

**MAPPING IDEAS AND BUILDING ACTIONS: SOCIAL CARTOGRAPHY
AND ENVIRONMENTAL EDUCATION IN THE MUNICIPALITY OF BAÍA
FORMOSA/RN**

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ABSTRACT

Thinking about university extension as a possibility to make connections and networks, as well as exchanges of experiences and knowledge, the study aimed to present the extension action as dialogical interaction with society, where the university has been progressively seeking an increasingly direct contact focused on local demands, in this context is presented the project "Social Cartography (CS) and Environmental Education (EA) in Baía Formosa/RN", which was developed as an extension activity of the Research Group on Landscape Geoecology, Environmental Education and Social Cartography and the Professor Paulo Freire State School, with the aim of through geographic knowledge, especially these two axes – EA and CS, spatialize and materialize local potentialities and limitations, seeking to reflect also on risk mitigations and conflicts in the municipality. Thus, seeking to go beyond the walls of the university, experiencing this integration and resulting in material products for all those involved in the process.

Keywords: Education; Extension; participatory mapping

**MAPEANDO IDEIAS E CONSTRUINDO AÇÕES: CARTOGRAFIA SOCIAL E
EDUCAÇÃO AMBIENTAL NO MUNICÍPIO DE BAÍA FORMOSA/RN**

Resumo

Pensando a extensão universitária como possibilidade de realizar conexões e redes, assim como trocas de experiências e conhecimentos, o estudo teve como objetivo apresentar a ação de extensão como interação dialógica com a sociedade, onde a universidade vem, progressivamente, buscando um contato cada vez mais direto e focado nas demandas locais, nesse contexto é apresentado o projeto "Cartografia Social (CS) e Educação Ambiental (EA) em Baía Formosa/RN", o qual foi desenvolvido como atividade de extensão do Grupo de Pesquisa em Geoecologia das Paisagens, Educação ambiental e Cartografia Social e a Escola Estadual Professor Paulo Freire, com o intuito de através dos conhecimentos geográficos, em especial desses dois eixos – EA e CS, espacializar e materializar potencialidades e limitações locais,

buscando refletir também acerca de mitigações de riscos e conflitos no município. Assim, buscando ir além dos muros da universidade, vivenciando essa integração e acarretando produtos materiais e imateriais para todos os envolvidos no processo.

Palavras-Chave: Educação; Extensão; Mapeamento participativo.

INTRODUCTION

The university extension is the triad (teaching, research and extension) that allows us to go beyond the walls of the university, enabling closer and concise work in the most different realities and communities. Thus, an important instrument of approximation of the university with society. The Federal Constitution of 1988, in Article 207, presents the principle of inseparability between the triad by emphasizing that: "universities enjoy didactic-scientific, administrative and financial and patrimonial management autonomy, and will obey the principle of inseparability between teaching, research and extension". Thus, this principle can be understood as a response to social demands for a socially responsible University, which actively dialogues with various sectors of society and which proposed a formation and production of knowledge, in dialogue with social needs (GONÇALVES, 2015).

Ribeiro (2011) states that the extension has a fundamental role in the construction of citizenship and a new model of society, assuming in the university a function of social practice, aiming first at the educational act, because, in addition to promoting the improvement of education in the training of professionals, it also provides services to the community, improving its functions and structures.

For Coelho (2014) the extension came to be understood as a dialogical interaction with society, where the university has progressively been seeking an increasingly direct contact focused on local demands. However, as much as actions of this nature have grown over time, it is still noted that the number of actions is limited for several reasons, among them: lack of interest to leave the comfort of the university, costs, dedication of time and exchange with the community that is visited, distrust of the local community, given that researchers often acquire the information they need and leave without leaving any return or concrete product for the group that welcomed them, among other reasons.

Moreover, it is also worth mentioning that with regard to the physical-natural themes for extension works aligned with schools, it is verified that the National Common Curriculum Base (BNCC) of basic education brings general (relative to human sciences) and specific (specifically on Geography) competencies for the area of physical-natural knowledge, which are respectively: 1) Identify, compare and explain the intervention of the human being in nature and society, exercising curiosity and proposing ideas and actions that contribute to the spatial, social and cultural transformation, in order to participate effectively in the dynamics of social life. And 2) use geographic knowledge to understand society/nature interaction and exercise interest and the spirit of research and problem solving; as well as develop autonomy and critical sense for understanding and applying geographic reasoning in the analysis of human occupation and space production. (BRAZIL, 2017).

