UNIVERSITY & COMMUNITY: AN ETHNIC-RACIAL THEME FROM THE PERSPECTIVE OF THE ETHNOMATHEMATICS PROGRAM

UNIVERSIDADE & COMUNIDADE: UM TEMA ÉTNICO-RACIAL NA PERSPECTIVA DO PROGRAMA ETNOMATEMÁTICA

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ABSTRACT

In this text, we create a dialogue in relation to ethnic and racial education. The work represented here originates from experiences during a postdoctoral research project (2014-2015) conducted at the Faculdade de Educação (College of Education), at the Universidade de São Paulo (University of São Paulo) and the Instituto de Educação (Institute of Education) at the Universidade de Lisboa (University of Lisbon). From the perspective of an ethnomathematics program, which primary goal is to unleash transdisciplinary aspects, the dialogue presented here focuses on the movement of coming and going between the University and the Community. We also present here facts and data from five Centers for African-Brazilian Studies and the African Center Studies of the Universidade do Porto (University of Porto), seeking to highlight the political, pedagogical, and cultural interfaces of their constitution in Brazil and Portugal and their actions for teacher education with African-racial themes. The school community is evidenced by elements gathered from the activities developed in the project Fronteiras Urbanas (Urban Boundaries) in Portugal. We found that the centers in the school community we investigated have thought about education and teaching that can be re-signified in terms of an ethnomathematics program. This can be done best by proposing an exchange of experiences and the opening of knowledge and to the decolonized curriculum, strengthening the teaching of the individual by providing a new look to the world and its diversity.

Keywords: Teacher Education; Ethnomathematics Program; Racial-Ethnic Relations; University; Community.

RESUMO

Neste texto pretendemos dialogar acerca da educação étnico-racial, a partir de experiências vivenciadas no período de desenvolvimento do projeto de pesquisa de pós-doutorado, junto à Faculdade de Educação da Universidade de São Paulo e do Instituto de Educação da Universidade de Lisboa. O diálogo privilegiará o movimento de *ir e vir* entre a universidade e a comunidade, na perspectiva do Programa Etnomatemática, desencadeando vertentes transdisciplinares. Serão apresentados fatos e dados de cinco Núcleos de Estudos Afro-Brasileiros e do Centro de Estudos Africanos da Universidade do Porto, buscaremos evidenciar interfaces políticas, pedagógicas e culturais em sua constituição e ações para a formação de professores com a temática afro-racial. A escola do bairro será evidenciada por elementos coletados a partir das atividades desenvolvidas

no projeto *Fronteiras Urbanas* em Portugal. Constatamos que tanto os núcleos, quanto a escola do bairro investigados possuem um pensamento acerca da educação e da docência que podem ser ressignificadas na perspectiva do Programa Etnomatemática, mesmo em contextos distintos. Isto pode ser realizado por meio da proposição da troca de experiências, da abertura para o conhecimento e para o currículo descolonizador, fortalecendo a formação do indivíduo e proporcionando um novo olhar para o mundo e sua diversidade.

Palavras-chave: Formação de professores; Programa Etnomatemática; Relações Étnico-Raciais; Universidade; Comunidade.

1. Starting the Movement...

The word Movement indicates a material act or fact of moving, but can also mean a set of actions of a group of people mobilized by the same order. In this paper, we are going to take ownership of the two senses. In act or fact of moving we will express our route of research during the development of a postdoctoral project conducted between 2014 and 2015 with 2 (two) university centers: the Instituto de Educação at the Universidade de Lisboa, and the Faculdade de Educação at the Universidade de São Paulo, and with the community of Terras da Costa[1], in Portugal. The word movement indicates the act or effect of moving, but it can also mean a set of actions of a group of people mobilized by the same purpose.

Thus, the idea is to present facts and data from research about how ethnic and racial issues have been discussed and worked on in a university context. This is done specifically in the teacher-training program and in the community by focusing on a school community in Portugal. People moved between the formal and the informal, in which the knowledge frames the path between the University and the community. These two senses of the word *movement* emphasize the dimensions of ethnomathematics program and invite us to an even larger movement: the reflection about the implementation and execution of a mathematics education for ethnic-racial relations.

Historically, this movement did not start in mathematics education. The approval of the law 10.639/03 in Brazil, which makes the inclusion of African and African-Brazilian history and culture in school curriculum mandatory, ended up generating a great movement in the academies and schools, both in the sense of teacher education, as in the production of didactic-pedagogical materials. In 2004, the *Conselho Nacional de Educação* (National Board of Education) and the *Ministério da Educação* (Ministry of Education), approved the national curriculum guidelines for the *Educação para as Relações Étnico-Raciais* (Education for Racial-Ethnic Relations) as well for the *Ensino da História e Cultura Afrobrasileira e Africana* (Teaching of African-Brazilian and African Culture History). Besides becoming a tendency towards the democratization and correction of the historical imbalances in Brazilian society, this was in recognition of a new political and social space created by the black movement in the political process in Brazilian education.

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[1]Terras da Costa is a term used by the researchers of the project Fronteiras Urbanas and by the members of this community. This neighborhood has neither electricity nor water; the municipality of Costa de Caparica in Portugal does not recognize it, mainly because its residents are Cape Verdeans and Roma people.

Specifically in regards to higher education, educational laws recommend the necessity to respect university autonomy in relation to the proposition of curricular content and activities for courses of ethnic and racial relations. As well as the promotion of political changes regarding African-Brazilian and Afro-centric courses, the contexts and the knowledge developed by the black population must be included in the teaching and learning process occurring in schools. For example, the contributions of African people to the development of mathematics can be identified and described by the ethnomathematics program. In this context, the promulgation of the law 10639/03 carries all actions guiding the education for ethnic-racial relations in the educational contexts from the elementary to higher education, including the creation of the *Núcleos de Estudos Afro-Brasileiros – NEABs* (Centers for African-Brazilian Studies).

From this scenario, we aspire to engage people in discussion about the importance of education for the development of ethnic and racial relations from its political, educational, and cultural perspectives. The *African-Brazilian Study Center of the Universidade Federal de Uberlândia – NEAB/UFU* and (Federal University of Uberlândia) and the African Studies Center of the Universidade do Porto. (University of Porto) triggered these discussions. This research also shares the experiences accomplished in a school community of Terras da Costa, in Portugal, during the period of development of my postdoctoral project between 2014 and 2015, which attempts to demonstrate movements that led us to build new reflections on the perspective of ethnomathematics program.

