



## Environmental issues in geography teaching in a public state school in Manaus - AM

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### Edilza Laray de Jesus

Professor at the Amazonas State University

### Vilma Terezinha de Araújo Lima

Professor at the Amazonas State University

### Karla Karoline Sousa de Oliveira

Professor at the Amazonas State Education Secretariat

### Lael Martins Queiroz

Geography student at the Amazonas State University

### ABSTRACT

This article presents contributions of Geography to the understanding and engagement of students in environmental issues. It results from research conducted in partnership between the University of Amazonas State and the State Public School and aimed to investigate the contribution of Geography to the knowledge of environmental problems in Manaus. The qualitative approach guided the bibliographic research and the construction of the methodological design proposed in the pedagogical trail: presentation of the research plan and the diagnosis of the environmental knowledge of the students, a lecture on the environmental issue, workshop to produce amateur video, production of the videos and socialization of learning at school. The arguments were constructed from the analysis of the diagnosis about the perception of students about environmental issues and the content of the videos produced by them. The results present data that allow convergent reflections: i) the social isolation of the pandemic period and some gaps in learning about the environmental issues of Manaus; ii) the importance of environmental experiences and links provided by geography in school; iii) the didactic video contributes to the work of the geography teacher. The research gave students a greater understanding of their reality from the point of view of their spatiality.

**Keywords:** Geography, Environmental education, Environmental video.

## 1 INTRODUCTION

In the complex dynamics of society-nature relations, environmental issues directly involve the guarantee of socio-biodiversity and the exercise of citizenship for the prevention and resolution of socio-environmental problems. Human rights such as health, food, education, work, housing, and sanitation come up against constitutional provisions that state: "everyone has the right to an ecologically balanced environment, an *asset for common use by the people and essential to a healthy quality of life, and it is the duty of the government and the community to defend and preserve it for present and future generations*" (Constitution of the Federative Republic of Brazil, 1988, art. 225).

Aware of the formative responsibility inherent to the science of geography and the teaching of geography in the classroom, the professors of the University worked on two research projects entitled: "Geography and Environmental Knowledge in a public elementary school in Manaus" provided by the Amazonas State University (UEA), through Ordinance No. 397/2020 for Scientific Productivity and "The



construction of environmental knowledge in elementary education in public schools in Manaus" - Notice MCTIC/CNPq No. 05/2019 Project Science at School. These professors have in common teaching in Geography at UEA and participation in the CNPq Research Group Teaching Research Interdisciplinarity and Sustainability in the Amazon - Episa.

The general objective of this work was to investigate the contribution of Geography to the knowledge of environmental problems in Manaus. To achieve this, the following strategies were adopted: i) identify, at the State Public School, the students' schooling trajectory. ii) evaluate the environmental perception of students from the contribution of Geography. iii) develop Environmental Education activities highlighting the complexity of the environment and; iv) produce amateur videos on the environmental theme with the students' eyes.

### **Contextualizing environmental issues in Geography teaching**

In spite of the Conferences and environmental agendas, the world continues to deplete the biosphere. Brazil has been presenting the highest rates of deforestation to meet extractive interests and expand the agricultural frontier. This is what the *Correio Brasiliense* newspaper reported, based on data from the Brazilian Institute on the advance of the agricultural frontier plus the deforestation of biomes: "Brazil has lost approximately 513 thousand km<sup>2</sup> of native areas in the last two decades - equivalent to 6% of the country's territory or the sum of the states of São Paulo, Rio de Janeiro, Paraná and Sergipe (IBGE. 2022). In the Amazon we can already see the effects of deforestation on the rainfall regime, on the floods and ebb tides of the rivers, showing that the pace of environmental destruction is much greater than the solutions presented so far. Thus, we have the loss of biodiversity, degradation of the habitat of the Forest and of the Amazon Basin, modification of the global climate, loss of the hydrological cycle, and social impacts. As Maretti (2022) notes, these impacts translate into more poverty and, in some cases, the migration of people to other areas to ensure their livelihoods.

