now. In doing so, we immerse ourselves in cultural roots and practice cultural dynamics.

Therefore there is the possibility of a symmetry between the education of ethnic-racial relations and the nature sciences and mathematics which both can favor a critical reading of the current moment from an overall view, resuming the history of the black people in Brazilian society, thus seeking to contribute to the combat of any form of discrimination.

Thus, it is important "[...] to remember that the teacher education process should be directed to all education professionals, ensuring that those ones linked to the exact sciences and nature do not depart from such a process" (BRASIL, 2006, p. 22).

The material proposed by MEC with Guidelines and Actions for Education of Ethnic-Racial Relations affirms the importance of the theme being worked on in training courses, understanding that the classrooms of basic education schools are spaces-times that can dialogue with the university with a view to teacher training.

Historically, the education and training of teachers, in particular, are marked by asymmetries, revealing the political, social and economic interests of each time. In Brazil, we are currently experiencing a context of uncertainty, marked by a wave of conservatism, stagnation and setbacks in educational policies, the advancement of the education market, the exploitation of teaching work from global capitalism, ideological patrols in schools and classrooms.

According to Pimenta (2018), international and market education organizations seek the formation of a practical technical teacher, that is, a mere executor of tasks planned by others, with practical training and (almost) absence of theory. Contrary to what is imposed by neoliberalism, the researcher wants to relate to the teachers considering them as reflexive critical intellectuals, researchers of their praxis and educational praxis in school contexts, which demands broad and solid knowledge of the social and political contexts that encompass teaching, committed to overcoming the inequalities present in school, education and society.

Behrens (2007) points out that, in relation to teacher education, the paradigms of education are conservative and innovative. The first is marked by capacity and training denominations. The second, paradigm of complexity, designates formation as initial, continuous or continued. It also highlights the professional development of teachers.

It is necessary to overcome the idea of training in which a professional "receives" and "passes" as a mere replicator/multiplier, because according to Lima (2001), the teacher-trainer needs to articulate: i) scientific knowledge with the knowledge worked in schools; ii) professional culture of teachers and teacher-pupils; iii) academic training and pedagogical practices of the cursists; iv) their expectations and the proposal for training; v) different realities between the education system and continuing education. According to Pimenta (2012, p. 25-26):

> [...] continuing education is not reduced to training or capacity and goes beyond the understanding of continuing education. From the valorization of research and practice in the teacher training process, it is proposed that it be configured as an initial and continuous training project articulated between the training bodies (university and schools).

In fact, training requires a mutual and collective process between trainers and participants, legitimizing itself as space-time for study, discussion and reflection. Thus, it is a continuous movement of comings and goings that must show itself individual and collective, with a view to the transformation of a reality common to the subjects (MARTINS, 2014). The option to highlight continuous training in this text is justified by the fact that the research was configured as a modality of continuous training for teachers of the participating schools.

Continuing education has had significant advances in recent years, such as: closer proximity to schools, criticism of verticalized formations, new action research processes, greater knowledge of reflective practice, institutional training projects, among others (IMBERNÓN, 2009).

Fusari and Franco (2005, p. 21) advocate continuing education in service, that is, "the one which occurs inside the school environment , having as a mediating element the dynamics of the school curriculum, that is, the pedagogical project in action". This time, they seek the strengthening of the political-pedagogical project through a formation that favors dialogue with educational work in the concreteness of the school in which the teachers work.

Thus, several studies and reflections have guided a new conception of formation, whose privileged locus is the school, taking the school institution and pedagogical practice as central elements of reflection and discussion. In this sense, Fusari (2002) presents three conceptions of continuous formation: i) in the daily life of the school, mediated by the work of pedagogical and/or area coordination, collectively constructed in dialogue with the Political Pedagogical Project; ii) outside the school, with courses, workshops, lectures; iii) training inside and outside the school.

It is expected that the teacher might feel able to reflect on the work done in the classroom and take concrete positions to overcome the problems emanating from the school life, since the training is not built by mere participation in courses, with the accumulation of certificates and techniques. The formative process develops from a permanent and critical reflection of the practices developed, which favors the understanding that the formation is a continuum process and life itself as a mediator of this process, which is configured as unfinished, essentially inconclusive, multifaceted and constantly changed (FREIRE, 2004).