2. The "Act or Fact of Moving"…

Considering qualitative research (Lüdke & André, 1986) as the design of a trajectory similar to a *pendulum*[2] seeking the union of two guiding ends, which are the University (NEAB[3] & CEAUP[4]) and the Community (*school community*) on the coast of Portugal, we designed the movement of this study as we looked to one end of the pendulum, the university, as well as to its community, the specific ethnography. In this movement, we sought to establish the path repeatedly until the project was completed. The political, educational, and cultural dimensions grounded the movement of *coming and going* of the pendulum. The *stopping* of the pendulum is movement interpreted as a metaphor, which can be considered as the moment of my reflections on own trajectory that was being molded.

From this metaphor, we seek to meet objectives to enable us to investigate the facts and data from the *African Studies Centers* in Brazil and in Portugal regarding cultural, political, and educational dimensions of their constitutions, as transdisciplinary categories, highlighting the education and the teacher education program established by these centers. It was also important to investigate how teachers in the *school community* in Costa da Caparica, Portugal, in the Fronteiras Urbanas Project, constitute their

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[2]The pendulum movement is a metaphor used in this research regarding to its trajectory in relation to the move of coming and going between the university and the community. Thus, one end of this pendulum is at the university and the other one is in the community.
[3]Núcleo de Estudo Afro-Brasileiros (Center for the African-Brazilian Studies).
[4]Centro de Estudo Africanos da Universidade do Porto (Centre for African Studies of the University of Porto).

pedagogical practices. In order to propose a reflection on this curricular subject, the project also looks for an understanding of how women articulated and developed knowledge and practices in Cape Verde during the process of teaching and learning mathematics.

Thus, this project considers the possibility of developing a mathematics education approach for the ethnic-racial relations from the reflective perspectives based on the actions proposed by the NEAB, CEAUP, and the community's neighborhood in Costa da Caparica. The goals of this project helped bring realities and contexts of socialized knowledge in an positive way because its pedagogical aspects opened possibilities for the discussion in relation to the construction of mathematical thinking in African and African-Brazilian practices and environments by considering the possibility of reframing teaching and learning processes in the context of cultural diversity.

Brazil is developing African and African-Brazilian Studies Centers, more commonly known as the *Núcleo de Estudos Afro-Brasileiros – NEAB* (Center for African-Brazilian Studies). By consulting the website of the *Associação Brasileira de Pesquisadores Negros – ABPN*[5] (Brazilian Association of Black Researchers) it is possible to identify at least one NEAB in each Brazilian region with a greater representation in national debate regarding issues involving education and teacher education.

In 2014, we found that the Associação Brasileira dos Pesquisadores Negros - ABPN (Brazilian Association of Black Researchers) website had collected information from 83 African-Brazilian Studies Centers, the Southeast (30), South (17), and Northeast (23). The criterion used to select the centers for this research was related to education programs. In this context, only 15 centers were identified, however, 13 of them offer teacher education programs.

The centers selected, by region are below:
- Northeast region: *Center for African-Brazilian Studies from the Universidade Federal Rural de Pernambuco* (NEAB/UFRP).
- Northern region: Center for African-Brazilian Studies at the *Instituto Federal do Pará* (IFPA/NEAB).
- Midwest region: Interdisciplinary Center Africa-Americas of the Universidade Estadual de Goiás in partnership with Universidade Federal de Goiás (Ucg/CieAA/UFG).
- Southeast region: Center for African-Brazilian Studies at the *Universidade Federal de Uberlândia* (UFU/NEAB).
- Southern region: Center African-Brazilian Studies at *the Universidade Estadual de Londrina* (UEL/NEAB).

For the stage of the research by the actions of the NEABs, we chose to apply a semi-structured interview with the coordinators of the selected centers. Initially we contacted the subjects by e-mail according to the information available on the ABPN website, all interviews scheduled and conducted during the second half of the 2014 academic year. The choice for this methodological instrument to collect data was relevant for the development of this research. Lakatos and Marconi (1991) affirmed that semi-structured interview is an instrument for social research excellence, which provides the data that

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[5] http://www.abpn.org.br/novo/index.php/institucional/quemsomos.

are not in documentary sources as well as are relevant to the development of the research process.

According to Amado (2013), semi-structured interviews consist of issues that derive from a prior plan where researchers define and register the answers to the open questions in a logical order, thus, the interviewee has a great deal of freedom to answer the proposed questions. The author points that:

> (…) semi-structured interview is one of the main instruments of qualitative research, especially because there is no rigid enforcement of issues, allowing the interviewees to discourse about the theme 'respecting their frames of reference' and highlighting what is more relevant for them, with words enabling immediate capture and chain of desired information (Amado, 2013, p. 208-209)[6].

The analysis of the interviews guiding questions and answers are codified in categories defined as *a priori*, which, according to Fiorentini and Lorenzato (2006), is when researchers go to the field with previously established categories that may or may not be in the review of literature. Such categories investigated the effects of cultural, political, and pedagogical interfaces at CEAUP.

The cultural category brought for discussion demands of local reality, the tensions of groups belonging to the African Studies Centers. The political category raised external teaching demands of these centers that involve social movements and/or other institutions of the local community that are locally established and institutionalized. The pedagogical category brought the initial and continuing process of teacher education to the current educational debate. These categories allowed the researcher to develop actions and pedagogical practices involved in the NEABs and later in the African Centers in Portugal.

In this regard, the subjects of the interviews were the coordinators of the NEABs and, later the coordinators[7] of the African Studies Centers in Portugal. The interview guide was composed of four questions involving topics related to motivations, reasons, other issues surrounding the construction of these centers and their political, educational, or cultural basis, thus, actions were developed by these Centers associated to its educational aspects, especially, regarding to the teacher education process.