Thus, the view that society and nature are intrinsic to geographic analysis appears in the presentation of the discipline of Geography, as well as categories and concepts, thus these skills and competencies relate to the relationship between society/nature. Therefore, what

really matters is to highlight how the physical-natural themes are important in understanding the geographic space, where one lives and how they are present in spatiality's, how they can be apprehended through geographic education, which implies reflection on the contents and their treatment (CALLAI, 2015 apud CUNHA, 2018).

Thus, on what is expected of what has been called Physical Geography, Nunes (2015, p.128) points out that, "what is expected is that Geography, especially Physical Geography, will build a full view of the processes of nature production, where nature and society are integrated, regardless of the verticalization of the theme, or the spatial cutout, to be adopted in geographical studies."

From this perspective, we can think about the actions developed in geographic science, performing the integration between the natural physical environment and the social phenomena that develop and influence the environment. Thus, with regard to actions worked from extension, the study will focus on the extension project entitled "Social Cartography and Environmental Education in the Municipality of Baía Formosa/RN", which was developed through the partner of the Research Group on Landscape Geocology, Environmental Education and Social Cartography - GEOPEC, federal university of Rio Grande do Norte - UFRN, coordinated by Professor Dr. Juliana Felipe Farias, professor of the geography department of the institution, and the State School Professor Paulo Freire of the municipality of Baía Formosa. It is worth noting that the project could also have been developed with any other portion of the community, besides the school, being easily adaptable.

In order to incorporate the environmental dimension not only with the objective of educating, Environmental Education (EA) confirms that all social and environmental manifestations enter into communion to adapt their demands and raise awareness of environmental problems. Thus, dealing with the themes addressed from the extension is not just an exhibition about the themes, but rather, as these areas can be actively identified, the factors or actions that promotes degradation or cause negative impacts on the environment and the population, addressing how these impacts can be solved or reduced, materialized by social cartography as a tool.

Therefore, the present study aims to develop a social mapping presenting a diagnosis that prioritizes the identification of local potentialities and limitations, in addition to mitigating impacts and conflicts, going through environmental education actions in the municipality, inserting in this context active social participation through social cartography.