And why study environmental issues in the Amazon? Because it is the largest Brazilian biome with an area of approximately 6,700,000 km<sup>2</sup>. It is the largest remaining block of tropical forest in the world, occupies 1/3 of South America and is present in 9 countries: Suriname, Guyana, French Guyana, Venezuela, Colombia Peru, Ecuador, Bolivia and Brazil. Of this area, more than 60% belongs to the Brazilian territory. Besides the states of Amapá, Acre, Amazonas, Pará, Roraima, Rondônia and Tocantins, it reaches the West of Maranhão and Mato Grosso.

With megabiodiversity, it is home to an enormous number of plants and animals that exist on the planet, and most of these species have not even been studied by scientists. The wildlife of the Amazon shares space with about 30 million people. This population includes more than 220 indigenous groups, as well as traditional communities that depend on natural resources for survival. The Amazon is home to the Amazon, the largest river in the world in terms of length and water volume, with a length of more than



6,400 km (WWF, 2022). And it is in this complex and dynamic environment, rich in cultures and ancestral knowledge, that the struggle is waged between preservation and destruction.

Burning, biopiracy, illegal fishing and hunting, deforestation, and mining have serious social and environmental consequences for planet Earth. From the loss of biodiversity, the degradation of habitat, the modification of the global climate, to the silencing and death of traditional peoples and cultures. In order to preserve the Amazon and signal sustainable actions contrary to capitalist market forces, geography debates degradation from the point of view of political, social, and economic order. The military governments of the 1970s implemented so-called modernization projects, granting financial concessions and credit in the name of development. However, enormous political obstacles to sustainability, understood as part and result of economic, social and environmental decisions, are perceived.

The relationships between society and nature problematized from the category space permeate the geographic contents and "Geography asserts itself to be the school curriculum component able to bring to the classroom the reality of the contemporary world, as if the other school subjects could not also do the same". (STRAFONINI, 2018, p. 3). School education is guided by national regulations related to environmental issues, (re)creates curricular plans and didactic-methodological dynamics and intends to strengthen school-community relations.

In the 1980's, the National Curriculum Parameters (PCN) established the *environmental dimension* as one of the transversal themes in the curricular programs of elementary education and opened ways for interdisciplinarity. In the 1990s, Law 9,795 was instituted, of the *National Policy for Environmental Education* for all levels and modalities of education in the formal and non-formal spheres. In 2018, the Common National Curricular Base (BNCC) was sanctioned and is in the process of implementation through the State and Municipal Curricular References throughout the country.

By prioritizing a set of skills and competencies, assigning the teacher such a responsibility, on the one hand the BNCC omits the Brazilian context of disregard for education manifested in budget cuts, low teacher salaries and the physical conditions of schools, especially those in the countryside, forests and waters, and therein lies the biggest criticism of the document, which serves the neoliberal proposal for education by setting goals to meet the demands of labor for the market.

On the other hand, it has an educational intent by emphasizing the importance of the school articulating the scientific, social, emotional, and cultural dimensions, articulating all areas of knowledge. It also establishes that the formative experiences allow students to know themselves and the other, to know and understand the relationships with nature, with culture, and with scientific production that are translated into personal, social, and environmental care practices. Therein lies the link with environmental education: understanding the various dimensions of life in society involves the formation of a critical subject with a broad perception of his or her environment.

According to Layrargues and Lima (2011), the critical conception of environmental education is an alternative to the conservative conception because it adds the sociocultural dimension for a better



understanding of the society-nature relationship. It requires the interlocution between the various disciplines. In basic education, geography has the formative role of guiding students to read the space, from the closest to their experience to the most remote, aims the formation of critical citizens and protagonists of effectively ethical actions capable of opposing the consumerist challenges guided by instrumental and economic rationality.

Manaus, capital of the state of Amazonas, received the Free Trade Zone Project in the 1970s and, if on the one hand it was responsible for keeping the forest standing, on the other it served as a magnet for urban growth and increased the rural exodus. People from this state and from neighboring states sought work, income, and better living conditions, especially in the fields of health and education. The banks of the igarapés were occupied and these were polluted and killed. The process of urbanization and occupation of urban space leads to the production of garbage, air pollution, and water pollution. In this aspect environmental education contributes to the understanding of today's society and aims ideas, collective practices that are able to structure a new model of society, in which the complexity of the environment is considered, as Layrargues (2011) states

Environmental education as a national policy is present in the 1988 Federal Constitution, in the 1999 National Policy for Environmental Education, and in the National Curriculum Guidelines. It is a dimension of education and should be worked on in all educational modalities and in all subjects as a transversal theme. It is closely related to geography because its object of study is the space where the interactions between society and nature take place. When working on environmental issues in Manaus it is possible to approach them from a local to a global scale. In this sense environmental issues are global.