Regarding to the Portuguese phase of this project before the trip to the *Universidade de Lisboa* there were formal contacts with the supervising-teacher Ana Paula Caetano and professor, vice-supervisor Henriques Guimarães, as well as searches on the websites related to Portuguese universities and centers of African studies about ethnic-racial themes, revealing four centers, including the African Studies Center of the Universidade de Lisboa, the African Studies Center of the Instituto Superior de Ciências

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[6]"A entrevista semiestruturada como um dos principais instrumentos de pesquisa de natureza qualitativa, sobretudo pelo facto de não haver uma imposição rígida de questões, o que permite aos entrevistados discorrer sobre o tema proposto 'respeitando os seus quadros de referência', salientando o que para ele for mais relevante, com as palavras e a ordem que mais lhe convier, e possibilitando a captação imediata e corrente das informações desejadas" (Amado, 2013, p. 208-209).

[7]After investigating three centers in Portugal to conduct this research, only the *Centro de Estudos Africanos da Universidade do Porto - CEAUP* (African Studies Center of the University of Porto) included the topic of teacher education program necessary for the development of this research.

Sociais e Política (Institute Superior of Social Science and Politics), the African Studies Center at the Universidade do Porto, and the Center for Social Studies at the Universidade de Coimbra (University of Coimbra).

In order to preserve the focus of this research, we investigated and identified African Studies Centers related to educational issues, since most of these centers are in areas of social and political sciences. In this case, only the African Studies Centers of the Universidade do Porto fit the intent of the research. Similarly, we contacted the vice-president of CEAUP during our stay in Lisbon, from January 20 to April 20, 2015, and we went to the Universidade do Porto to conduct interviews by adopting the same interview guide used in the Brazilian stage of the project.

Regarding the research fieldwork in the coastal neighborhood in Portugal, we applied a methodological approach based on the perspective of critical ethnography, conducted semi-structured interviews with mathematical educators of the school community from the Fronteiras Urbanas project, and recorded observations of the field notes in relation to the activities that we experienced during the period of investigation. One of the teachers who worked as a volunteer teaching mathematics in the school community completed his postdoctoral studies from the experiences during a year within the realization of the project mentioned above.

We conducted the interviews with a Brazilian mathematical literacy teacher and a Portuguese teacher in the school communities on February 19, 2014, in Niterói, Rio de Janeiro and on February 25, 2015, in Lisbon, Portugal, respectively. We first met the Portuguese educators in this school on February 14, 2015, which allowed us to talk about the project and arrange a date for the interview. The questions conducted with the mathematics teachers in the school community raised facts and data concerning the motivations and reasons for them to become teachers in the Fronteiras Urbanas project, if they tended to either cultural aspect or educational policy, and the target audience for the *school community* in the teaching and learning process.

The questions of the interview highlighted facts and data related to the motivations and reasons that led teachers to work as volunteers in the project Fronteiras Urbanas. We privileged cultural, political, and educational dimensions as we did with the interviews conducted with the coordinators of the African and African-Brazilian Studies Centers during the fieldwork of this research. Other questions of the interview suggested the possibility of using a *D'Ambrosian* perspective and his *Trivium* curriculum for mathematics in the teaching practice of these teachers as well as a reflection about their opinion regarding the importance of mathematics education related to the issues of ethnic and racial relations.

3. The Ethnomathematics Program and the Teacher Education Program

According to D'Ambrosio (2015), ethnomathematics is a research program in history and philosophy of mathematics with pedagogical implications, which focus on how and why human species generalize, organize, and disseminate their knowledge. In a transdisciplinary range, this program considered the ethics of ethnomathematics in its diversity that deals with respect, cooperation, and solidarity.

We understand that an ethnomathematics program detects paths throughout the investigation because it makes us think about and promote mathematics education for the development of ethnic and racial relations. This understanding is based on the results of first investigations that we developed in the *Grupo de Estudos e Pesquisas em Etnomatemática – GEPEm* (Research Study Group on Ethnomathematics at the Universidade de São Paulo such as the proposal regarding to the Brazilian Culture and Mathematics: Fractions (Costa, 2010).

Simultaneously, a bibliographical and documentary survey regarding the Brazilian popular festivals as well as how they configured and reconfigured in religious traditions was conducted at the *Universidade Federal de Mato Grosso* - UFMT (Federal University of Mato Grosso). Through an extension project on teaching fractions involving proposals for activities, courses were developed at the Universidade Federal de Uberlândia during the conduction of a research project related to initial and continuing teacher education programs for mathematics teachers.

This partnership culminated with the offering of a course entitled *Mathematics Education and Racial Prejudice: the African and African-Brazilian Cultures in the Classrooms*. This course was taught at the tenth *Encontro Nacional de Educação Matemática – ENEM* (X National Mathematics Education Meeting), and which was supported by the *Sociedade Brasileira de Educação Matemática – SBEM* (Brazilian Society of Mathematics Education), in 2010, in Salvador (Costa & Oliveira, 2010).

Regarding the contributions of ethnomathematics for teacher education, Santos (2014) considers that the author moves away from his/her theorization any educator's approach with an essentially technical practice that has in the transmission of ready and frozen contents and its reason to be. Drawing on the perspectives of teacher education of D'Ambrosio and from studies on his works, the author considers that:

> In fact, in a historic moment in intercultural relations are as necessary as a way to promote a multicultural education rooted in trans-disciplinary ideals, when the affective, emotional and cultural issues are not part of a teacher education curriculum, particularly mathematics. Any attempt to remove the mathematics of history that has guided as a disjointed knowledge of day-to-day issues, utility and useful issues, trials and an instrument for building a better human being in every sense, is stiffening/compromised. In addition, the teacher will be nothing more than a mere executor of tasks and knowledge transmitter, which usually brings more frustration than motivation to students (Santos, 2014, p. 82)[8].

With this in mind, we seek to raise a few possibilities and contexts in/for teacher education with regard to acts of thinking about an education (and education in future

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[8]"De fato, num momento histórico em que as relações interculturais são necessárias como forma de se promover uma educação multicultural arraigada em ideais transdisciplinares, quando as questões afetivas, emocionais e culturais não fazem parte de um currículo de formação de professor – particularmente de matemática -, qualquer tentativa de se afastar a matemática do percurso histórico que a tem guiado como uma área do conhecimento desconexa das questões do dia a dia, das questões úteis e utilitárias, das experimentações e de um instrumento para a construção de um ser humano melhor em todos os sentidos, fica enrijecida/comprometida. E o professor não será nada mais que um mero executor de tarefas e transmissor de conhecimentos, os quais, geralmente, trazem mais frustação que motivação aos educandos" (Santos, 2014, p. 82).

mathematics) for contexts within ethnic-racial relations. In the period of postdoctoral teaching course at the Institute of Education of Lisbon, we had access to many different studies in relation to teacher education, since the investigated topic is distinct along the trajectory of that Institute. However, with respect to teaching for cultural diversity, it was difficult to find specific and recent studies. A fact which shows the importance to continue working with this theme, and from the context of immigration to Portugal, and how this phenomenon affects the teaching and learning process in school reality.

