TECHNIQUES OF FORMAL AND INFORMAL ENVIRONMENTAL EDUCATION IN ELEMENTARY SCHOOLS AND IN THE COMMUNITY

Hermes Alves de Almeida1; Claudia Fernanda Costa Estevam Marinho2; Albênia Silva Monteiro3

1Associate Professor, State University of Paraíba, Department of Geography, CNPq Research Productivity Scholarship, 58400-560 Campina Grande, Paraíba, Brazil.
2Graduate in Geography with master's degree in regional development. Geography teacher of the key state-level education system and medium
3Graduate in Geography

ABSTRACT
Environmental education is a process of awareness of social and environmental processes. Knowledge of environmental practices for those residing on the banks of the Epitacio Pessoa Dam, Boqueirão, Paraíba, Brazil, may be the main cause of the environmental degradation of this aquatic ecosystem. For this reason, formal environmental education procedures were adopted in primary schools and informal, in the community, and these determinations are the main objectives. Theoretical and practical classes were given in schools and informal activities with residents and the community of the city. The main results showed that small producers living on the banks of the Epitácio Pessoa dam do not know whether the environmental practices adopted are correct or not. Formal education is of great importance because students will be multipliers of environmental issues. Thus, environmental education makes it possible to educate the entire population about the need to take good care of the environment. However, it must be done continuously and involving the whole society, always focusing on the training of multipliers.

Key-words: environment, environmental education, sustainable development, hydro geography

Introduction
Environmental education is a comprehensive form of education that aims to reach all citizens through a participatory pedagogical process that seeks to instill a critical awareness of the problem of environmental degradation. Humanity's relationship with nature began with a minimum of interference in ecosystems and has culminated in a strong pressure on natural resources.

In the view of Ors (2012), environmental education starts within the family with the birth of the individual and continues throughout his primary and higher education. However, environmental education cannot be limited to formal educational institutions since an individual also acquires awareness through his social life and his social relationships.
For Hanan and Batalha (1999), the environmental education carried out by the various means of communication is a way of clarifying the community how to overcome neglect of the environmental issue and avoid adverse impacts on its productive activities.

In Brazil, environmental education is a state policy, established and regulated by law no. 9.795/99 and decree no. 4.281/02.

Reports by Artvinli (2017) indicate that informal education in geography is not to be seen as tricky information. This knowledge is one of the most critical ways for teachers to acquire geographical knowledge and plays an important role in motivating them to teach geography. Although, it’s understood that the importance of learning in geography is in an environment that supports free and creative thinking.

The importance of non-formal education to the community in the context of environmental education is not new. In Chapter 36 of Agenda 21 (UNCED, 1992), "non-formal education is something that formal education generally ignores and encompasses all flows of formal and non-formal education, basic education, and all key education-related the human development”.

Although there are important differences between formal and non-formal environmental education, important resemblances between them also exist.

An educational process should begin with a diagnosis of environmental references and practices, where people understand, structure, and learn about the subject. Thus, the school represents an ideal environment to develop knowledge, values, and attributes favorable to the environment, and environmental education is a fundamental tool to interact in this process (Pereira et al, 2006).

Environmental education brings with it a new pedagogy that arises from the need to guide education within the social context and the ecological and cultural reality where the subjects and actors of the educational process are located. This implies the formation of consciences, knowledge and responsibilities that are shaped from concrete experience with the physical and social environment and from there to seek solutions to local environmental problems (LEFF, 2004).

In Brazil, to date, there are few studies that address the influences of the physical and social environment. Reflecting about the complexity of environmental education is the opportunity to understand the formation of new social actors who get mobilized to set an articulated educational process committed with sustainability (JACOBI, 2003).

Humans need lifelong learning. This need is extremely visible in the environmental topic, because both the environment and our approach to the environment change constantly (SOYKAN and ATASOY, 2012).
Water in the Brazilian semiarid is always a very important issue, because rain is the element of time with greater spatial and temporal variability, mainly in the semi-arid region of Paraíba, where rain is characterized by irregularity in quantity and distribution.

Faced with this condition, the best way to raise awareness of a population is that everyone needs to take better care of the aquatic environment. For this, formal environmental education techniques were used for elementary and non-formal students for families living on the banks of the Epitácio Pessoa dam and for the urban community. This reservoir covers parts of the lands of the municipality of Boqueirão, located in the micro region of Cariri, in the state of Paraíba, and has the capacity to store 411 million m³. Stored water is the only source to supply more than 800,000 people. In addition, there is a large withdrawal of water to irrigate orchards on the banks of the water basin, whose practice has contributed to degrade the aquatic environmental.