The continuous reflection of pedagogical practices favors the identification of possible obstacles and points out ways to overcome. It is not an individual act, it is a collective practice in which teaching work in the school routine is analyzed and criticized by the various education professionals, with a view to a liberating teaching and learning process, which dialogues with theory and expands individual and collective knowledge.

Methodological path

Due to the complexity of the object of study, seeking to understand the possible articulations between teacher education and the education of ethnic-racial relations through the gaze of high school teachers in the areas of Nature Sciences and Mathematics of Acarape and Redenção, we opted for qualitative research through a Case Study.

Qualitative research is rich in the detailed description of the behaviors, which seek to be understood from the subjects themselves who are part of the investigation, considering the phenomenon in its complexity and in the natural context (BOGDAN; BIKLEN, 1994).

The own nature of the researched phenomenon, "burning and relevant political theme, ideologically and theoretically" (FRIGOTTO, 2010, p. 77) reveals the critical-dialectical nature of this study, which seeks to encompass the totality and contradictions of the investigated reality and the "praxis, that is, unity of theory and practice in the search for transformation and new synthesis in the plane of knowledge and in the plane of historical reality" (FRIGOTTO, 2010, p. 79).

The Case Study was considered an important methodological strategy due to favoring a deepening in relation to the investigated phenomenon, enabling the use of multiple sources of evidence, such as interviews and documentary sources. According to Yin (2005), in a case study, interviews are understood as the main source of evidence and documentary sources are important to add information as well as to elucidate evidence from other sources, such as the statements generated with the interviews.

Acarape and Redenção, locus of the research, added to eleven other cities around the Baturité Massif. According to Martins (2011, p. 21), this region "stands out in the hot semiarid region of Ceará for its mild climate, abundance of natural attractions such as flora, fauna, streams, waterfalls, mineral water sources, and one of the rare vestiges of Atlantic Forest existing in the northeastern countryside".

The three UNILAB campuses in Ceará – Liberdade, Auroras and Palmares – are located in the cities of Acarape and Redenção, which have five high schools, which are selected for the research, as they receive a greater number of UNILAB students for the development of Supervised Internship, projects and programs.

We established as a criterion of participation in the research, teachers who had at least five years of teaching in high school in the schools surveyed, which favored a total of twelve teachers, distributed as follows: four biology teachers, three physics teachers, two chemistry teachers and three mathematics teachers, eleven of them are temporary teachers and one of them is a permanent teacher. The participants of the research filled out a Free and Informed Consent Form, ensuring respect for privacy, the right to refuse their participation in the study at any time, assistance throughout the research, free access to all information and knowledge that there would be no economic value, to be received or paid, for such participation. In order to preserve the identity of the participants in this text, aliases were used, with the first three letters of the discipline in which they work and a number, such as Bio1, for example.

Teacher training and work with the education of ethnic-racial relations in the Baturité Massif-CE

The teachers participating in the research have a good schooling, standing out in their region, considering that until the present decade the Baturité Massif did not have a public institution of higher education. Eight of the twelve teachers paid for their initial training in higher education institutes, which offered paid courses "from graduation over the weekends and in an intensive period of classes during the months reserved for recess in basic education schools" (MARTINS, 2014, p. 57). The investments made by teachers and their families denote that, both by purchasing power and global cultural level, they made significant efforts to reach higher education, since, in general, they were the first in their families to reach the access to higher education (BOURDIEU, 2007).

The teaching profession is situated in the condition of a subject in permanent construction, because the professionals reality demand that the teachers continuously remake their praxis according to the demands that are presented in the school routine. Lima (2001)

draws attention to the fact that it is necessary to think of teaching work as praxis and the teacher as a transforming intellectual, historical subject, committed to his/her formation for the construction of a just society of emancipated beings.

The participants of the research were invited to reflect on whether/how the theme of ethnic-racial diversity has been developed in the high schools of Acarape and Redenção. The teachers were unanimous in stating that the Education of Ethnic-Racial Relations is addressed in their educational institutions, advocating about its importance, as it follows.