Assuming that the teaching of Geography contributes to the formation of an environmental citizenship, the environmental rationality advocated by Leff (2000) associated with the idea of complexity of Morin (2003) the school needs to work much more than skills and competencies and aim for environmental awareness by the formation of critical thinking about environmental issues in Manaus, precisely because we are nature. The formation of sustainable societies is imperative.

Carneiro (2022) proposes three perspectives for geography to work on environmental issues: at the methodological level: *interdisciplinarity*, due to the complexity of environmental problems that require different views of sociology, philosophy, ecology, economics, anthropology, biology, etc. Another perspective is the *criticism* of the development model based on exacerbated production and consumption and establishes nature as a source of energy, raw material for the generation of products. The third perspective is *prospective*, ethical, and conceptual, capable of breaking the dissociation between society and nature and learning, for example, from traditional societies and their harmonious relations with the cosmos. These perspectives establish environmental education as theoretical and practical knowledge and a condition for environmental sustainability. The author clarifies (2002, p. 44):

The formation of a *geographic reasoning* by the student is the founding goal of school geography: from the identification and distribution of elements in the vital space, through the apprehension of



phenomena under increasing scalar representations, the apprehension of causal relations of location and spatial variations and reaching the understanding of the forms of organization and human construction of space, in the context of society-nature relations. In this progressive sequence of cognitive breadth and analytical-interpretative penetration, the student will be able to understand the world as a relational space. By thinking about geographic relations, they will also grasp and think about environmental interdependencies, in the perspective of desirable changes and transformations, through appropriate strategies, in view of socioeconomic development styles compatible with quality of life, at local levels and in different places, peoples or nations. And here comes the action of the school, the teacher, the geography teacher, to value the curricular time of this discipline as *geographic education* - in line with a professional commitment, therefore competent and ethical, for the realization of the environmental dimension of school education (MÉRENNE-SCHOUMAKER, 1994, p. 31-32; ALEXANDRE; DIOGO, 1997, p. 45-47).

It is possible to work in geographic education with different social groups problematizing representations of the environment. Students have perceptions of nature and, in order for them to assume citizenship and ethics as assumptions for their actions, they need to think about water, air, and forests. They need to understand the interrelationships between them and the techniques used by human beings. That is why environmental education is a transdisciplinary theme in basic education and a subject and course in higher education, and why it is premised on discussing environmental issues.

### **Methodological Procedures**

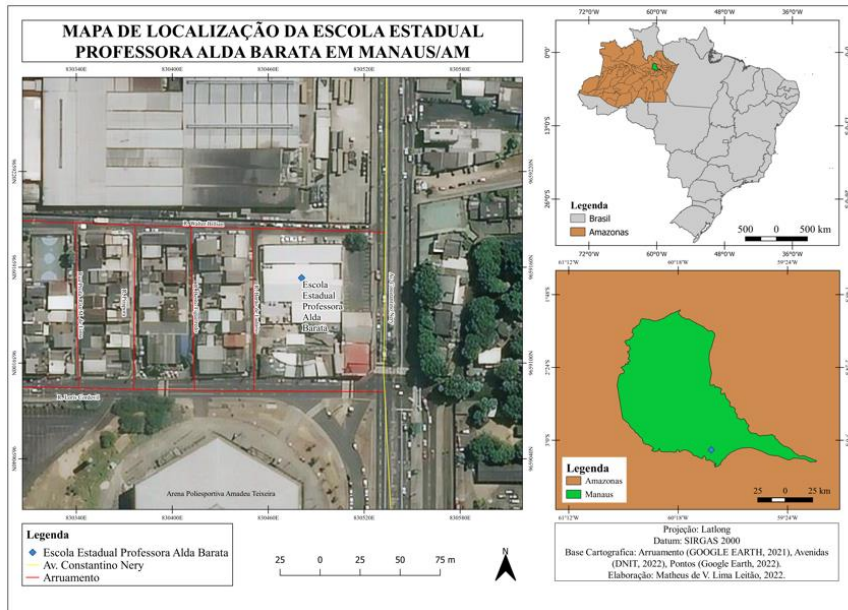
The bibliographic and field research was made possible by the use of a qualitative approach through the Discourse of the Collective Subject (DSC) method addressed by Lefevre et al. (2009), whose purpose was to contextualize the students' learning about environmental issues of Manaus, based on their most immediate place of experience: the street, the neighborhood, the route to school and the school itself. The search for theoretical elements in books and websites such as Scielo, Google Scholar and Microsoft Academic Search allowed access to previous studies. The field research was divided into thematic stages to organize the methodological steps. Three steps were established: a) identification of the students' knowledge about environmental issues in Manaus; b) a video production workshop using a cell phone; c) elaboration of a Collaborative Activity Guide (RAC). The purpose was to investigate the contribution of Geography to the knowledge of environmental issues in Manaus.