The social and technological profiles of the smallholder community that resides in the twenty-six sites that surround the Epitácio Pessoa dam are precarious. There is no garbage collection system and there is a lack of knowledge about the use of agrochemicals and soil and water management techniques. This lack of knowledge contributes, increasingly, to littering and degrading the said aquatic environment.

The social and technological profiles of the small producers who live in the twenty-six sites on the banks of the Epitácio Pessoa dam are precarious. There is no garbage collection system and there is no knowledge of the riverside community about the use of agrochemicals and soil and water management techniques. This lack of knowledge contributes, increasingly, to littering and degrading the said aquatic environment.

Faced with this reality, the need for formal and informal environmental education became evident as a more efficient means of bringing about changes in the habits of the population from the urgent need for the rational use of water and the environment.

In this context, four elementary schools were chosen, of which about 200 students were children and/or relatives of the riverside. They were taught theoretical contents, with practical applications and thematic workshops, that is, formal education. On the other hand, informal corresponds to organized learning initiatives that take place outside (out of school) education was used for the community through campaigns, educational practices and environmental events, with the participation of the students of these schools, in order to raise awareness and mobilize the community about the urgent need to better care of water and the environment.

Thus, the use of formal environmental education techniques, in primary schools, and informal for the community of the city of Boqueirão, located in the Cariri micro region of the State of Paraíba, in the Brazilian northeast, was the main objective of this work.

**Materials and methods**
Environmental education is an important pedagogical instrument that aims to sensitize citizens about socio-environmental problems and, therefore, it is necessary that it contemplate the most varied segments of society. It was to this end that the environmental education activities were developed in two ways: a formal and an informal one.

The formal education component included content taught in theoretical and practical classes for approximately 200 students from four middle and high schools in the city of Boqueirão (07° 48’ S, 36° 13’ W and 350 m), located in the micro region of Cariri of the State of Paraíba, northeastern region of Brazil.

The methodological procedures to minister the thematic contents on water, environment and sustainable development were presented in lectures, using data show, white board, and research activity through the internet.

The emphasis of formal education was to show the relevance of these contents applied to the local reality, that is, the importance that the Epitácio Pessoa dam (Figure 1) has for the micro region and the need for sustainable environmental management, not only for the communities that live on the banks of this reservoir, but for the water supply to more than 800 thousand population.

![Figure 1. Aerial view of Epitácio Pessoa Dan, Boqueirão, Paraíba, Brazil.](image)

The educational practices were always to stimulate the creation of a system of garbage collection, the use of agrochemicals, the degradation of the soil and the destination of the solid residues. All pedagogical procedures related to educational activities that stimulate the valorization and the waste of water and the non-destruction of natural resources in the areas contiguous to the Epitácio Pessoa dam, including also teachers and managers of these and other schools to implement education in schools.
With this teaching methodology, the direct public attended directly was about 300, including students, teachers and school staff. The non-formal contingent of different social classes in the city (students’ parents, recyclers and other members of the community) was around 1000 people.

The disclosure of practices in the environmental management of solid waste, water use and protection of the banks of the Epitácio Pessoa reservoir was made through lectures and/or workshops with practical activities in schools, service clubs and commemorative days (of the environment and water). In addition, educational campaigns were carried out in the city, involving all the social actors mentioned, on the importance of the theme and the need of everyone's engagement and the need to take good care of the environment.

The socio-environmental diagnosis was carried out by applying questionnaires, with questions on social, economic, technological and environmental issues, to one hundred and eighty-six residents, from the twenty-six sites, located on the banks of the Epitácio Pessoa dam, namely: a) Social (age group, educational level, consumption and treatment of water, sewage, garbage, etc.); b) Technological (use of fertilizers and agrochemicals, destination of pesticide containers and irrigation methods); c) Economic (commercialization of production, areas and types of crops); d) Environmental (open sewage, use and deposits of agrochemical packaging, etc).

Data analyzes were performed by means of statistical analyzes, whose calculations, tables and graphs were made using an Excel spreadsheet.