> After UNILAB and the foreigners arrived here, certainly the discussion about the issue improved a lot, 100% and even the charge to be updated, checking the laws issues, but so, in general, the school always seeks to see dates, events in the subjects themselves, we are having the concern to see if the books address such issues, how we can add something new that the book does not address, so this concern is being constant (Bio4).
>
> Yes. We have created a project which is always presented every three months, in general, open to the public through lectures as well (Quí2).
>
> Yes, the theme has been developed through projects. The school works on a subject [...], which covers several projects and also in November a more specific work is done focused on this issue and we always count on the participation of some students, even from the university, who are from other countries (Mat3).
>
> Our proposal covers that idea and I confess that at first it was a little embarrassing because of some students opinions, but today they welcome and receive well these proposals. They participate, they respect, they feel ok. I think they were able to internalize that it's part of it, that we're all the same, that there's no difference, because there was a difference here, we realized that... a foreigner came here, "who is this black guy?". They mentioned some situations that made us a little embarrassed but nowadays is different, they act naturally, treat well, welcome well, I think it was properly worked and is being well worked (Fis3).

The professors reveal that the presence of university students from UNILAB partner countries in schools, mainly due to supervised projects and internships, contributed to students understanding the importance of respect for cultural diversity, as well as the development of new attitudes towards discrimination and prejudice.

That is why the daily life of the schools of Secondary education specifies to be understood like collective spaces-times in which teachers,

> students and too many professionals of the education should be recognized like subjects co-responsible for the process of construction of the knowledge and of the curriculum, which must be conceived to pay attention to the diversity and to the plurality of the African and Afro-Brazilian cultures (BRASIL, 2006, p. 23).

The last testimony shows that the diversity racial-ethnic is contemplated in the pedagogic proposal of the school, showing that the institution wants to follow the important lines found in the National Implementation "Plan of the Curriculum Guidelines for Education of the Relations Racial-ethnically and for the Teaching of History and Afro-Brazilian and African Culture", which affirms that " the institutions must carry out a curriculum revision for the introduction of the theme in the management of the projects pedagogic-politician and in the pedagogic co-ordinations and collegiate " (BRASIL, 2013, p. 38).

The teachers show that the areas of the Human studies and of the Languages have been gaining prestige in the development of activities that work the education of racial-ethnic positive relations. On the other side, in their testimonies they show that, in the areas of Nature Sciences and Mathematics, the questions connected with the education of the racial-ethnic relations have been worked in the schools in less intensity, as it follows:

> It's not easy for a math teacher to deal with such an issue because people do not understand that the diversity means working at any moment, the crucial thing is the respect, when I start to work the respect, I am working the diversity, everything happens, and it is a great idea but I must say that it is not very well developed (Bio2).
>
> I work on it in a very simple form, but yes, I still do it! In the area of natural sciences and mathematics, we have small actions contemplated in the curriculum proposal (Bio3).

Verrangia (2016, p. 96), when dealing with the teaching of Sciences combined with the experience of positive ethnic-racial relations, identified in some teachers in this area the "conception that the Nature Sciences, as a curricular area, have less, or do not have, responsibility to act in the face of problems involving ethnic-racial relations, or even the obligation imposed by the current legislation".

The researcher also points out that the processes of initial and continuous formation of Sciences – and mathematics is also added – has not favored a pedagogical work that makes a dialogue between specific knowledge and ethnic-racial diversity. On the other hand, the fight against prejudice and various forms of discrimination must be a *sine qua non* condition in the planning and processes of teaching to learn in all areas of knowledge.