### Research location

This study was developed in a State Public School located in the Flores neighborhood, Midwest of Manaus - AM, on Constantino Nery Avenue, near the Amadeu Teixeira Sports Arena, one of the most important access roads, with bus lines from the six administrative areas of Manaus. The E is 6 km from the city center and a 4-minute walk to the nearest bus stop. It has 583 students enrolled (School Census 2021, INEP).



Figure 1 - Location of the study area



Source: LEITÃO (2022).

The school has a Political and Pedagogical Project (PPP), but it was not possible to access it because it is being reworked. The last meeting took place on 18.05.2022, as shown in fig. 2.

Figure 2 - General Assembly to (re)elaborate the PPP

Source: [https://web.facebook.com/eealdabarata/?\\_rdc=1&\\_rdr](https://web.facebook.com/eealdabarata/?_rdc=1&_rdr) (2022).

The ease of access to the school justifies the presence of students from various neighborhoods, from the closest to Flores to the most distant. There are also foreign students from the Dominican Republic, Venezuela, and even from European countries. The school works with 6th and 7th grades in the morning, and 8th and 9th grades in the afternoon. The partnership between the University and the Public School implied the action research as a possibility to fill possible theoretical and practical gaps about the environmental knowledge of the students of the Elementary School II.



### Research subjects and ethical procedures

During the pandemic period in the years 2020 and 2021 classes were suspended in the Amazon and worldwide. When the deaths and cases related to covid-19 decreased, the safe return to classroom classes was duly authorized by the Ministry of Education (MEC) through Technical Note No. 343 for all school systems, as long as it respected the measures compatible with biosecurity guidelines such as social distancing, staggering for entrances and exits, availability of alcohol gel, equipment for hand washing, among others.

Thus, for the development of the research were selected, from an extensive dialogue with the manager and the geography teacher of the school, that the 8th grade would represent a possible environmental trajectory made possible by the school education. The 5 8th grade classes participated in the first stage of the research - the diagnosis of environmental perception and answered the printed questionnaire. For the following stages only 1 class with 28 students participated in the activities proposed in the research and this cutout is justified by the need to rescue contents taught during the pandemic period caused by the social distance and the priority of Portuguese and Mathematics contents for the entire public network of Manaus and Amazonas. The class selected for the elaboration of the project was the one that best fit the criteria assigned to the research so that the content taught during the school year would not be compromised. The geography teacher, partner in this research, reserved part of the content prescribed in the curriculum to be worked on by the UEA researchers.

The inclusion criteria for the students were: being duly enrolled and attending the State Public School, being in the 8th grade of Elementary II, and agreeing to participate in the research. On the part of the geography teacher: interest in participating in the activities. And from the management: the signed Letter of Consent, respecting ethical procedures. As exclusion criteria, students who presented any impediment or health problem that hindered their participation in the stages of research did not participate in the study, respecting Resolutions 446/2012 and 510/2016 of the Research Ethics Council. In order to protect the image rights of the students, all were always done with their backs turned. The work in the classroom had the active participation of the Geography Teacher, co-author of this work, since the outlining of the field activities until the last stage.

