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ENVIRONMENTAL HEALTH SUPPORT AND EDUCATION PROGRAM IN THE STATE OF AMAPÁ: THE SEARCH FOR AN ENVIRONMENTAL EDUCATION THAT CONTRIBUTES TO THE CONSTRUCTION OF AN ENVIRONMENTALLY HEALTHY AND SUSTAINABLE SOCIETY

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ABSTRACT

Environmental sustainability is one of the most discussed topics today and its concepts should undoubtedly occupy educational agendas. Its application in education is of great importance, since the change of attitudes regarding the environment must be provided through cultural changes. Based on these precepts, Fluminense Federal University (UFF), with the support of the National Health Foundation (FUNASA), executed the Environmental Health Support and Education Program (PAESA). This program consisted in the execution of strategic studies focused on environmental health at educational institutions in the State of Amapá and assistance to traditional peoples and communities, regarding water quality and its impact on the health of the local population. This article presents the difficulties faced and lessons learnt through this project approaching the possible scope of the synergy between early childhood education and environmental education, seeking an encounter between theoretical approaches and educational practice. This was the great bet of PAESA: to start disseminating the importance of making community members (schools etc.) a participating agent in the search for paths and strategies that modify local realities.

Keywords: Environmental Health, Environmental Education, Environmental Sanitation.

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1. INTRODUCTION

Throughout the 1980s, the World Health Organization (WHO), motivated to intensify the control of morbidity caused by several parasitic diseases, began a new phase of promotion of environmental health programs, based on popular participation, whose main tool was and still is education (WHO, 1985). It is clear the role of education in the generation and dissemination of concepts for the full exercise of citizenship and popular participation (Mello, 1975). On the other hand, access to education, especially in less developed countries, is a political issue, and this is one of the main obstacles to its full development (Schall, 1994). In this context, the role of the university is to reconcile the various actors involved in this process (Baptista Neto et al., 2020).

Some time ago, the traditional education model did not consider the reality of communities, much less their quality of health (Carvalho, 1978). Currently, there is an evolution of this model, aiming to promote hygiene standards by approaching basic procedures with the youngest, and the application of cleaning methods and materials, in addition to proper nutrition. The new model establishes a cause-and-effect relationship with the question of the existence of diseases, either by the absence of preventive attitudes or by recognizing the initial signs of illness and raising awareness of treatment options (Tatochenco, 1979).

The increase in intellectual capacity of the poorest castes in society has exposed the ineffectiveness of the traditional model of education. This is mainly the result of political interests distinct from the populations themselves. In this conception, the educational performance uses an outdated model based on technical concepts transmitted vertically and that does not consider the historicity of the educational practices and contents to be valuable.

Contrarily, nowadays it is known that health education, in order to be effective, must be based mainly on the valorization of local wisdom and the recognition of popular practices in facing problems. The frequent adequacy and updating of technical-scientific information in development are necessary in the constant maintenance of the focus, in the promotion of health, and in the improvement of the quality of life (Júnior; Barbosa, 2017). In this sense, it is vital that educators promote participatory education where technical knowledge and popular wisdom complement each other. The contents are not exclusive to the educator, evolving from practice: "knowledge is born and develops as people reflect on the experiences lived in all practices". (Freire, 1979). Therefore, the application of the concept of health and disease in education results in questioning the various dimensions surrounding these concepts, and their complex and multifaceted nature (Schall, 1994).

The proposal of this article is to share information about the enriching learning obtained in the state of Amapá with the Program of Support and Education in Environmental Health (PAESA), developed by the Fluminense Federal University (UFF) in cooperation with the National Health Foundation (FUNASA). The program was developed for the execution of strategic studies in Amapá's teaching entities regarding water quality as support for the application of environmental education for the benefit of collective health. The strategic studies were developed to reflect the socio-environmental management in public educational entities in Amapá; to carry out socio-environmental evaluation, diagnosis, and physical-chemical evaluation of potentially contaminated environments; and to create and apply methods of environmental education both in the formal axis of education and in traditional peoples and communities (PCT, in Portuguese).