MATERIALS AND METHODS

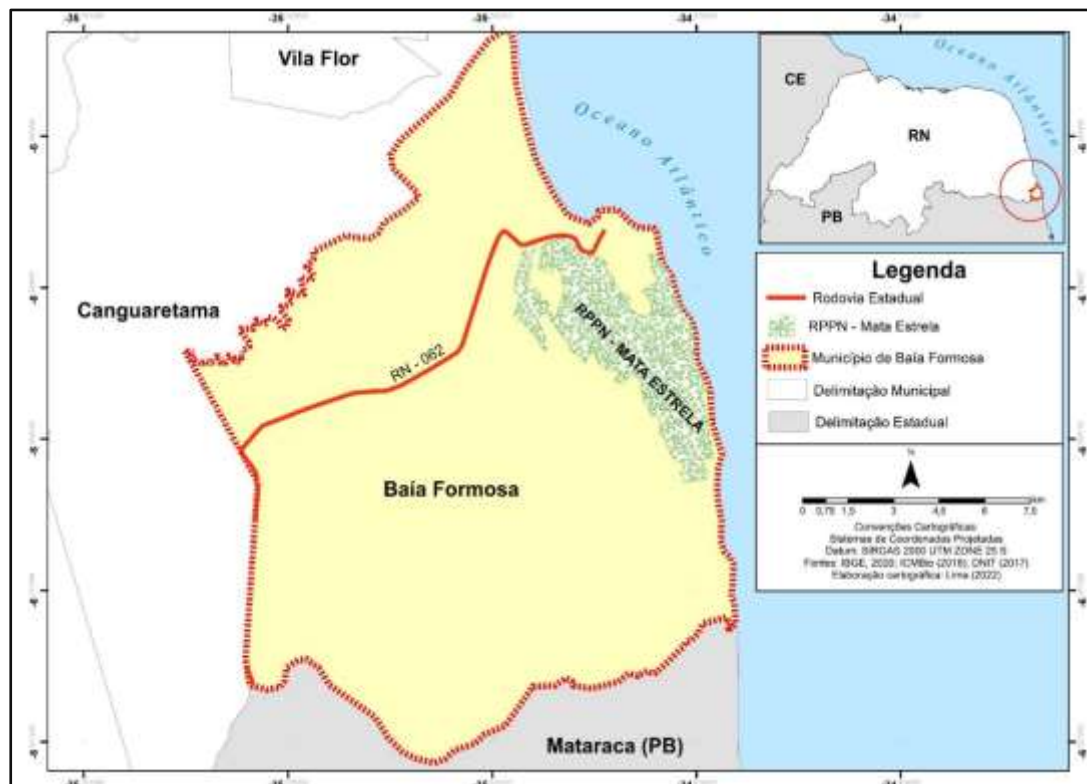
Area of study

The municipality of Baía Formosa, chosen as the study area, is located approximately 100 km from Natal, the state capital and belongs to the micro region of the south coast. With regard to its municipal limits, the site borders the municipality of Canguaretama (RN) and Mataraca (PB). Thus, it is worth noting that before its political emancipation obtained in 1959, Baía Formosa was part of the territorial extension of Canguaretama.

Its denomination is attributed before its characteristic as a bay (recess of the coast through which the sea advances to the interior of the continent), allowing the boats to land near the continent, so the municipality has its economic and territorial formation from a nucleus of fishermen who settled on the site and developed their activities motivated by the geographical location and availability of natural resources to take their livelihood, which is currently characterized by the strong presence of fishing and sugarcane cultivation. Currently, the projected population of Baía Formosa is 9,218 inhabitants, according to IBGE (2018).

On the environmental physical aspects of the municipality, it is important to highlight that Baía Formosa encompasses the largest continuous area of Atlantic Forest in the state, according to ICMBio (2018) the area corresponds to 2,039.93 ha with the Private Reserve of Natural Heritage (RPPN) – Mata Estrela (Image 1). Thus, its vegetative aspects constitute as a formation of beaches and dunes where these dunes are stabilized or fixed when covered by natural and named vegetation. In the area it is also possible to verify the mangrove ecosystem to which other plants and animals are associated, adapted to a soil periodically flooded by tides, with great variation of salinity, as addressed by SEMARH (2008).

Image 1 - Location of the study area



Source: Elaboration of the authors (2022)

About the geology of the site, it is inserted, geologically, between the sedimentary basement of the Barreiras group and Holocene sedimentary deposits (Souza et al, 2019). Faced with the geomorphological attributes, it is found in a natural region Wet and sub humid sedimentary plains and plateaus" that is divided into 2 (two) geocomplexes: "Humid coastal plains" and "Humid coastal plains" (Diniz; Oliveira, 2018).

By performing the association with the soil types present in the municipality, it is possible to verify two types, according to the Brazilian System of Soil Classification: Chromic Luvisol and Litholic Neosol. According to IDEMA (2008) soils classified as Chromic **Luvisol** present medium to high natural fertility, sandy / clayey and medium / clayey texture, stony phase, smooth wavy relief, well drained, relatively shallow and very susceptible to erosion. In turn the Litholic Neosols comprise a high natural fertility, medium texture, stony and rocky phase, smooth wavy relief and strong wavy, shallow, much eroded, well to sharply drain. Thus, soils allow economic activity through management techniques adapted to the situation in which they present themselves, where they lack medium and low-sized technological levels.

When portraying the municipal water resources, according to the CPRM (2005) the presence of 37.75% of the municipality inserted in the perimeter of the Guaiú River basin 33.99% in the domains of the Curimataú River basin and 26.43% in the Coastal Strip of Diffuse Runoff. In addition, the municipality is bathed by the Atlantic Ocean and the Taboquinha and Calvaçu streams. There are no dams with accumulation capacity equal to or greater than 100,000m³. All watercourses have intermittent regime and the drainage pattern has dendritic predominance.

The climate of the municipality is similar to that of the state capital, being classified as rainy tropical according to koppen classification constituted as type Aw. Its average annual rainfall is 1230 mm, with rainy periods from January to August and its average temperature is around 25.8 °C (EMPARN, 2019). In order to synthesize the information about the environmental physical attributes present in the study area, Table 1 represents a compiled of the above-mentioned information.