### Techniques, stages and collection instrument

The first contact with students to learn about environmental issues in the city of Manaus was through the presentation of the research and general information about the project to be developed and also applied a printed questionnaire containing open and closed questions, with total freedom of answers. In the second activity there was a lecture on environmental issues, with a historical review since the Industrial Revolution considering the economic, political, cultural and ecological aspects, going through the global and national environmental problems.



The environmental problems of the city of Manaus were pointed out by the students themselves and the lecture was very participatory. The third activity was a workshop to produce environmental videos with the use of cell phones, taught by a geography student and scientific initiation scholarship holder of the UEA teachers. Nine videos were produced, being only one collective and seven individual. All were analyzed under technical and content criteria. In the fourth and last stage the students watched the 9 videos and in the process the class commented on the impact of the activities in their individual and collective formation. The research activities were organized according to the specific objectives, their main thematic elements, and their respective operationalizations.

### Operationalizing the Field Research

A total of 114 students from four 8th grade classes participated in the research. Of this total, 64 declared themselves female, 48 male, 1 male and 1 female, and 1 did not declare himself. About their schooling trajectory (goal i), all of them started in elementary school with the expectation of staying until high school and finishing their studies in this modality until they were 14 years old. They understand that school education is the best way to guarantee a future with decent work and income. They are between 13 and 15 years old, indicating that there is no age/grade distortion.

The students' environmental perception was answered according to the cognitive (chart 1 and figures 2 and 5) and attitudinal (figures 3 and 4) criteria from the contribution of the Geography worked by the school (objective ii), and are demonstrated below:

Table 1 - Geography's contributions to students' environmental perception

Question in the form	Student response
Geography and environmental issues	<ul style="list-style-type: none"> <li>Talk about the Amazon, the country and the world</li> </ul>
Responsibility for the environment	<ul style="list-style-type: none"> <li>It belongs to all sectors of society (public authorities, school, family, individuals, and social organizations 85%).</li> </ul>
Interest in discussing environmental issues	<ul style="list-style-type: none"> <li>Awakened during the various contents worked on</li> </ul>
Main environmental problems worked on	<ul style="list-style-type: none"> <li>Garbage, fires and deforestation in the Amazon</li> </ul>
Participation in environmental education projects	<ul style="list-style-type: none"> <li>Little or no participation</li> </ul>
Media research on the environment	<ul style="list-style-type: none"> <li>Do not perform</li> </ul>
Event focused on environmental awareness	<ul style="list-style-type: none"> <li>Arbor Day</li> <li>World Water Day</li> </ul>
Research in environmental news	<ul style="list-style-type: none"> <li>Deforestation and fires in the Amazon</li> </ul>
About deforestation and fires in the Amazon	<ul style="list-style-type: none"> <li>Aggression to nature</li> <li>Harmful to all forms of life</li> </ul>
Places in Manaus with environmental problems	<ul style="list-style-type: none"> <li>Polluted and dead Igarapés with bad odor</li> <li>Sambódromo after the holidays</li> </ul>
Targeted environmental actions	<ul style="list-style-type: none"> <li>Rational use of water</li> <li>Turning off lamps and electrical appliances when not in use</li> <li>Correct disposal of garbage</li> </ul>
Environmental care reference-places	<ul style="list-style-type: none"> <li>Amazonas Theater</li> <li>Mindu Municipal Park</li> <li>Amazon Rainforest</li> </ul>
Day-to-day guidelines	<ul style="list-style-type: none"> <li>Use water without wasting it</li> <li>Turn off lamps and household appliances when not in use</li> <li>Correctly dispose of garbage in appropriate places</li> </ul>
Suggestions for your School	<ul style="list-style-type: none"> <li>That all teachers talk about these topics</li> <li>Field classes to parks, zoo, Museum of the Amazon and Inpa.</li> </ul>

Source: research data (2022).