2. MATERIALS AND METHODS

UFF established technical teams for PAESA that traveled through 14 municipalities in Amapá. The municipalities selected for the program's actions were those that belong to FUNASA's scope of action, i.e., those with less than 50,000 inhabitants. The municipalities accompanied by PAESA were: Amapá, Calçoene, Cutias, Ferreira Gomes, Itaubal, Laranjal do Jari, Mazagão, Oiapoque, Pedra Branca do Amapari, Porto Grande, Pracuúba, Serra do Navio, Tartarugalzinho, and Vitória do Jari (Figure 1). From August 2018 to December 2019, actions were developed with the municipal and state public schools of Amapá and PCT. Urban and rural schools were served.

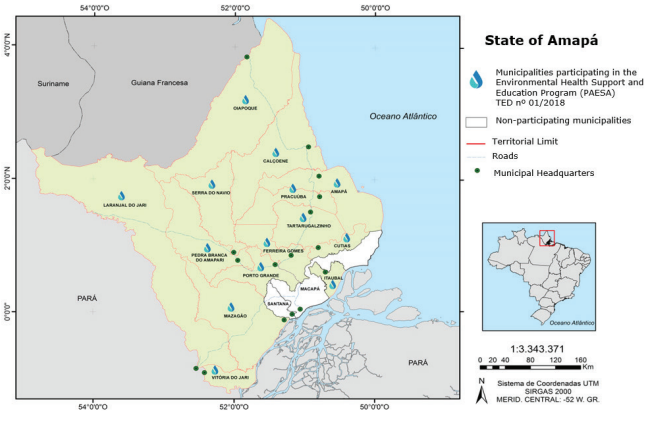

Figure 1. Study Area

The proposal of the PAESA program was to develop two fronts of action: one for the effective diagnosis of water quality in public schools in Amazonia and another for the application of environmental education methodologies. The

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environmental education actions were carried out considering three axes: formal education (teachers and students), distance education with the construction of an online platform called Environmental Health Learning Community (CASA), and PCT. The experience of PAESA with the community of Amapá has been consolidated in a productive way, both by the possibility of bringing information on water quality and environmental health to the population, and by the impact of field experience that has driven us to reflect on environmental education in the country as a paradigm to be modified, or at least expanded. The contact with teachers and students from urban and rural schools, PCT and riverside population led us to a deep reflection on what environmental education really is, besides understanding its effectiveness.

For this reason, we developed this article both to share the experience of the program and to propose and initiate a discussion on the subject of environmental education, i.e., how effective or ineffective it has been in the country for the construction of an environmentally healthy and sustainable society. Perhaps, in this way, we can develop more projects that will go into the field to listen to the voice of those who live with the problem of environmental catastrophes that devastate a country with minimal basic sanitation conditions, instead of creating theories and methodologies of environmental education within the academic walls.

The proposal of environmental education actions of PAESA was divided into three axes of action: formal environmental education, which dealt with activities for teachers and students of public schools; the CASA program, creation and development of a virtual space for continuous learning for teachers; and PCT, which was focused on activities for the traditional communities of each municipality served by the program.

Environmental Education "Formal Axis"

The environmental education actions of PAESA, which included the 14 municipalities of the state of Amapá, were divided into three campaigns. On the occasion of each campaign, specific actions were carried out in the modeling of environmental education workshops, targeting teachers and students from municipal elementary schools and state high schools. One stage of each workshop held proposed environmental education activities carried out in order to emancipate, raise awareness and exercise citizenship, always respecting the singularities, cultures and stories of the participants. Participants were encouraged to build their knowledge with their experiences and to develop a critical responsibility, so that they are able to solve and understand the environmental problems they experience.

In the first campaign held in person in the municipality, actions with specific methodologies were used for each public, teachers and students. Part of the PAESA team was responsible for the teachers' workshop and part of the team responsible for the students' workshop. The themes presented to both audiences, in a way adapted to each of them, were water in Brazil and in the world, surface waters and their importance, groundwater and aquifers, and environmental health (Figure 2).