Pacheco (2014) presents a survey of several teacher education approaches to multiculturalism, whereas it is one of the goals of the *National Council for Accreditation of Teacher Education* (NCATE). Among the surveys carried out by the researcher, we want to highlight in this text the critical approach to contexts of teacher education and multiculturalism in which a critical analysis of educational policies was undertaken. Unlike other approaches, the critical perspective focused on the deepening of understanding on the part of teachers, and the educational inequities in preparing them for resisting oppression. This author also stated: "most of the teacher education programs prepare teachers for multicultural sensitivity, tolerance and multicultural skills, but does not prepare them to identify or eliminate educational inequities or create equitable learning environments" (Pacheco, 2014, p. 165)[9]

According to this context, Zeichner (1993) stated that the majority of teacher education programs use teaching strategies/approaches in two ways: The integrated and the segregated. Integrated approaches incorporate professional courses and field experiences of teacher training programs on the theme of diversity. These programs focus on preparing teachers to teach various groups of students in the context of urban schools or to teach specific groups of students such as the Native-American and/or African-American. Although segregated approaches consider teacher education for cultural diversity as a subtopic or a complement in one or in several courses, with field experiences, these programs did not refer to questions about cultural diversity. This type of training is the most common form of implementation, including the program, of course, multicultural or ethnic formation studies.

Another perspective regarding in-service and continuing teacher education emerged through an investigative process related to the *Education for the Development*[10]. Coelho, Mendes and Gonçalves (2014) stated that *education for development* constitutes a greater need of the contemporary world as a contribution towards the eradication of poverty and the promotion of sustainable development through educational approaches. According to these authors, it is important to think about the expression *education for the development*, which is composed of two different words and their meanings can depend on how we see each of these concepts individually.

Coelho et al (2014) advocate that education is a cultural, political, and social product. Their reference, Freire (1995), and his social pedagogy, synthesized a liberating educational design related to *education as a practice of freedom*. The concept of

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[9]"(...) na sua maioria, os programas de formação de professores para a multiculturalidade prepara os professores para a sensibilidade, a tolerância e as competências multiculturais, mas não prepara os professores para identificarem ou eliminarem as iniquidades educacionais ou criarem ambientes de aprendizagem equitativa".

[10]*Education for the Development* is a term used by UNESCO and by the European Community.

development as incorporated from the ideas of Boni (2006) considered as being a *transformative educational process* that is committed to the defense and promotion of the human rights of all people. This approach encourages the action and participation of individuals in their local and global scope towards the achievement of human development.

Regarding the teacher education program, Coelho et al. (2014) report an experience related to the context of relations between society and the internationalization developed by the *Instituto Politécnico de Viana do Castelo em Portugal* (Polytechnic Institute of Viana do Castelo in Portugal). These authors consider that this theme can only reach schools from basic education with the commitment and the involvement of the *Escolas Superiores de Educação – ESE[11]* (Schools of Education) because they assume integral education of the individual.

The experience was implemented though the insertion of themes related to the *Education for the Development* from the curricula of the teacher education program related to the discipline *Iniciação na Prática Profissional – IPP3* (Initiation into Professional Practice). According to the criteria adopted by the *Bologna process[12]*, students developed thematic stages, involving the teachers, employees of the participating schools. From the knowledge of the actions developed throughout the school year, we identified issues of *racial discrimination*, *cultural diversity* and *acceptance of difference as bullying prevention*, which had interfaces with our research theme.

Coelho et al. (2014) showed a series of advantages developed in the study from questionnaires (surveys) targeting involved (students, teachers, employees and students), such as:

- The possibility of a positive interaction between many diverse actors in the educational community, which proved to be a learning experience for all;
- The recognition of thematic development, education, and global citizenship as fundamental to the schools, in order to help the development of better, active, informed, and responsible citizens;
- The identification and enhancement of essential tools to the profession, such as planning as well as methodologies and the use of diversified and challenging educational practices;
- The centrality placed on the designed methodology, which promotes teamwork, students' participation and the cooperation between all the actors of the educational community;
- The focus on the development of students' learning as well as on the reflections about the processes and its outcomes.

4. The Actions of a Group of People Mobilized by the "Same Order"

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[11]*ESE* are higher educational institutions responsible for initial teacher education program in Portugal.

[12]The Bologna process relates to the Bologna Declaration, signed on June 19, 1999, in the city of Bologna, Italy. Ministers who are responsible for higher education in 29 European countries signed this declaration, which is a process of inter-governmental reform at the European level that aims to concretize and achieve European Higher Education objectives regarding to mobility and quality of education.

This section presents actions of a group of people mobilized and who discussed facts and the data gathered from the research that is related to ethnic and racial issues discussed and studied in the context of the university; specifically, in regards to teacher education and the community school in Portugal. Therefore, people that moved between the formal and the informal and in which knowledge was interweaved between the university and the community.

4.1. The University Context

The centers of African-Brazilian studies selected have identified themselves using various particularities composed throughout the investigative process in addition to teacher education programs.

In the Northeast of Brazil, as stated earlier, we selected the Center of African-Brazilian Studies from the Universidade Federal Rural de Pernambuco - NEAB/UFRP created in 2008. This center plays an important role since it attaches to specific academic issues focusing on ethnic and racial relations, on the articulation of the concepts of gender, social class, and race/ethnicity, on the critical dialogue regarding issues of racism, affirmative action[13], agroecology, and economic solidarity economy. The main areas of practice were the history of Africa and the African-Brazilian education, ethnic and race relations, social black movements, *quilombolas*[14] communities, African-Brazilian culture, oral traditions, memory and heritage, African-Brazilian religion, identity, and ethnicity.