Other representations of environment are shown in the figures below:

Figure 3 - Topic that the student comments the most about the environment



Figure 4 - Destination of solid residues

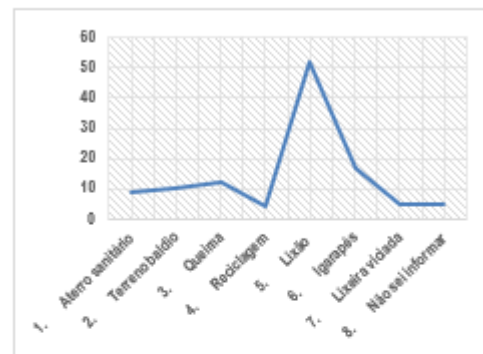


Figure 5 - Individual actions to conserve the environment

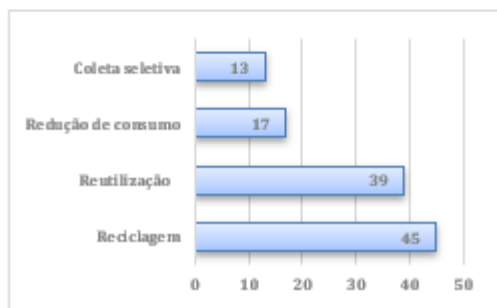
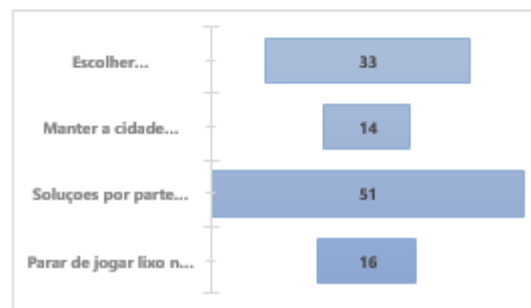


Figure 6 - Collective actions to reduce the environmental problems in the city of Manaus



In fulfillment of objective iii, the Environmental Education activities developed with students highlighted the complexity of the environment. A script for a lecture was prepared from the framework and reference figures (presented above). Moscovici (1981) offers contributions for geography teachers to approach the environment based on the students' social representations, and in this stage of the research social representation is a set of concepts, explanations, and statements that originate in daily life, in the course of inter-individual communications, and the universe of social representations is common sense. The reflections of Del Rio & Oliveira and Yi-Fu-Tuan were also used to understand the concept of environmental perception through social representations.

Del Rio and Oliveira (1999) define environmental perception as the mental process of human interaction with the environment through perceptual mechanisms, directed by external stimuli captured by the senses and cognition comprising the contribution of intelligence to the perceptual process since the motivation to the decision and conduct. For Tuan (2012, p. 4), "perception is both the response of the senses to external stimuli and the purposeful activity in which certain phenomena are clearly registered, while others recede into the shadows or are blocked." Thus, the invitation to talk about environment was guided by these intentional understandings to build the didactic panorama approaching Environmental Education in its various dimensions, readings, and conceptualizations, as shown in figure 7. Figure 8 shows the slides used in the lecture:

Figure 2 - Slides and content covered in the lecture about the environment



Source: research material (2022).

The lecture began with the socialization of table 1 and figures 3, 4, 5 and 6 produced from the diagnosis, presented in this article. Gradually the students reflected on their answers. In the same two-hour meeting, slides with photographs and short videos were presented to work on concepts, history, and the norms of Environmental Education.

Figure 3- Record of the conversation about the environment at school



Source: authors' file (2022).

Objective iv included the production of amateur videos, by the students, on the environmental theme. In this step, the geography student who develops a scientific initiation research on the production of videos as didactic resources in geography teaching, co-author of this article, taught the workshop in the State Public School taking as a basis Youtube videos and especially a work done by Torres in the social network Instagram (2022). The steps for the production are as follows: a) Create a 1-minute script with all

the acts; b) Film using the layouts and shots; c) Edit in *Capcut* video editor; d) Edit the transitions and coloring and; e) Finalize and export. In order to facilitate the dialogue between the academic and the school students, a WhatsApp group was created for the students to ask questions and send the videos. The class was motivated for this activity and after 20 to 30 days of the workshop, of the 28 students, 11 made videos and sent them (close to 40% of the class) and 17 did not comment on the activity. A printout of the videos sent by WhatsApp is in Figure 9:

Figure 4 - Print of the environmental videos made by the students



Source: survey data (2022)

Torres (2022) understands that technological resources in the learning process can serve as teaching materials and attract students at all stages of education. They can also replace and complement existing teaching materials, which are generally scarce and/or outdated in public schools.