Results and Discussion

Figures 2 and 3 show, respectively, the age groups and education levels of the 187 people who live in the twenty-six sites, located on the banks of the Epitácio Pessoa dam. It is observed (Figure 2) that 44% of the residents are between 38 and 55 years old and 60% of them are less than 50 years old.
Figure 2. Relative frequencies (F) of the age groups of the residents of the twenty-six sites, located on the banks of the Epitácio Pessoa dam. Boqueirão, PB, Brazil.

Figure 3. Relative frequencies (F) of the education levels of the residents of the 26 sites, located on the banks of the Epitácio Pessoa dam. Boqueirão, PB, Brazil.

The educational level of those residing on the banks of the Epitácio Pessoa dam is very low (Figure 3), since 78.3% do not have elementary education and none of them have a college degree. The contingent of illiterates is 40.0% and only 21.7% declared to have primary course (fundamental). Certainly the low level of schooling and culture of this riverine population hampers the introduction of sustainable environmental practices.

With regard to sanitary sewage systems and garbage collection and storage, it is verified (Figure 4) that there are 71.4% of households declared to have sewage and 76% burn waste. Already, in 28.6% there is no sewage treatment and in 24.0% the collection of the waste is free or it is stored in a reservoir.
Figure 4. Relative frequencies of sewage and garbage systems by the residents, located on the banks of the dam Epitácio Pessoa, Boqueirão, Paraíba, Brazil.

The low social and environmental indicators on the banks of the Epitácio Pessoa dam show, therefore, that it is necessary to alert all citizens to the importance of the environment, that is, to the need for "transformative education". Although the transfer of thematic content is done in school (formal), the informal knowledge should not be neglected, because environmental education is a duty of all. In this aspect, we tried to insert theory and practice in school content, as well as to implement environmental education in non-formal.

The environment theme was presented and discussed, always aiming to make everyone aware of the need to take better care of the environment in Brazil and in the world. Thus, the content given to the students and practical field activities, the emphasis was this. Figure 5 exemplifies some moments of theoretical and practical classes (in the field) practical activities on the subject.

Figure 5. Visualization of students' participation in theoretical and practical classes, on the banks of the Epitácio Pessoa dam, Boqueirão, Paraíba, Brazil.

Some topics were discussed, among them waste, selective collection, recycling, etc and the main problems caused by garbage (contamination of soil and water).

Some topics were put to the discussion, among them the recycling; the advantages and difficulties of recycling; materials that can and can not be recycled; the major problems caused by garbage (contamination of water sources and soil). The awareness that everyone should take better care of their garbage, certainly, contributed to preserve the environment and improve the quality of life.
Figure 6 shows a practical application with the students, showing the place where the garbage is deposited (on the banks of the Epitácio Pessoa dam). In addition to being an unsuitable place for garbage disposal, rainwater can carry into the reservoir. They also identified the presence of recyclable packaging that can be collected separately and reused.

Figure 6. View of a garbage deposit (dump), on the banks of the Epitácio Pessoa dam, Boqueirão, Paraíba, Brazil.

The slope of the area will further contribute to drag by rainwater, waste and/or residues applied to the inside of said reservoir (Figure 7).

Figure 7. View of the drainage of sewage and agrochemicals passing through a banana tree on the banks of the Epitácio Pessoa dam, Boqueirão, Paraíba, Brazil.
In schools, the selective garbage collection was stored in pails with the respective identifications. This material was sold and revenue reversed to buy durable goods for school.

With the participation of students from schools and the community of the municipality of Boqueirão, Figure 8 exemplifies one of the formal and non-formal activities applied to the local community, in the different streets of the city, with emphasis on education and environmental management. This mobilization involved all public and private schools and had more than thousand students. The posters, banners and other means of dissemination were directed to the need that we all have to take care of the environment.

![Figure 8. Mobilization of public school students in the main streets of the city of Boqueirão, Paraíba, Brazil.](image)

**Conclusion**

The small producers who live on the banks of the Epitácio Pessoa dam are unaware of whether or not the environmental practices adopted are correct. Therefore, formal education has great importance, because students will be the multipliers of environmental issues and, therefore, of practices that prevent the degradation of natural resources.

Formal and informal education are important to make the population aware of the need to treat garbage, sewage and to avoid the use of agrochemicals, because these wastes are carried by rainwater to the said reservoir, which results in contamination of stored water for drinking purposes.

Environmental Education must be carried out continuously and permanently, whether formal or non-formal, but involving the whole of society, always focusing on the training of multipliers.
Non-formal education events allowed the active participation of social actors and the valorization of local knowledge that interrelates with scientific knowledge.

Bibliographic References