The Center for African-Brazilian Studies at the *Instituto Federal do Pará* IFPA/NEAB (Federal Institute of Pará) represents the Northern region of Brazil, and was integrated since 2013 into the organizational structure of the institution that allowed it to begin the development of actions in order to implement Brazilian Law no. 10639/2003, done with the implementation of the course UNIAFRO related to the improvement of public policies regarding the racial and ethnic relations sponsored by the Ministry of Education. From December 2006 to February 2007, this 180-hour course was offered in order to train 30 teachers and graduate students to work on the implementation of this law in basic education developing research actions and strategies for the teaching process.

During the years 2009 and 2010, *NEAB/IFPA* approved several research projects regarding the implementation of *10.639/2003* concerning the offering of high school graduation courses. For example, a study case on the feasibility of the implementation of racial quotas at IFPA as well as the implementation of this law in undergraduate courses for *Educação para as Relações Étnico-Raciais - ERER* (Education for Ethnic and Racial Relations) with institutional research, scholarship of the PIBIC[15], from the *Conselho Nacional de Desenvolvimento Científico e Tecnológico*[16] (CNPq) for undergraduate students in favor of initiating and integrating them to the scientific

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[13]Affirmative actions defined as a set of public and private policies designed to combat racial, gender, disabilities, and national origin discriminations, as well as correcting the effects of discrimination practiced in the past, which aims to provide equal access to fundamental assets in society.
[14]Quilombola is a term assigned to the black slaves who took refuge in places called quilombos when they were escaping from Brazil's mines and farms during the time of slavery.
[15]Institutional Scholarship Program for Scientific Initiation.
[16]National Council for Scientific and Technological Development.

process. They participated in a 180 hour-course in education for ethnic-racial relations in a distance education maintained by the Universidade Aberta do Brasil[17] (UAB) in partnership with SECAD/MEC[18] of the IFPA. This course was offered from August 2009 to March 2010 in ten educational centers of the UAB system (Juruti, Conceição do Araguaia, Salinópolis, Moju, Tucuman, Canaã dos Carajás, Muaná, Thailand, Redemption, Santana do Araguaia) to 350 teachers of basic education indicated by the respective secretariats of education. According to the current coordinator, extension research and courses are still present in the current activities of the NEAB/IFPA.

It is important to highlight a peculiar aspect of the NEAB/IFPA related to the development of the discipline regarding education for racial and ethnic relations in Teaching Projects in the 40-hour graduate course. This course offered in 2007 is currently in its fourth year, and is having highly positive results. It seeks to prepare prospective teachers to deal with ethnic and racial issues, provide opportunities for pedagogical approaches about race issues as well as to confront racism in schools and, more specifically, in the classrooms of the IFPA-Belém campus, in all educational levels offered in this educational institution.

The Interdisciplinary Center of African-American Studies at the *Universidade Estadual de Goiás - UEG* (State University of Goiás) in partnership with the *Universidade Federal de Goiás – UFG* selected to be the representative of the Midwest region in Brazil develop activities by applying projects, research, and studies regarding to relations and ethnic diversity. The UEG projects in the schools, *Abá[19]*, and teacher education courses in the history of African-Brazilian and African cultures in the State of Goiás are examples of activities developed in this university. In addition to develop research and teaching projects along with the *Quilombola Community of Porto Leocádio*, there is also the development of public policies related to the promotion of racial equality and quotas at UEG.

The archives in the *Centro Interdisciplinar de Estudos África-Américas - CieAA* (Interdisciplinary Studies Center of Africa-Americas) include a wide selection of DVDs, CDs and books from their own production center and other partners in contemplation of promoting the discussion of this discipline in the context of the professional teachers. The collection, available to teachers and community consultations is composed of 182 books with themes that involve Africa, ethnic-racial Education, and Brazil's history and regional history. In addition to these materials, DVDs and CDs of documentaries and interviews about African religions, history of Africa and racial issues are available to the students and to the public in general.

In the Southeast region of Brazil is placed the *African-Brazilian Studies* at the *Universidade Federal de Uberlândia – UFU/NEAB* created in 2006. Its focus is on teaching, research, and extension in the area of African-Brazilian studies and on affirmative actions that help African-descendant populations to access higher education, likewise in the area of studies of African history and African Brazilian culture. In 2009, this center promoted the first *Basic Training Course in the African-Brazilian and African Cultures History* for undergraduates in the teacher education program at the

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[17]Brazilian Open University System.
[18]Secretariat of Continuing Education, Literacy and Diversity of the Ministry of Education and Culture.
[19]Abá is a project developed by the Interdisciplinary Studies Center of Africa-Americas. The word Abá, in Yoruba language means elder.

Universidade Federal de Uberlândia, which is part of the *Programa Institucional de Bolsa de Iniciação à Docência*.

In 2014, these campuses also offered the first *Graduate Course in the African-Brazilian and African Cultures History* including the graduate program in Racial Equality Policy in the School Environment is a semi-presential modality course. It promoted actions regarding continuing education related to *gender, race, and ethnicity* for basic education teachers. It also promoted a program for public school teachers by applying the project *Culture* offered by the *TV Futura* (Future TV) from the Roberto Marinho Foundation. The offering of the distance-learning course *Education for Ethnic Racial Relations*, and a course to improve and promote racial equality in the school environment (2014).

The Center for African-Brazilian Studies at the Universidade Estadual de Londrina UEL/NEAB (State University of Londrina) in the southern region of Brazil, aims to develop studies regarding African-Brazilians, Africans in order to contribute to the interdisciplinary knowledge production and subsidies for the formulation of policies to combat racism and racial discrimination, especially through the exchange between UEL and similar institutions.

They conduct researches, courses, conferences, meetings, publications, and exchanges between researchers from other institutions and operate in the areas of work within the framework of teacher education and in partnership with the social movements spreading the African-Brazilian reality. They promote, encourage, and conduct studies and researches on populations with African origin regarding the study of different societies in the world. They also maintain and archive specialized documents and data on topics of interest to the center.

