Environmental education in the school network in the municipality of Marabá, Brazil: A case study

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Abstract— Currently, humanity has been concerned with the need to preserve the environment. Such urgency triggered the need to educate man to live with the environment. Thus, environmental education emerges as a possibility for new knowledge and methodologies in an interdisciplinary perspective, presenting itself as an essential instrument for the transformation of concepts and conduct towards the environment. To understand environmental "teaching" in the network of municipal schools in Maraba in the state of Pará - Brazil, SWOT analysis was used. We use two schools as study models located in the urban and rural areas. The research was experienced with the managers and educators who work in the schools through a questionnaire with questions regarding the internal and external areas of the schools (regarding school management). We found that there is an administrative effort to provide students with projects that raise environmental awareness in schools in the areas: urban and rural. Despite the insufficient support from the government (municipal, state or federal), the difficulty that the rural school has in this work is clear, both in relation to governmental visibility, as well as the resources to acquire materials to develop socio-environmental projects. In this way the SWOT analysis proves to be a promising tool to analyse the management of environmental education in the school network where it helps educators and managers in the teaching of Environmental Education and in decision making for the functioning of the school as a whole.

Keywords— Environmental management; Environment Rural school; Urban school; SWOT analysis.

I. INTRODUCTION

The changes caused by humans to the environment have occurred since the beginning of our perception as a species, with: (1) hunting and extinction of the megafauna in the early civilization, (2) the beginning of low-intensity agriculture with the first settlements, (3) intensive agriculture, logging, forest fire and loss and fragmentation of modern-day habitats and (4) the intensification of land

use, water, soil and air pollution coupled with the intensification of global climate change, together, human actions severely degrade natural ecosystems and leading to the global homogenization of biota (Lewis et al. 2015). One of the tools we can use to "brake" (a more subtle way, to educate) is through Environmental Education (Teixeira and Torales, 2014), whose principles are: (1) to move the individual about environmental problems, (2) to generate information about the composition of environments, (3) to recognize the mistakes that human makes in the face of nature, (4) to be able to analyse and provide attitudes in benefits of the environment, and (5) being able to harmonize the environment with society (Effting, 2007).

As we can see, the environmental issue is increasingly present in the daily life of contemporary society, and especially in the challenge of preserving the quality of life of the population. In this scenario, the educational process involves social actors that will lead a transition towards environmental sustainability, thus environmental education emerges as a possibility for new knowledge and methodologies in an interdisciplinary perspective, presenting itself as an essential instrument for the transformation of concepts and conduct for with the environment (Segura, 2001). It is agreed that planning for the execution of projects is extremely important for the continuous improvement of student performance and the quality of teaching at the institution and is essential for the evolution of the teaching team. (Teixeira and Torales, 2014).

Additionally, environmental educational actions have been standing out in the current scenario mainly in relation to the socio-environmental crisis resulting from human behaviour (Tozoni-Reis, 2006). Especially with the increase in Ecological Movements that emerged in the early 90s because of society's perception of environmental problems such as environmental degradation and uncontrolled exploitation of natural resources (Layargues, 2001). Generating frightening consequences, compromising the lives of all living beings, including our own species (Loureiro, 2004). In the formal setting, most educational institutions strive to implement the objectives of Environmental Education, but some are truly consistent results with the desired practice (Krawczyk, 1999).

In this context, there is a need for strategic planning that makes Environmental Education viable, based on understanding its structure and function, whether at school, or in the surrounding community. (Freire, 1980). Planning is the crucial point for obtaining satisfactory results from a project or any other activity. According to Azevedo (2001) the SWOT analysis (Strengths, Weakness, Opportunities, and Threats): performs a diagnosis of strengths and

weaknesses, opportunities, and threats, to develop medium- and long-term management plans. Being one of the main tools to be used in strategic planning (Roth, 2014). For example, can help the school management in the implementation of Environmental Education from the internal evaluation (strengths and weaknesses) and external environment (opportunities and threats), it can be observed and potential vulnerabilities that teachers and schools are subject in our society (Araújo and Schwamborn, 2013). Thus, with the diagnosis of Environmental Education from the perspective of SWOT, we assessed the strengths and weaknesses for the development of socioenvironmental educational practices in the schools network in the municipality of Marabá located in the state of Pará (Amazon region), Brazil.

II. METHODOLOGY

The study was carried out in two schools in the municipal network of Marabá (5 ° 22 '08 "S 49 ° 07' 04" O) in the state of Pará, Brazil. School 1: located in the urban area of the city (hereinafter, urban school) and school 2: in the rural area, is 78 km from the city of Itupiranga (Pará) and 110 km from the city of Marabá, but belong to network of Marabá (hereafter, rural school).