Table 1– Synthesis of information on the physical and environmental attributes of the study area

Environmental Physical Attribute	Characteristic
Vegetation	RPPN Mata Estrela - Remnant of the Atlantic Forest; Formation of beaches, dunes and presence of the Mangrove ecosystem
Geology	Sedimentary basement of the Group Barreiras and Holocene sedimentary deposits
Geomorphology	Natural region Wet and sub humid sedimentary plains and plateaus" that is

	divided into 2 (two) geocomplexes: "Wet coastal plains" and "Humid coastal trays"
Soil association	Chromic Luvisol and Litholic Neosols
Water Resources	Hydrographic Basins: Guaiú River, Curimataú and Diffuse Runoff Coastal Strip; Streams: Taboquinha and Talvaçu; Atlantic Ocean.
Climate	Aw (tropical rainy) with average precipitation of 1230 mm (January to August) and average temperature of 25.8 °C

Source: Organized by the authors (2022)

In view of the application of the project in the municipality of Baía Formosa, a place was presented for the execution of social mapping and socialization practices of the theoretical concepts that guide the desired products to be made. Thus, in order to corroborate so that all practical stages of the project were carried out, the chosen place was the Professor Paulo Freire State School.

This is the only school that offers high school in the municipality, founded in 2000, currently having only 22 years of existence. The school has three shifts (morning, afternoon and night), with 338 students (School Census 2021, INEP), and the proper code of INEP - 24073857, it is also worth mentioning that the school still receives students coming from the rural area (districts of the city, such as: Sagi, Pituba, Uriuna and Estreito), so it is verified that several students perform the process of commuting migration to get to the educational institution. Moreover, with regard to the physical structure, it is noted that it has 04 classrooms; 01 robotic laboratory; 01 library; 01 female bathroom, 01 men's bathroom, 01 secretariat; 01 room for direction; 01 teachers' room; 01 kitchen; Courtyard; and Green area/space and/or garden.

Thus, it is verified that the school in question as well as most public schools in the country have some limitations and problems, however, it was evident the great receptivity to the actions of the extension in this school, both by the management, as well as by the students involved, which corroborated so that even in the face of a pandemic, the contact lasted until the implementation of the project.

Methodological procedures

Farias et al (2021) address that extension projects have mostly medium and long-term planning, since actions are interconnected and happen dynamically. Thus, it is worth emphasizing the importance of having a contact between University and social representation in the chosen area so that everything can be planned according to real demands and applies in order to extract and bring the greatest amount of information to each activity.

In view of the above, for the realization and application of the project in the municipality, it was necessary to distribute the activities in phases so that it was possible to obtain satisfactory results and that they were correlated with the themes addressed.

Therefore, in order to choose which activity will be more coherent/functional or not, it is not necessary to elaborate content with high complexity, since, as already discussed above, it is part of the process of sensitization the act of reflecting and analyzing how the information will be passed in an understandable way and generating an approximation with the theme to be worked on (FARIAS et al, 2021. p.614).

Thus, the phases of the project were distributed as follows: research, action and participation In the first phase, surveys and field activities were carried out on site with the participation of guiding professor, volunteer students of the project and school management in order to identify relevant points for social mapping as well as the location of negative impacts from anthropic actions and the spatialization of environmental physical characteristics of the municipality (geological, geomorphological features, vegetation heritage and soil types) to add to the applied concepts.

In turn, the second and third phase (action and participation) occurred in ways that respected health protocols due to the pandemic and were aggregators for the participating students. Thus, 5 (five) workshops were held, 3 (three) in face-to-face format and 2 (two) in remote format through the Google Meet application. Table 2 discusses the workshops and the modality in which it was applied.

Table 2- Workshops and application modality in school

WORKSHOPS HELD IN THE PROJECT	
<i>Workshops</i>	<i>Application mode</i>
Moment of Integration	Classroom
Typography and Social Cartography	
Participatory Mapping	
Conceptual Concepts of Geography	Remote
Environmental Education	

Source: Prepared by the authors (2022)

With the workshops, it was possible to verify that all participants made their contribution from their own vision about the municipality where they live, which subsidized the

preparation of participatory mapping through the social cartography tool and corroborated the insertion of the natural physical theme in the project.

RESULTS AND DISCUSSION

The Social Cartography and Environmental Education project in the municipality of Baía Formosa/RN was born with the aim of mapping ideals and building actions from the extent, for this by appropriating geographic knowledge and materializing them in the lived reality of the participants of the actions.

Thus, it is verified that the concept of Environmental Education used in the project fits the perspective "Emancipator", proposed by Loureiro (2004) that understands environmental education as an element of social transformation inspired by dialogue, the exercise of citizenship, the strengthening of subjects, the creation of collective spaces, the overcoming of forms of domination, understanding the world and life in its entirety.