Figure 2. Didactic material elaborated for the project

A Rapid Participatory Diagnosis (RPD) was initially conducted for teachers and students, with the purpose of identifying perceptions about the environment where they live. From the perceptions, we worked on the proposed content, besides obtaining important information about the recognition of the space in which one lives to extract from this information strategies of knowledge construction. After the RPD, both teachers and students participated in the dynamics of the dream house: what is the environment in which you would like to live (environmentally healthy) and what is needed to achieve it? What strategies can be idealized and realized? What is the role of each one to build the imagined environment? In addition, the teachers worked with field visits, in environments that represent damage to environmental health, for video production, as construction of learning objects. The students worked on water quality using ECOKITS as a water analysis laboratory.

In the second campaign held in person in the municipality, also including content adjustments for teachers and students, the following contents were presented: human activities that impact nature, contaminants that pollute water, effects of water pollution and waterborne diseases. The students participated in the history wheel called "Vic and Moleco" (Figure 3), a book built from the characters created for PAESA, in which they participated in the elaboration of an ending to the story.

Figure 3. Book "Vic and Moleco in Clean Waters" built from the characters created for the PAESA, in which they participated in the elaboration of an ending to the story.

Students and teachers have built radio spots as learning objects. Teachers built and developed lesson plans and strategies to make the school environmentally healthy, as well as ongoing good environmental practices.

In the third campaign held in person in the municipality, a feedback was made to teachers and students of the diagnosis of water quality of schools assessed and workshop on water conservation, wastewater, remedial measures for water quality from low-cost technologies, and guidance of technologies that can be requested from the competent bodies for the solution of low water quality in municipalities of Amapá. The workshops worked on community engagement in the search for possible solutions to the environmental problems faced in the municipality. Hard work was done on the importance of changing habits that come from culture and the distinction between man and nature established in our evolution as a species.

Environmental Health Learning Community - CASA

The PAESA program created the Environmental Health Learning Community (Comunidade de Aprendizagem em Saúde Ambiental - CASA) for continued and distance learning, which is aimed at primary school teachers in the state of Amapá. The objective of CASA was to create a space for interaction, collaboration and sharing with the teachers who participated in the training, in addition to being a repository of materials developed in the program. The main theme of the platform was water quality and environmental health.

Teachers have undergone training on distance education, virtual learning environment, CASA, and learning objects related to the program themes. The purpose of the workshops was to raise awareness among teachers of basic education (elementary and high school) in public schools in the State of Amapá to the use of the program's virtual environment and also to research repositories to bring new work methodologies into the classroom in the discussion of the topic. Another factor to be highlighted is that CASA carefully developed, together with teachers and students, materials contextualized with the local reality of each municipality, which was a great differential.

Environmental Education for Peoples and Traditional Communities

The objective of the PCT's action in PAESA was the socio-educational support of this traditional people and the elaboration of a strategic socio-environmental study of the communities to structure workshops to discuss water quality in the municipalities of Amapá that have FUNASA's action.

The theme of water quality and environmental health were the central elements addressed in the environmental education workshops at the PCT, which focused on improving environmental health in rural areas. Therefore, for the development of socio-environmental mapping, an integrated vision was undertaken that would facilitate participatory and shared processes. The result of the production of materials by and for the PCT was essential. Nevertheless, it was an action imbued with expressing the perception of the community members about the importance and use of this natural resource in their lives, at the same time to favor good consumption practices, besides the development of balanced forms of environmental management.

The main objectives of the PCT workshops were to raise awareness, raise questions, and induce community members to reflect critically on water and environmental health issues in their localities. The socio-environmental mapping carried out with PCT was aimed at presenting local groups regarding their realities and the relationship established with water, in which social discourses and perceptions matter. At the end of the program, the "Caderno das Águas" (Water Notebook), which is a participatory material of community authorship, was built for the community members themselves, in order to be aware of their realities, as well as holders of representations that reveal objectives, desires and interests associated with water resources.

The result of the activities carried out with PCT was the recognition of a social group as active players in the execution of public policies that provide socio-environmental (territorial) empowerment and the construction of shared knowledge and also provides more synergistic processes in the evolution of environmental health actions that result in autonomy of use, in the face of environmental adversities (contamination and disease) and the insufficiency of full state assistance.