To create the SWOT matrix, the Excel program was used (Clavell, 2011). The research had a qualitative and quantitative character, in accordance with the ideas of Cappelle et al. (2011). The variables were observed characterizing them through an in-depth study of the environment in which it is inserted (Wainer, 2007). The research was experienced with managers (e.g. principals and deputy principals) and educators (e.g. teachers) who work in schools through dialogue. The importance of Environmental Education was placed on the agenda, then a questionnaire was applied with questions regarding the internal and external areas of the schools (Figure 1).

The data obtained were measured and analysed according to two environments (internal and external), where the school space is a reference. The internal environment corresponds to the expectations of the school itself and the external environment to the expectations of society. In the external environment, variables are still indicated regarding the proximity to the internal environment. The general and operational environment, allowing the analysis of potential, negative and positive trends. Each analysis topic (strengths, weaknesses, opportunities, and threats) can reach 100%. Therefore, this study had its sampling defined by accessibility (not probabilistic), considering that this research was carried

out with the application of SWOT analysis in environmental planning.

Internal factors	
Item	Question
1	Is the school recognized in its environment?
2	Does the school have an innovative differential?
3	Are the infrastructure and physical space adequate?
4	As classes possuem número adequado de alunos?
5	Is the geographical location privileged?
6	Does the school have curricular autonomy?
7	Is operational efficiency a favorable factor?
8	Does the school have low staff turnover?
9	Are financial resources available?
10	Is management democratic and participatory?
11	Is there assertive communication between the actors at school?
12	Is there an updated pedagogical project?
13	Does the school develop environmental education projects?
14	Do educators have mastery of the socio-environmental theme?
External factors	
Item	Question
1	Is the school admired by the community?
2	Is it possible to establish strategic partnerships?
3	Is there political party influence in management?
4	Does the school take advantage of technological advances?
5	Does the school's financial budget meet the needs?
6	Does the school hold major events?
7	Interested in socio-environmental initiatives?
8	Existe suporte da gerência (municipal, estadual ou federal) para projetos socioambientais?
9	Does student family structure affect school performance?
10	Do students' parents participate actively in school life?
11	How do new technologies affect learning?
12	Is there a barrier to developing environmental projects?
13	Does the lack of public structures interfere with students' performance?
14	Does violence interfere with school performance?
15	Is the community surrounding the school interested in socio-environmental issues?

Fig. 1: List of all variables considered by the subjects, arranged by the internal environmental (Strengths and Weaknesses) and external environmental (Opportunities and Threats) applied in urban and rural schools in the municipality of Marabá located in the state of Pará, Brazil.

III. RESULTS AND DISCUSSIONS

The purpose of this study was to make a diagnosis of environmental education in the school environment in the city of Marabá, Brazil. As a result, we found that the SWOT analysis applied to school planning has benefits for managers and educators, by: 1) providing a "whole" view of the school situation in the development of the Environmental Education theme; 2) to manage preventive actions and improve the environmental approach through: dedication of school professionals, work in the community and participative management; 3) carry out a survey of the limitations of the school environment and demonstrate the remedies, since the principals responsible for the schools had as strengths a qualified and flexible team to internal and external changes; and 4) the low cost, the ease of using SWOT analysis, accredits it as a tool in school planning

not only in the theme of environmental education, but also in the planning of the entire school environment.

The school in the urban area demonstrated the existence of "forces" for obtaining an adequate environment and a good location (in relation to the community), and they are always producing small events that have environmental relations and on the importance of preserving the environment. However, what becomes a "threat" and a "weakness" is the lack of financial budget from the municipal government for the production of large events, where there is inclusion of society and the public from outside the neighbourhood where the school is located. It is worth noting that at the global level, the resources allocated to education are insufficient: there are countries in Latin America and Africa that are investing less than 3% of GDP – Gross Domestic Product. Even when there is a desire to invest in education, these investments have, in many cases, been misdirected and inefficient (Arnaldo, 2018).

To build the knowledge of an individual, since childhood, it is necessary to relate a set of educational processes originating from family life, in teaching and research organizations, cultural and social movements, living with other beings and civil society organizations (BRASIL, 1996). Thus, it is necessary to collaborate for the development of knowledge in the social view, obtained from experiences inside and outside the school environment, which is significant for the pedagogical acquisition combined with family, school, and society. School events as a teaching methodology, in turn have the importance of disseminating culture, linked to the social. Thus, contributing to other strategies used by educational institutions to better relate to their students, thus resulting in notable benefits for society (Dalmoli and Kadota, 2015).

In seeking and adding pragmatic plans in didactics for children and young people, we must provide better reflection and analysis for both, which will contribute to the development of the most diverse school and social contents. As the student participates in school events, he acquires greater aptitude in making decisions in the face of different problems, due to the exchange of experiences, thus expanding the capacity to exercise a critical reasoning of the socio-environmental issues that are inserted (Cabral et al. 2020).