The author also adds that environmental education should be seen as a democratic practice, which prepares for the exercise of citizenship through individual and collective active participation, considering the socioeconomic, political and cultural processes that influence it. Thus, the understanding of Environmental Education in its emancipator aspect is consistent with the concept and objective of extension, and fits perfectly into the theoretical propositions and methodological procedures of Social Cartography.

Considering that all axes have as their central focus actions thought at the University and focused on society, Social Cartography is used as a tool that facilitates the knowledge and analysis of a set of spatial information of a given territory, however the social adjective informs that the mapping is the result of a collectively constructed participatory process (COSTA, et al. 2016). This being a field of Cartographic Science that privileges popular, symbolic and cultural knowledge (GORAYEB; MEIRELES; SILVA, 2015).

Thus, with the flexibilization of safety protocols, it was possible to perform the expected face-to-face moments at the school. Initially, the first contact with the group of students was due to the workshop "moment of integration", a moment reserved to meet all the participants of the project (group of students and teachers), through an integration dynamic (Image 2).

Image 2 - Moment of integration between participants



Source: Collection of authors (2021)

The objective of this workshop was the presentation of each participant, creating a space for them to feel comfortable to highlight the information they thought pertinent about them, such as: name, age, series, why they were interested in participating in the project and what the expectations were. The first person to speak at the end of his speech passed a line (string) to the colleague that he would like to continue the presentations, and so it happened until he reached the last person, in order to create a "web / network" of people, thus demonstrating that the actions of the project would follow this perspective of interconnection of knowledge and sharing of knowledge as a true network aggregating all.

After this workshop, it was the moment when the group responsible for teaching the workshops carried out the official presentation of the project to the students, explaining the two fields of action of the project, focusing on Environmental Education and its practical developments, as well as the proposal of mapping participating, being this product of social cartography. Moreover, this whole moment was opened to hear and identify the participants' previous knowledge about these great themes, as well as their lived place, allocated potentiality and limitations of each part of the space and feature of the landscape. Since "taking into account the lived world of students implies apprehending their previous knowledge and their experience in relation to the subject studied" Cavalcanti (2013 p.148), in order to advance to a more systematized knowledge.

Thus, the students were able to share and cite places in the municipality, which present problems in relation to high levels of pollution, occupation of undue areas - located in areas at risk of landslide, areas where rudimentary practices of soil and garbage management are carried out, etc. On the other hand, from this activity were also added preserved areas with high economic and tourist potential.

In this perspective, the phase of active participation of the project began, where the students of the institution were divided into groups and each received a satellite image

(LANDSAT Image 8 on date of 2020 - wet period) of the municipality. With the aid of vegetable paper, pens, colored pencils, adhesive tape and rulers, they were able to analogously map areas of the municipality that were relevant in their view or that had the aforementioned environmental problems.

Goldstein et al (2012, p.47), in turn, points out that the result of participatory mapping does not necessarily generate maps according to the norms of cartography. Reports, illustrations, paths, schematized scripts can be initial or final objects of these experiments. Usually this mapping is related to both environmental and spatial planning issues.

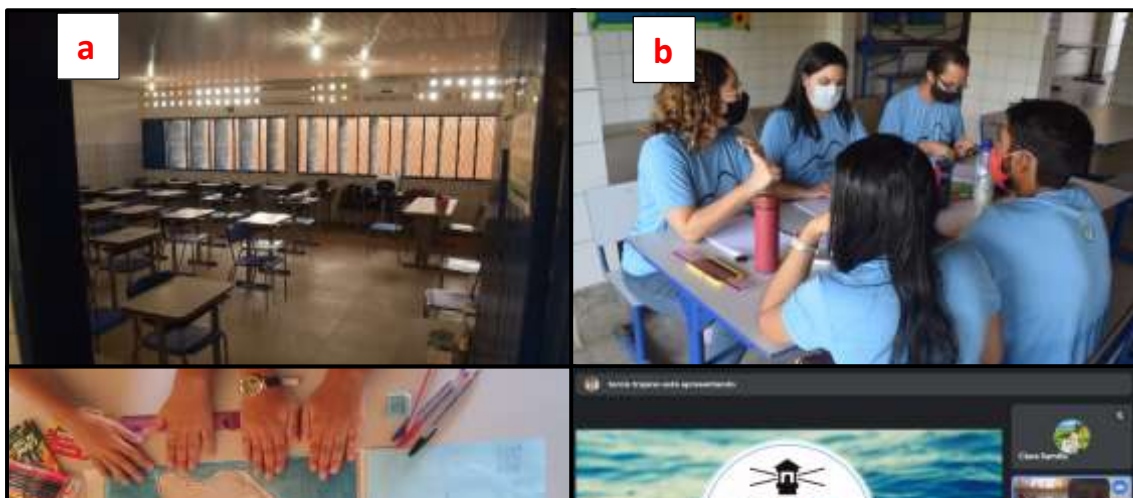
When performing the mapping, the participants had the opportunity to use colors of their preference and build subtitles so that everyone could visualize what was being represented, finally, a moment of debate and presentation of the social maps was held, in which the participants' vision about the mapped locations was presented, identified and thus shared.