When they were asked about the possibilities of a dialogue between ethnic-racial diversity and the subject they teach, there was a multiplicity of answers. The four biology teachers revealed that they had already worked on that issue and had something to highlight:

> In addition to adding scientific knowledge, Biology also fosters human, social and demographic knowledge. And it is worked, for two reasons: first, it is part of the relevant legislation to work on the racial ethnic issue and second, it is a way for us to reduce prejudice and show that the Brazilian miscegenation really exists (Bio1).
>
> I have worked on that lots of times! We always have chances to work on that when we teach about genetics. The issues about the characteristics and the history of black people is fully discussed. In Biology I work on this area some more times; in the Nucleus we discuss about characteristics and social identity, cultures and the issue of ethnicities as well (Bio2).
>
> Yes! Especially in biology when we work on the origin of life, genetics etc (Bio3).
>
> Sure, I do. For example, we talk about cultures and peoples. In the area of genetics itself, the contribution of new lineages. I think it's quite possible that these organisms can interact in our country and in other countries. It is really comfortable to do it in classroom (Bio 4).

The statements reveal that biology teachers perform a work of promoting positive ethnic-racial relations, based on the specific knowledge of the area, emphasizing the history of the black people, the diversity of cultures and ethnicities, involving health, genetics, origin

of life, organisms and making teaching and learning more socially relevant. In fact, pedagogical work "and educational routines must be fully oriented towards egalitarian social relations, which require the recognition and appreciation of the contribution of African women and men and their descendants to Brazilian social formation" (BRASIL, 2013, p. 7).

Some other teachers also see possibilities about working with ethnic-racial diversity in dialogue with their subject:

> Yes, I believe so, because chemistry is the science that is present in us […], sometimes we have that process of discriminating something, a certain color, for what the person is, and we have to see the science itself, in a natural way, it is around us and we have to respect because the human being also has many natural diversities (Quí2).
>
> Taking data collection into consideration we realize the students who accept themselves [self-declare] with a black race and so we are able to elaborate statistical data (Mat2).
>
> Yes. I believe that you can do some work, through statistics, the question of graphs, data, analysis of this information and in relation to what has been happening (Mat3).

The statements above show that somehow the theme of ethnic cultural diversities has entered the universe of teachers in these areas. However, Dauanny (2015, p. 32), in a research conducted on the initial training of mathematics teachers, reveals that their training, in general, do not consider "[...] that addressing the issues and challenges existing in the field of education requires a clear position on the role that education and school must play in our society".

The two mathematics teachers (Mat2 and Mat3) propose to work with statistics combined with data related to the black race and current affairs. D'Ambrosio (2005, p. 113-114) defends the use of Ethnomathematics, i.e., "[...] different ways, techniques, (tips) skills to explain, understand, deal with and live with (matema) different natural and socioeconomic contexts of reality (ethnos)".

Teaching, regardless of the subject, should be assumed as a possibility of human emancipation. Thus, the teacher is called to the construction of knowledge, to the work of mediator of his or her students learning. For this, the teachers need to be clear of their pedagogical intention and seek the possibilities for the student to learn, thus surpassing the memorization.

> It is necessary, above all else, those indispensable knowledges which from the very beginning of the teachers formative experience, they can assume themselves as subjects of the production of knowledge, and also they can be definitively convinced that teaching is not transferring knowledge, but creating the possibilities for its production or construction (FREIRE, 2004, p. 22).

Freire's (2004) ideas reveal a perspective of horizontality, in which teachers and students teach/learn in a process of autonomy of both, valuing thoughts, creative freedom which might result the concrete reality of teaching such subjects.

Some teachers reported that they have not had the opportunity or do not see how they can perform a work that conjugues their subject with ethnic-racial diversity. Let's take a look:

> So, that is my challenge. I have to do a lot of researches to create a project, to work on my discipline that I haven't found yet. And it's because the time we have is too short to research something (Fis1).
>
> We help in what we can do, but I can't relate math to that issue (Mat1).
>
> So, I have not had the opportunity to work this issue in the classroom yet. Actually, my degree is in biology but I teach chemistry and we have another chemistry teacher and I haven't had the opportunity to work on that topic. There were some students of that PIBID project, but it was related more to mathematics and sometimes physics so it might not be possible to offer some feedback (Quí1).
>
> It's a little complicated but I believe I can possibly work on that (Fis3).