Schools located in rural areas have obstacles inversely proportional to their potential for modernization, since resources are not properly available for use (Arnaldo, 2018). Unfortunately, the focus of the public authorities in these schools is low, the infrastructure is limited, the teaching materials are not complete and teachers do not

constantly participate in professional training programs, causing them to have a weakness regarding the organization of major events. The coverage of public investments in education helps in the formulation of inclusive policies, maintenance, and development of education, and in the expansion and improvement of schools of different levels and modes of education (INEP, 2020).

The school structure, as well as the public resources invested, and the students' development are inseparable elements. The school infrastructure and the financial resources applied are always related when it comes to the quality of Education. Both elements contribute to the good development of Brazilian educational institutions (Vasconcelos et al. 2020). Where, the educational quality is entirely linked with the government resources invested as well as the correct management and equal distribution of them (Vasconcelos et al. 2020). Another important point is that the educational quality of a country can represent the type of citizenship that shapes a society, that is, if there is no effective investment in education, the quality of citizenship and, consequently, the social, economic and democratic improvement will be negatively affected (Iosif, 2007).

The lack of opportunities raised by the rural school, provides a lagged teaching, resulting in the difficulty of updated information, trained teachers, lack of didactic material and among others. In both schools we find that there is a search for educational activities related to the environmental issue, but with difficulty in carrying them out due to lack of government incentive. However, in contrast to these difficulties and scarcity of resources and partnerships, school managers seek to development environmental awareness activities with reused materials, even if infrequently. A question arises for the governors "For the future of society", is: Environmental Education essential for the formation of the character of the citizen?"

Yes, environmental education is considered indispensable in human development. It must be approached beyond the school environment, as well as in all extensions of society to generate effective changes in the relationship between man and nature. Since environmental disturbances come from human activities to supply political, social, economic, cultural, and ethical conditions (Fernandes, 2010). According to Law No. 9,795 / 1999 of National Environmental Education Policy: Environmental Education of Brazil, it understands the processes through which the individual and the community build social values, knowledge, skills, attitudes and competences aimed at the conservation of the environment, a common use of the people, essential to the healthy quality of life and its sustainability.

Therefore, it is necessary to develop a group of reflections along with actions that result in social behaviours of commitment and social organization, focusing on the importance of belonging and responsibility. Environmental Education, in turn, aims to motivate an ecological awareness in individuals, striving to provide a perception that changes human attitudes aimed at protecting the natural environment (Sorrentino, 2004).

The school is considered one of the crucial spaces for the formation of a citizen, usually in educational institutions that have the first contact with awareness regarding issues of nature conservation. Based on the knowledge constructed at school, it is that students will follow the progress of socialization starting at home, thus playing an important role related to the social and environmental behaviour of the students. Therefore, teachers are fundamental in the process of sensitizing society, regarding environmental problems. (Silva and Bezerra, 2016).

Environmental Education will only reach its real goals if it is applied in a conceptual-methodological way, in the school plan of interactive work, questioner, proposer of effective updated actions, so that in this way it provides greater questioning on a large scale. Thus, contributing to the expansion of Environmental Education (Zuquim et al. 2012).

a) Strengths

Both schools proved to be recognized by the community to which they belong. However, the urban school had a score of 95 in contrast to the rural school a score of 45 (Figure 2). A good geographical location is a privilege for schools, with a greater chance of having public or private partnerships (Falcão and Roquette, 2007). Community participation enables knowledge, assessment of services offered and organized intervention in school life, which can influence the democratization of management and the improvement of teaching quality (Libâneo, 2001). The intention is that all the practice is consolidated through informed action in the partnership of the subjects within the school, and the educational institution with the family and the community as a whole, aiming to achieve mission and principles adopted by the school. Another point raised was the democratic management is participatory, and both schools are always developing environmental education projects with their own resources and partnerships from neighbouring regions, which help in the didactic and participatory development of the nearby community, allowing

knowledge to be shared (Paro, 2006). Note that the reflection on the theme of democratic and participatory management becomes relevant because it is an emerging need in the reality of public schools and educational debates, in order to promote changes in education that has been witnessed today.