The Amapá PCTs that were chosen to participate in PAESA met the following criteria: precarious sanitation, social

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and environmental conflicts, poverty, active school in the community, and logistics. The activities were distributed in three field campaigns, and in the first one environmental education and socio-environmental mapping workshops were carried out, from which a socio-environmental video of each community was developed containing important interviews with community members; in the second campaign materials were produced for the Community, such as production of spoken maps that resulted in the production of the Water Notebook and radio spots; in the third campaign, the communities received a feedback on the diagnosis of water quality in the communities evaluated, a workshop on water conservation, wastewater, remedial measures for water quality from low-cost technologies and guidance on technologies that can be requested from the competent bodies for the solution of low water quality in the municipalities of Amapá. In the workshops, the recognition of the active role that the community can play in the search for possible solutions to the environmental problems faced in the municipality was worked on.

3. RESULTS AND DISCUSSION

Reflecting on environmental education is essential for the development of constructive practices that can be the foundation of an environmentally healthy and sustainable society. The term environmental education, commonly used, needs to be well understood in order to fulfill its role in the formation of a society that establishes a harmonious and respectful relationship with the environment. There are numerous definitions for the act of educating, such as instructing, informing, disciplining, indoctrinating or, even in non-traditional visions of education, we can think of emancipating, elaborating, or building knowledge. In all definitions, as different as their methodological approaches may be, they are not different in essence.

In both situations, the environmental educational practice always ends up being essentially informative and not formative. The central idea is to pass on information and knowledge, and raise awareness of environmental issues, as if this were enough to build good practices for the environment, and what is at stake is the construction of socially and culturally instituted habits. There is an idea of transparency and linearity of knowledge and autonomy of individuals as if they were able to change their habits, instantly, from the information they receive. For example, the Ministry of Health warns that smoking is harmful to health, but have many individuals stopped smoking solely from this information? The information is very important, but we have to go further.

It is necessary to reflect on what it means to build knowledge and form consciousness in the field of learning, especially when what is on the scene is the human attitude and behavior towards the environment. Acting on the environment implies automated habits and behaviors. Recognizing this is fundamental and requires an understanding of what habits are and how they develop and institute themselves in human behavior; in this way, effective educational practices can be offered.

To address this theme, we raise knowledge of cognitive neuroscience. The understanding of how the brain and mind work in learning and knowledge construction is important for the search of effective methodologies, especially when the subject involves habits and behavior (Júnior; Barbosa, 2017). The human brain is comprised of an architecture composed of billions of neurons that work in a highly coordinated network. Its functional and structural basis is directly related to memory capacity. There are several types of memory: short-term, long-term, procedural (automatic), and declarative (reflected), which can be episodic (historical) and semantic (data learned before information). All types of memory, together, provide the different types of knowledge. There are implicit and explicit knowledge (implicit and explicit memory). There are conscious and non-conscious (automatic) actions (behaviors) (Sargiani; Maluf, 2018).

To exemplify, think about the action of walking. It is possible to describe this action, bring it to the consciousness and reflect what needs to be done to walk, which muscles of the body are used, the imbalance of fifty percent of the body for unilateral support followed by alternation, etc. But the action is performed without this consciousness. It is a non-conscious (automatic) action. Knowledge is procedural. The brain learns, develops a walking pattern, and performs it automatically. Just as most human actions become automatic, like talking, breathing, and driving. Emotional reactions are learned and automated behaviors, and so are habits. For the construction of automatism, the brain learns and "hardens" (systematizes) this learning, becoming of difficult modification. Thus, changing habits is not something simple that is modified only in contact with new information. Habit change implies emotion, value construction, mirroring, and routine repetition.