Teachers are willing to work with issues related to the ethnic-racial context, but they have not found means or possibilities for a dialogue with the theme mentioned and their discipline. It is also evident in his statements the absence of the theme in initial education and some of the precariousness that involve teaching work in schools, such as the lack of time for study, being allocated in a discipline different from that in which the teacher graduated, and others.

Oliveira (2012, p. 8), synthesizing several studies, points out possibilities of valorization of ethnomathematical knowledge, of African and Afro-Brazilian matrix, combining research and teaching: i) Mancala game, with the exploration of logical-mathematical reasoning; ii) capoeira, exploring flat and spatial geometry; iii) game of whelks, working probability; iv) teaching and learning mathematics, in an inter- and transdisciplinary way, which “in addition to provide learning on the subject, contextualized and significant in values and cultures, will lead to an anti-racist pedagogy”. The researcher presents some ideas that can be worked on in mathematics teaching and that we believe can be incorporated into the teaching of sciences, requiring that objectives be elaborated to this end, with a view to combat racism and prejudice in school.

Nogueira and Domingos (2018), in a study that sought to discuss the implementation of Law 10.639/2003 in high schools in the Baturité Massif, showed that professionals lack training to work with the Education of Ethnic-Racial Relations and African and Afro-Brazilian History and Culture in schools in the region.

Similar the aforementioned researchers, we asked whether the subjects of the investigation had participated in some training on the education of ethnic-racial relations. From the twelve teachers of Nature Sciences and Mathematics, eight stated that they did not and only four revealed that they did: i) Uniafro/UNILAB specialization (Bio2); ii) complementary courses (Bio3); iii) with a UNILAB teacher (Mat1); iv) in the university routine as a UNILAB student. It is interesting to reflect that from the four actions mentioned, UNILAB is present in three, corroborating its importance for the region.

Caprini and Deorce (2018, p. 17) suggest a multiculturally oriented pedagogical practice, based on a process of continuous teacher education, with curricular reorganization in

which "[...] the theoretical discussion of critical multiculturalism is theoretical support, so that there is the implementation of a teaching capable of promoting a differentiated education. The one that overcomes discrimination and prejudice".

Thus, the continuous training of teachers to work with issues related to the education of ethnic-racial relations could be developed in schools where teachers work, with the support of pedagogical coordination, the coordinating teacher of the area or another professional, the school or outside it – such as UNILAB teachers – and can be collectively planned in line with the planning of the teaching unit.

Final considerations

The study sought to understand the relationships that teachers in the areas of Nature Sciences and Mathematics establish between ethnic-racial diversity, training and work in the context of High Schools of Acarape and Redenção, in the Baturité Massif/CE.

The data set unveiled symmetries, with possibilities of dialogue between the Education of Ethnic-Racial Relations and the areas of Nature Sciences and Mathematics, which can contribute to teachers developing an emancipatory education, with a critical view of their own training and their work in schools, including the use of Ethnomathematics and Ethnosciences in the daily life of their classes. The results also signaled some asymmetries, such as the need to overcome issues related to prejudice and various forms of discrimination.

The study revealed the opportunity to envision a more democratic education, valuing identity issues, the interaction and dialogue of different sociocultural groups, reflecting that cultural relations do not always take place in symmetrical processes, but marked by struggles and historically situated.

We understand that teaching should be assumed as a possibility of human emancipation. Therefore, it can be allied to the investigative activity, problematizing various issues in dialogue with scientific knowledge, respecting students in their diversities and singularities. The various areas that make up the high school, including the Nature Sciences and Mathematics, should collaborate with the re(de)construction in relation to the black people, potentiating diverse readings, reflection and the attribution of new meanings and senses. Therefore, an articulated work between the faculty and the school management is fundamental and defined in the Political-Pedagogical Project.

In summary, the education of ethnic-racial relations in dialogue with the Nature Sciences and Mathematics and also with other areas of knowledge, can favor the development of an anti-racist pedagogy, providing respect for the other, valuing the universe of traditional cultures, mobilizing teachers and students, individually and collectively, for the exercise of citizenship, the guarantee of human rights and the fight against various discriminatory practices. In addition, it provokes universities to carry out teaching-research and extension actions that are multiculturally compromised.

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