In this research, the selection of four African Studies Centers in Portugal conducted researches on the institutional sites: the *Centro de Estudos Sociais - CES* (Center for Social Studies) at the Universidade de Coimbra, the *Centro de Estudos Africanos - CEAF* (African Studies Center) of the Instituto de Ciências Sociais e Políticas (Social Institute of Social and Political Sciences) at the Universidade de Lisboa, the *Centro de Estudos Africanos da Universidade do Porto - CEAUP* (African Studies Center of the University of Porto), and the African Studies Center (CEA) of the Lisbon University. From this research and in accordance with the delimitation of the educational area and, specifically, regarding to the teacher education program, the CEAUP was the center we chose to further develop this research.

Thus, CEAUP included the dimensions of education and teacher education necessary for the development of this investigative field. This center is a multidisciplinary center that brings together a diverse group of researchers, students, and institutions. It integrates multiple domains of the Social Sciences and Humanities, with the goal of developing and applying research in Africa. Currently, this center brings together 67 researchers. The teacher education program configures regarding research developed in school communities and businesses in Guinea Bissau, Mozambique, and Angola.

4.2. The Community Context

The project Fronteiras Urbanas (2012-2014), funded by FCT, attached to the Institute of Education, at the Universidade de Lisboa, has as main investigator Professor Monica

Mesquita. "focused on the reality of a space occupied by workers of various skills, located in the city of Costa da Caparica near Lisbon, and near the mouth of the Tagus River" (D' Ambrosio, 2014, p. 9).

Because of accelerated urbanization due to tourist attractions offered by Costa da Caparica, we can observe two cases of human rights violations. First, the removal of the working conditions of a traditional fishing community and, second, the lack of minimum conditions for survival for the members of this community comprised of 400 people from the neighborhood lands of the coast who live in a settlement not formally legalized, installed for four generations mainly composed of African immigrants (D'Ambrosio, 2014).

According to the project, (2012-2013) entitled *Fronteiras Urbanas: Dynamics of Cultural Encounters in the Educational Community* forwarded to FCT in 2014, its theoretical-methodological design comprises issues related to the community education (circles of culture, art, and education), the program ethnomathematics (*Trivium Curriculum for Mathematics*[20] and transculturation), Systemic Complexity (transdisciplinarity), and critical ethnography and ethics (humanization of space). Its main general objective was to give conditions to the development of multicultural voices of two local communities: the fishing community and the community on coastal land, known as the *Comunidades de Bairro*[21] (Neighborhood Community).

The report of the project Fronteiras Urbanas, pointed out that this research process, intra dimensions and intercultural understanding, largely developed in essential clarifying intrinsic educational processes of the local community in order to meet the requirements set by their members; the *symbolic* recognition of these communities by society as a whole, as a result of being perceived as an integral and active in cultural diversity that represents them, as well as in urban hegemony regarding to their geographical location.

The project worked with specific objectives in the development of three activities: critical literacy, diverse cartography, and life stories, used as tools to reach its overall objectives. The completion of this project led to the publication of the book entitled Fronteiras Urbanas: Essays on the Humanization of Space, in 2014, which served as the main bibliographical source for forwarding this investigation regarding the possibility of seeking to think and reflect on a mathematics education for the ethnic and racial relations.

The concept of critical effectiveness in the Fronteiras Urbanas project brings together many of the options taken in a process lived and shared (Freire, 2014) by the three participating communities: community neighborhood, the fishing community, and the academic community. The action research design used in the Fronteiras Urbanas project was methodologically supported by the critical ethnography approach (Gérin-Lajoie, 2009; Thomas, 1993) by utilizing the procedures and techniques of classical ethnography, which involve the members of the communities in intentional changing processes. In this sense, the survey of facts and data as well as the analysis and the investigation relied on writing field notes, photographs, documents produced during the process, and informal interview with some residents of the neighborhood community

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[20]Literacy, matheracy and tecnoracy.
[21]This is a community composed by Roma peoples and Cape Verdeans. The Portuguese government does not recognize this community.

regarding the activities in which we participated. Thus, it is necessary to emphasize activities experienced by members of the school community participating of the project Fronteiras Urbanas until the first half of 2015 as a request of its residents and the people of the community named the *Escola do Bairro* (Neighborhood school) during the development of this project.

Escola do Bairro is a space of non-formal context, and functions as community school in which the educators and learners fuse in the learning and teaching process. The members of this school organized and systematized reflections elaborated during the meetings reported into Google docs. The goal was to provide a space for community members to share ideas, activities and events with flexibility to changes, and insert new thoughts and ideas collectively designed and built. The members of the school community organized and systematized reflections in meetings by using the Google docs feature, creating a space for sharing their own experiences.

5. Facts and Data

The analysis of the data collected during the investigation process presented a liberating learning perspective based on the student-centered practice, not on the teachers. This category emerged from the interviews, scholarly works and passing between the actions of the members of the *school community* according to the theorization of Paulo Freire. In some sources, such as the interview with the coordinator of the CEAUP and professors of the Fronteiras Urbanas Project, educator Freire explicitly quoted in their answers and reports.

Another explicit perspective in the interviews from the mathematics teachers, the coordinator and the researchers of the CEAUP was the question related to the Trivium curriculum for mathematics. In the interviews and in the context of mathematics education, this proposal is based on the D' Ambrosio's (2014) curriculum idea used in the Fronteiras Urbanas Project. This curriculum proposal is composed of *literacy*, which is the ability to process critically written and spoken information that includes reading, writing, calculating, dialoguing, media, and internet. *Materacy*, which is the ability to interpret critically and analyze signs and codes in order to propose and use models and simulations in everyday life to develop abstractions about representations of the real world. *Technoracy*, which is the ability to use and combine critically simple or complex technological instruments such as one's own body as well as the ability to evaluate their potential, limitations, and suitability for its application in different contexts, situations, and needs. This proposal came to life in the *school community* from the everyday activities of women of Cape Verde, establishing relations with the time and space in their needs for survival and transcendence.

The interviews with CEAUP researchers showed that they pointed for the necessity of a mathematics curriculum that analyzes its traditional development and cooperation models. Their answers also showed that the members of the *school community* and the teacher education program in the African context must follow their own solutions to solve problems they face daily strengthening the cultural identity of each community. In this perspective, it is possible to think about the *decolonization* of curriculum proposed by the Portuguese author Boaventura de Sousa Santos.