Human behavior is automated from countless habits. The habits are shaped by various circumstances, including the culture to which one belongs. In this case, a return to the history of homo sapiens is worthwhile. What is man's primordial relationship with nature? Throughout the history of mankind, man has walked a path of rupture with nature. From a uniqueness between man/nature, a bipartition configured by man x nature has developed. From a sum of one, man/nature, to a sum of two, man and nature. As the human being began to develop his tools and develop his wisdom (mind), he was acting on the environment, conquering more and more distance in his link with nature. A detachment that

arose from the belief of a superior living being able to shape and modify nature according to his needs.

The various revolutions that homo sapiens have gone through in history, which are cognitive, scientific, and technological (Harari, 2015), have provided an ability to act on nature, which has become nothing more than an instrument of development. As nature became something apart, differentiated from man, it was established the belief of not having to take care of nature as one's own. The valorization of nature was, throughout history, supplanted by the idea of using its resources for the development and construction of societies as it is today. However, as the resources are finite, nature began to complain, to alarm about its suffocation and principle of scarcity. Man, historically differentiated and bipartite from nature (as if this were possible), has built a relationship of exploration and use and, in this way, has become difficult to understand and modify his behavior. There are beliefs and habits that have controlled his behavior for millennia and this does not change from a simple information. A new cultural model on environmental practices is needed.

Returning to the functioning of the brain, we have the declarative memory, which is the one about which we can speak and declare that it is in my consciousness, or content learned. But there is the implicit memory, which is latent and appears in habits, in behavior. And we still have the prospective memory, which goes into the imagined future, which we will refer later. But declarative knowledge/memory and implicit/procedural knowledge are essential to understand if the subject to be worked on is environmental education.

The declarative knowledge in environmental health can be accessed through lectures, classes, books and several other sources of information, such as how contaminated water damages health, how throwing garbage in nature is harmful, how smoking causes diseases, and so many other topics that can be declared or informed. But are there individuals who, even with so much information available, continue to pollute the waters, throwing garbage in the nature and smoking? Why does this happen?

Knowing about something does not imply a change in habit, behavior, or human action. There is another type of knowledge, which is implicit/practical knowledge, which is programmed and established in another area of the brain, different from the area of declarative memory. The brain learns by doing, registering actions in the implicit memory, and turns them into automatic activities. Likewise, any habit and behavior are consolidated, such as: throwing garbage on the floor, smoking, eating abusively, etc.

Dall'Agnol (2019) refers to the different types of memory in different ways of knowing, the know-how and the know-what, and uses the following example:

> A person may *know-that* it is necessary to swim to the riverbank to save himself from the sinking boat, but not *know-how* to act. No matter how much theoretical information he/she hears there at the crucial moment; if he/she hasn't learned to swim by exercising certain activities until acquiring certain skills, he/she will not be able to save him/herself. The latter kind of knowledge is acquired by a learning process based on training until it results in practical knowledge and not merely in apprehending information (p. 6).

For the author, the know-what (informational/theoretical knowledge) may be a necessary condition of the know-how, but it is certainly not enough. The practical activities presuppose declarative or observed information of the environment to, through the practice, become memorized and automated. For example, playing the piano, playing chess, driving, or throwing garbage in the river and wasting water are actions that become habitual.

Thus, by bringing the foundations of neuroscience, it is possible to start reflecting that environmental education, as a possibility to instruct and inform or to build and elaborate knowledge, is not in most cases a strategy that, by itself, propitiates changes in behavior, values, attitudes, and habits. Besides recognizing the establishment of neuronal connections in the different types of knowledge, it is necessary to think that there is the cultural rooting of habits. Culture shapes the neuronal connections of the human brain that are not simple to be undone. The cultural, neural, and behavioral sewing goes beyond a simple mending that is easily detached. This is the reason why we need to discuss environmental education in relation to the way it is currently employed. Lectures on how important it is to stop polluting rivers or on how many waterborne diseases there are may not, in itself, be effective for the behavior change we need to build an environmentally healthy and sustainable society.

Environmental education needs to go further. It is crucial information; however, it is equally important to place the perception of the community at the center of the discussion and to elaborate strategies for permanent practical actions in the community and in schools that can provide real changes in human behavior habits towards the environment. This was the exact idea we developed in the implementation structure of PAESA, and with this experience acquired at the end of the project, we reflected whether the name "environmental practice" instead of "environmental education" would no longer be productive to mark a paradigm shift that includes practice, continuity, and community involvement, in addition to the only informative action of what is commonly proposed by environmental education in the country. Nevertheless, this is a subject for further discussions. Our intention is only to initiate the debate.