Among the mapped areas, we can mention places with environmental problems that directly impact the landscape features as well as the quality of life of the population, such as: absence of an appropriate place for disposal of solid waste, lack of adequate sanitation, deforestation in dune areas, depredation of cultural and tourist heritage, such as in the surroundings of lookouts, thus harming areas of strong nature of belonging to the population.

It is also worth mentioning the importance of remote moments, in which it was possible to work on themes such as: "Conceptual Concepts of Geography", recalling and applying key concepts for Geographic Science (space, territory, region, landscape and place) relating the concepts with images from different locations, including the municipality in question, making students able to apply the theoretical concepts seen in the classroom in the practical reality experienced by them. Thus, it was possible to simply understand the basics and bases of geography, in order to better understand and systematize also how environmental education, and social cartography can be developed in favor of a better care for the environment, which is directly linked to the quality of life of an entire community.

Therefore, even with the difficulties experienced in 2020 and 2021 due to the pandemic, the project remained alive, with the support of the school and interest of students in the development of actions, being possible to perceive and experience a rich exchange of experiences and construction of knowledge, as well as concrete products such as the representation and delimitations of places with emphasis on the potentiality and local socio-environmental limitations. Mosaic 1 presents some records of the activities carried out in the project, being preparatory, face-to-face workshops or remotely and result of mapping through social cartography.

Mosaic 1 - Records of steps performed in the Project





Legend: a) School classroom; b) preparation and organization of the ministry team for the face-to-face workshops; c) result of participatory mapping through social cartography; d) holding workshop remotely. Source: Collection of authors (2021).

FINAL CONSIDERATIONS

Undoubtedly, integration, the product of extension actions, is extremely rich, both by the exchange of experiences/experiences, as well as in the construction of knowledge/knowledge. It is noted that the actions developed in the extension project highlighted here have led to moments and material and immaterial products that reverberate outside and within the academy, outside in the perspective of bringing empowerment to the school and the community, where students and teachers have the opportunity to become multipliers of these knowledge, processes and the work developed, in view of the plural and dynamic characteristic of the school as an active agent of citizen formation.

The guarantee of receptivity and all the interest of the school community in relation to the practical application of the actions and developments of the project, allowed the maintenance of the dialogue between the University and civil society, passing on and building information and updates about the theoretical improvement and the propositions in relation to the elaboration of our activities. It is also noted that both teachers and managers understood the dimension of participatory mapping and knowledge of social cartography in a category that integrated the methodology in geography teaching, in the teaching-learning process and, in addition, in the university-school-community relationship, as well as the relevance of the theme of looking closely at the natural physical attributes of the municipality.

Thus, the knowledge acquired and developed has the mission of reaching the most diverse audiences, contributing and positively impacting the lives of groups of people and the place in which they live. Being the academic context, it aims to contribute to the doing science, assisting and providing theoretical-methodological device for other teaching, research or extension projects, becoming an integral theme or part of research of monographs, dissertations or theses. Thus achieving the idea of going beyond the walls of the university seeking to contribute in various ways.

In addition, as an unfolding of this project is currently active another extension project "Dingbats Sources as a tool for the documentation of local culture: a proposal from social cartography actions in the municipality of Baía Formosa (RN)" an interdisciplinary interaction between areas of Design and Geography, in addition to the dissertation project under development entitled "Geoecology of Landscape and Social Cartography: A proposal for participatory mapping and use of resources in Baía Formosa."

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