The data relating to critical education discussed in academic-scientific contexts has intensified in recent years, especially, in the field of mathematics education and teacher education programs. According to Skovsmose (2001), critical education has several sources of inspiration, although the most relevant is its association with the understanding of humanism and a Marxist society.

Skovsmose (2001) arguments that by giving the principle of being equal partners, in a Critical Education paradigm, teachers and students have an important role. This perspective suggests the development of the Emancipating Pedagogy (Freire, 1995). Therefore, education should be part of a democratization process guided by dialogue between teachers and students. Consequently, it is necessary to emphasize the establishment of an approximation between critical education and mathematical education.

From these perspectives, we realize that the proposed classes in the *school community* in the coast follows the line of critical education in the process of teaching and learning, especially, with respect to literacy *of the letters and numbers*, as they talked about the *Lady Vivi*[22], a striking figure in the community. In community education, the primary focus is working with and for the community, having that voice and active participation in the organization and development of local projects. As Freire argued:

> Learning *in* the community, *with* it and *for* it, means to use the history of its own region, externalizing the culture of silence. Means learning to engage in their own region, becoming conscious of the sociopolitical situation and fighting for the closed societies transformed into open societies (…). That is for the community education a matter of fundamental importance (Freire, 1995, p. 12-13)[23].

We evidenced the same attitude in the education and in the teacher education program developed by the CEAUP within the projects cooperation in Africa and the experiences of the *Escolas Superiores de* Educação (ESE) in Viana do Castelo, in Portugal, mentioning the Intercultural education term and the perspective regarding to the teacher education program in the results of this investigation. Both issues raised some elements incorporated to the importance of mathematics teachers in the school community, in the actions, and in relation to the ethical concerns in the activities of the CEAUP.

Finally, we came to realize that according to the theoretical assumptions in mathematics education and in the ethnomathematics program, teacher education and intercultural education permeated the ideas about mathematics, community, teachers, and learning throughout this investigative analytic process as well. It is important to emphasize that in official documents, intercultural education is a relevant to process that helps to minimize conflicts and processes in educational context. The principles of equality,

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[22]*Lady Vivi* was a subject of this study.
[23]"Aprender *na* comunidade, *com* ela e *para* ela, significa usar a história da sua própria região, exteriorizando a cultura do silêncio. Significa aprender a engajar-se na sua própria região, tornando-se consciente da situação sócio-política e lutando para que as sociedades fechadas sejam transformadas em sociedades abertas (…). Isso é para a educação comunitária uma questão de fundamental importância" Freire (1995, p.12-13).

difference, and positive interaction point that interculturalism represents coexistence in diversity.

We also found that there was a *rapprochement* between intercultural education and education for citizenship as reported by the work developed by Pacheco (2014). We noticed that this approach represented in the ideological-political discourse and actions for the teaching process developed by the African Studies and African-Brazilian Centers (CEAUP & NEABs) glimpsed in the ethnomathematics program and in its critical stance in relation to the *school community* and the Fronteiras Urbanas Project.

From the facts and data of the African-Brazilian Studies Center, we have come to realize that spaces they occupy in the universities are far beyond the physical component. The analysis and interpretation of the data shows the NEAB is a space of multiple dimensions that gained momentum according the responses given by the coordinators interviewed during the fieldwork of this project.

The data also have demonstrated how NEAB/IFPA functions as a channel for the insertion of excluded populations in higher education because the "excluded ones are coming!" This center configures as a space of struggle and work, resistance and opposition. In addition, coincidentally, the coordinator of this center also states the "excluded ones are coming!".

The coordinator of NEAB/UFRP considers the importance of all NEABs is to tell and show many stories knowing them all, since NEAB is a place to acknowledge and value, respecting the developed work to expose racism in society.

NEAB/UEL is a place to give visibility to the African and African-Brazilian history and culture that has been left out and it aimed towards focusing on the implementation of the *Law 10639/03*. Its coordinator believes that the law is the important flagship for this center because all actions are based on the changing of mentality in order to combat racism. In his point of view, the importance of this center is to help the development, conduction and the promotion of research by offering courses related to the African-Brazilian and African populations.

The CieAA/UFG/UEG[24] is a network place that hosts multiple centers in the state of Goiás, in Brazil, that opens channels for communication with social movements. The data analysis show that experiences lived in the land reflected in the research approach of the investigator and sensitizes the thought that education cannot be the same for everyone. The curriculum design provided by the CEAUP according to the *freirean perspective* moves towards its decolonization.

Such a claim can be evidenced by the fragment of the interview conducted with the vice president of CEAUP, in which he highlights "Freire said Amilcar[25], in each liberated

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[24]The CieAA is the *Centro Interdisciplinar de Estudos África-Américas* (Interdisciplinar Center Africa-Americas Studies), UFG is the *Universidade Federal de Goiás* and *UEG is the Universidade Estadual de Goiás* This center works in partnership with UFG and UEG.

[25]Amilcar Cabral was an African leader who created the African Party for the Independence of Cape Verde and Guinea Bissau. Paulo Freire worked with the elaboration of a literacy model for adults in Guinea Bissau by dialoguing with the population and by using the perspective of Amilcar Cabral.

zone, create a school, and teach those who do not know". This perspective leads us to the educators' posture in the school community".

According to the reports by the investigator at CEAUP, education is considered ideological and that children need education, not schooling. About the teacher education program, the CEAUP presented the idea that local realities and experiences of those who live in the communities studied must be obtained critically. For example, the African education experiences cannot be studied away from nature and its informal spaces that are instinctive and vital: the Earth. This statement reported to the *school community* in which land, water, children, animals, greenery, and family are not obstacles to literacy encounters, everyday mathematics, and poetry, philosophical, or political theater. In this context, school is part of the world!

First, in this community movement, before arriving in Lisbon and at Terras da Costa, the necessity of going to the school community was an activity proposed in my post-doctoral project. This movement relates to the ethnographic characteristic of the thematic of my investigation. In my first day in the neighborhood, I went to the Museum of Contemporary Art of Chiado with children and young residents, which allowed me to see necessities, implications, and outpourings of a group of people rather than consider this moment as a simple investigative activity. The bonds done and undone by community members and the researchers of the Fronteiras Urbanas project, brought a range of views, impressions, and perspectives regarding the current situation of the neighborhood, not just in their adverse conditions of habitability, but also on the complexity of relationships that weave the condition of being human.