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The PAESA made possible the field experience and a unique experience of listening to the perception of those who are directly exposed to environmental damages that compromise their health. In the Amapá region, the extent of basic sanitation in both urban and rural areas is precarious. The Amapá Water and Sewage Company (CAESA) is not able to supply what the population needs with total efficiency and a large part of the supply is left to the Amazon and artesian well, when this is the case. The quality of the water is precarious and there is a great presence of water diseases. The first learning with the region is the bravery of a people that resists the scarcity of so many things and yet survives with great enthusiasm for life. It was not uncommon for the attentive eyes of children of about ten or twelve years of age paying attention to each image and listening to each speech, asking, and wanting to understand the environment in which they live:

> "But if I do my part, will the river water be clean? What if other people don't do the same? It will get dirty again". "My grandmother said she always drank the river water, and it has never done any harm, so it won't do for me either". "When will we run out of water? We won't be able to get it from the river". "Gee, my mom needed to hear that." "At home there's a neighbor who doesn't like to use the bathroom, he prefers to go near the river". "That much garbage will never get out of there". "It is very difficult to choose the color of a garbage can to throw garbage; I don't ever memorize what color it is" (fragments of speeches from students of the Amapá schools of the PAESA Project).

On the one hand, the discourses of the students are loaded with culture and popular customs. Changing customs rooted in culture is not an easy task and advances are slow. On the other hand, the interest of young people in sharing information points to the possibility of developing a new environmental reality with them, so that they can cause some effect of change in their elders and solidify themselves to create a modification of habits and customs for the next generations.

The idea is to acculturate humanity from the new generations. That is why the importance of education and the commitment we seek to have with Amapá's teaching networks, so that they become schools that produce daily "good practices" to consolidate new learning in health and environment in a sustainable and effective way. This is the great bet of what was accomplished with PAESA: **Building more "Environmental Practice", another way of understanding "Environmental Education"**.

4. CONCLUSION

The basic sanitation actions include water supply, access to the collecting system, sewage treatment, access to collection, disposal of solid waste, and stormwater drainage. The absence of such services has resulted in precarious health conditions and the incidence of diseases, especially water transmission. This is a very common situation in the regions visited by PAESA in the municipalities of Amapá.

Besides basic sanitation, there is environmental sanitation, which represents the set of socioeconomic actions aimed at achieving environmental health, that is, an environment capable of preventing the occurrence of diseases conveyed by the environment and promoting favorable conditions for the health of urban and rural population. Basic sanitation is more concerned with access to the service and environmental sanitation, in addition to access to sanitation services, which include environmental issues and its preservation, including environmental education. In this concept, the sanitation area involves, not only the works and technologies implemented, but also a complex educational process that should transform individuals capable of changing their surroundings.

The availability of sanitation services does not guarantee effective benefits to communities. There is not always an effective social appropriation of sanitation services. It is necessary to build a perception of sanitation as a collective and indispensable asset to maintain the quality of human and environmental life. This perception needs to be built from an environmental education that can be developed in the collectivities, the necessary criticality to identify, analyze and judge the factors that influence their lives in the various dimensions of sustainability with the possibility of proposing referrals and help in the execution of actions that, in line with the demand of the reality experienced, allow the increase of quality of life and maintenance of a healthy environment.

Thus, the issue of environmental education, that is, environmental health education should occupy the center in any discussion of environmental sanitation. All sanitation infrastructure is fundamental, but without environmental education, i.e., without what we defend as "environmental practice", sanitation does not become sustainable. This was the great bet of PAESA: to start disseminating the importance of transforming community members (schools, PCT, etc.) into participating agents in the search for paths and strategies that modify local realities.

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represented an extremely enriching experience for all the components of the group, and which presents itself as a milestone in the democratization of knowledge in the state of Amapá.

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