When discussing the video Santoro (1989, p.18) states: "it is a means of communication with its own mode of production and exhibition, with specific content and audience". Silva (2009, p. 9) relates it to the classroom when he says: "video is a resource that can be easily handled to achieve specific goals, since it provides visualization and listening, touches the senses, involves students".

## 2 RESULTS AND DISCUSSION

The results point to the fulfillment of the general objective, which was to investigate the contribution of Geography to the knowledge of environmental issues in Manaus. A pedagogical trail was planned with the presentation of the research plan and the diagnosis of the students' environmental knowledge, a lecture about the environmental issue, a workshop for the production of an amateur video, the production of videos by the students, and the socialization of what was learned at school.

The construction of environmental knowledge already built in the school *locus* of the research through geography is related to the students' daily lives. The educational trail worked on environmental education enabling the understanding of the dynamics of geographic space through the reading of space.



Adopting the Freirian category, the reading of the world for geography implies the reading of landscapes, streets, schools, neighborhoods, nature and society, as cited by Callai (2005).

The videos produced by the 8th grade students show the garbage, the pollution of the streams, the lack of trees in the streets and in the neighborhood. They portray a more detailed and critical look. It corroborates the educational process worked in the school and is not guided by neutrality because, according to Freire (2003), education is human formation and, therefore, should be essentially critical, transforming, and liberating. Only in this way can it contribute to the emancipation of oppressed groups and the overcoming of inequality and injustice.

Despite the 2 years of remote classes during the Covid-19 pandemic period (2020 and 2021), the 8th grade students' learning through geography contributes to the environmental education in Manaus. The diagnosis presented some theoretical and practical gaps:

**At school:** environmental education is worked on in geography and science subjects, and more specifically on specific dates such as Tree Day and Environment Day. The environmental projects at school are carried out on specific dates and in the contents taught in the classroom. **The students** discard garbage in inappropriate places, such as streams and garbage cans. They realize the existence of environmental problems, but do not act as protagonists in the sense of performing environmentally correct actions at home and at school. But they also realize the need to adopt sustainable practices. Therefore, it is important that teachers relate ecological epistemologies of Leff's (2010) environmental thinking and the development of an environmental rationality that accounts for environmental education practices committed to the issue of sustainability in its complexity.

Convergent reflections of the research approach and relate the social isolation of the pandemic period and some gaps in learning about environmental issues of Manaus, especially those related to garbage and streams, the importance of experiences and environmental links by geography in school, such as field classes, and the use of digital tools like cell phones for research and production of didactic-pedagogical material generating more attractive classes, favoring both the construction of environmental knowledge and ethical training, critical, transformative and liberating about and in the city of Manaus.

### 3 FINAL CONSIDERATIONS

The research created spaces for debates, discussions and propositions about environmental education in the State Public School, by dialoguing with the manager and the geography teacher. The pedagogical trail had its participative culmination in the workshop on video production with a focus on Geography teaching. We sought to understand how the use of video as a resource occurs, whether it contributes to improving the teaching work, and its effectiveness as an enriching agent for student learning.

The students of the researched class/grade have cell phones with internet access and these, when used as didactic resources, contribute to better teaching-learning through geography in its close relationship with environmental education, considering, above all, the problems and limitations of the pedagogical and



curricular models of the basic schools. In this sense the technology was an ally in the construction of environmental knowledge in the teaching environment.

Based on all the experiences lived *in* and *with the* school, the environmental dimension should be worked on by all teachers at the school. As a suggestion, we have the pedagogical trail presented here to understand the Sustainable Development Goals (SDGs) and work on various environmental issues, which are also geopolitical issues. And, as a whole, they point to a planet that is possible to live on with better social and environmental conditions. It is believed that the research participants have developed a new view of the world around them and will make conscious choices and interventions guided by the principles of sustainability and the common good.





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