I recognize that we will always have research perspectives, sensitivity, and solidarity. However, what unites us is still the Being (verb and noun). Human beings (noun) because we care about each other. For example, care about Lady Vivi[26], who never attended school, care about Daniel, who seeks to represent his identity and the individuality of his neighborhood and the society that surrounds him; Rita and Iliana as well as Mr. Guilherme and his family, who explores the human being (verb) discourse in his poetry. This cultural dynamics of the encounters brings us closer to where we want to be, to where our eyes cannot reach.

In our first impressions of the group from outside of the neighborhood, we could delineate new paths for education regarding to the informal, cultural, and political education developed in Terras da Costa, Portugal. This is an educational conception beyond the school education. It is an educational approach considered as the practice of freedom, which finds poetry as a form of expression in the phrases*: Who am I?, Where did I come from?, I am here, to...* and *I feel it...* and *I want it.. .* These phrases challenged us to develop new writings and reflections in the poetry sessions in the evening in the neighborhood school.

As a mathematics teacher for 20 years, teaching classes in several schools, at diverse levels of education and universities, I had never experienced any work like this in an informal space, specifically, with mathematics that at the beginning of this research generated great expectations. From my point of view, the activities conducted in the *school community* helped the development of citizenship because participants were able

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[26]Lady Vivi, Daniel, Rita, Iliana, and Mr. Guilherme were the subjects of this study.

to read the world by using letters and numbers. They also learned how to talk about the *Lady Vivi* relating art and other aspects about basic education, seen as the *foreground* to some residents of the neighborhood that helped them to experience other contexts, experiences and new perspectives of world. I believe that the educational function in formal or informal contexts of the teaching and learning process clear boundaries in the search for new cultural contributions.

It seemed to me that the group of researchers of the Fronteiras Urbanas Project, from diverse fields of knowledge conducted their investigations in the neighborhood lands of the coast of Portugal and approached its residents by using activities such as courses, workshops, and technical visits. This research helped them to develop affective relationship with the inhabitants of that region.

We see that investigations involve communities tending to be increasingly scarce, considering the differing degrees of difficulties such as the time of engagement and immersion of researchers with the members of the group, with their view of the world, and their own understanding of the quality and identity. On the other hand, critical ethnography, the *Trivium* curriculum for mathematics, and intercultural education in the perspective of the ethnomathematics program, must enter the agenda of qualitative research in education and mathematics education. This approach functions as relevant alternative methodologies to the interpretation of the world of the learners in formal and/or informal educational situations and contexts.

6. Continuing the Movement…

The first analyses of the sources and theoretical and methodological instruments as well as reflections regarding this research brought some opportunities to think about mathematics education for ethnic and racial relations. Along with this investigative process, it was possible to take ownership of the term *mathematics education* for *cultural diversity* while it unfolded the conceptions of intercultural education in which the most important was the appreciation of culture, people, and human beings.

Relations between trends presented in the sources of this research and in the constitutions of the African and African-Brazilian Studies Centers pointed to a freirean perspective of learning, highlights the understanding of each other in a community, evidenced from the critical ethnography approach and the posture of the teachers/educators that must be based on the conceptions of the intercultural education because:

> Without prescriptions or one-dimensional positions, without prejudices built by neglect and windows open to the other, we believe that it is possible a project of multi intercultural education/training, in which rationality and empathy walk hand in hand (Peres, 1999, p. 32)[27].

From the perspective of teacher education, Freire (1995) presents evidences regarding the work with communities that opens to new perspectives for the practice of the

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[27]"Sem receitas nem posições unidimensionais, sem preconceitos construídos por negligência e de janelas abertas ao outro, cremos ser possível um projeto de educação/formação multi intercultural, no qual a racionalidade e a empatia caminhem de mãos dadas" (Peres, 1999, p. 32).

teachers in relation to the recognition of the *emic*[28] and *etic* educational contexts. It alerts for the possibility that teachers who work in the classrooms guided only by standards, timesheets, bibliographies, and standardized evaluations are exposed to a greater dynamism and mobility in social movements, and could learn about other educational possibilities, and other sides of education not found in textbooks. There is something very important that people are creating out of formal education. For teachers, it would be an experience of opening new perspectives. However, Freire (1995) respected teachers who preferred to stay in schools, considering that even there should be a critical movement within the system.

The pendulum action of research in the process of coming and going between the community and university found a stopping point for reflection. This process relates to the ideas developed in the article written by Caetano and Freire (2014) in which the authors present three projects: Cyberbullying: diagnostic of the situation in Portugal, Fronteiras Urbanas: the dynamics of cultural encounters, and Voices of youth in the development of intercultural education that involve values of citizenship and intercultural education. The line of reflection and notes presented in that article makes us consider that education and research can contribute to the fight against fortune telling that destroys the hope of the humanity, destroying the hopes of generations, especially of the young people. Considering this context, research has an important role to play in building policies and practices so that educators, students, and researchers can contribute through a dialogical process that closely connects the theorization with practicing.

From our point of view, the authors present the intellectual contexts (university) and the multiple voices (communities) that is according to the context of this investigation that consider education and, consequently, mathematics education for cultural diversity. In this context:

> We need to find spaces where we meet face to face, we feel the presence of the other, we sense their desires and anguish. We need to find ways of assuming the human existence in its multi- and inter-dimensionality, including dimensions that seem to be taboos in some intellectual contexts, such as the spiritual and emotional ones. Moreover, we need to regain the sacredness of cities, as places where organization promotes encounter (Caetano & Freire, 2014, p. 116).

In this perspective, we finish this text by hoping that this dialogue can contribute to the developments in the area of research in mathematics education. It is our expectation that this contribution help us to reflect on our moves as researchers in the university and in the community in order to understand how we can promote the cultural dynamics of the encounters, achieving a mathematics education approach for the development of better ethnic and racial relations.

7. References

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[28]Emic and etic are terms used in anthropological research involving situations in which, on the one side, the observers (outsiders, etic) use their science tools to observe the *others* and, on the hand, the observers put themselves in the place of *others* – emic (although they will never be) as *insiders* (Campos, 2002).

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