b) Weaknesses

We found a contrast in the scores for "weaknesses", where in the urban school it presented the value of 30 while in the rural school the value was 80 (Figure 2). However, in both schools, the main points are related to the number of people involved (employees and students) and the school space, which reflects the internal difficulties to develop the work of environmental education. Institutions that have administrative infrastructure such as the board of directors and the teachers' room, the presence of laboratories and the availability of internet; present a better educational performance. On the other hand, factors such as the number of classrooms, the number of employees and the number of students per class, are negatively related to the average proficiency in school subjects (Biondi, 2008). This is due to the increasing difficulty in managing larger units and overcrowding in the classroom, which tend to hinder learning (BRASIL, 2005). Another point raised is that the financial resources are not enough to carry out internal activities, therefore, it has the help of partnerships and interaction with the outside society. However, unlike the urban school, the rural school lacks teaching materials and teachers who have mastery of the socio-environmental theme, which makes it difficult to practice activities related to the environment. (Falcão and Roquette, 2007).

c) Opportunities

The schools in this study showed high values in relation to "opportunities", where they obtained the following scores: urban school value of 77.5 and rural school value of 67.5 (Figure 2). The urban school is admired by society (according to the SWOT analysis), because it holds major socio-environmental events, and are always taking advantage of technological advances to improve education, which helps in interacting with external society through events (science fair, water event, knowledge web etc.) and are always open to partnerships. On the other hand, the school in the rural area holds small events, it is worth noting that it is not for lack of interest from managers, but for lack of investments (Arnaldo, 2018).

The "opportunities" pointed out for both schools were: continued teacher training suggested by all the respective school principals; the indication of didactic projects by the Municipal Education Secretariat, and the support of a management within the specific school for the operationalization of socio-environmental themes. The possibility of partnerships with other schools, universities and research institutions, for example: Casa da Cultura de Marabá (House of Culture of Marabá - http://casadaculturademaraba.org/), Universidade Federal do Sul e Sudeste do Pará (Federal University of the South and Southeast of Pará - https://www.unifesspa.edu.br/), and Universidade do Estado do Pará (State University of Pará - https://www.uepa.br/).

The training of teachers as a professional preparation starts to play a crucial role, as it makes possible in their own learning process, the development of skills necessary to act in the scenario where the school is inserted, recognizing it as part of a trajectory of continuous education throughout of life (Mello, 2000). According to Selles (2002), it must be provided that the teacher can recognize that learning is built on a "two-way street". That is, not only the academic knowledge produced at the university must contribute to the teachers, but also, the experience derived from daily work at the school provides an important contribution to be explored theoretically. The approximation of the University and other research institutions to the school, however, cannot be reduced only to the insertion of academics in this favourable environment for the improvement of teacher education. It is also necessary to bring the school closer to the university, as it is in this instance that scientific knowledge is produced in relation to pedagogical practice. From the university, which radiates the knowledge built in the most diverse areas of knowledge (Scheid et al. 2009).

d) Threats

Both schools listed the main "threats" that are surrounding the school environment with the following values from the SWOT analysis; the urban school with a score of 67.5 and the rural school with a score of 77.5 (Figure 2). In both schools there is a clear lack of management support (municipal, state, or federal) for socio-environmental projects. The financial budget does not meet the needs of schools. Parents' lack of participation and family structure hinder school performance and affect student learning (Arnaldo, 2018). However, in rural schools, the threat is even greater, as they do not hold large events due to the lack of teachers in the various areas of Science in the school environment and the appropriate place for holding large events, and even for mandatory classes, as there are barriers that interfere in the development of projects (Falcão and Roquette, 2007). As stated, education is one of the main factors in the development and social inclusion of a nation. Making it

quality to a larger number of people is a constant challenge for Brazil (Camâra, 2016).

The current advances in science and technology have caused profound changes in social behaviour, in the forms of communication, in the production processes, in the organization of work and, consequently, in the training of human resources. As a result of these changes, society has been demanding professionals who, in addition to technical competence, have the capacity for engagement, initiative and decision-making (Maricato et al. 2000). However, technology (smartphones) was also reported by managers as interfering with student learning, as there is no control over the use of electronic devices in the classroom, even with rules for use by students (Zuin and Zuin, 2018). In this way, new technologies, when used in excess, can cause negative consequences on student behaviour and learning. Immediate access to information can cause superficiality in the knowledge of users, thus impairing the system of memorization and understanding completely of different areas of knowledge, thus impairing the functioning of the brain (ÉPOCA, 2011). In addition to technological dependence, social isolation is another negative factor in the use of technologies, as children and adolescents spend so many hours involved in cyberspaces that it negatively affects their social, family and school life, thus impoverishing their interpersonal skills. Access to large amounts of information can also become a negative factor, as it can generate cognitive overload, leading to stress. As they spend part of their existence in the virtual world, it is difficult to distinguish the reality between the two worlds (virtual and real). Because more attention is needed to control the use of these revolutionary technologies, so that we cannot be controlled by it, nor cause damage to individual well-being (Oyama, 2011).

It is worth mentioning that the use of technologies in contemporary society has brought great positive impacts to several areas, including school environments. The use of technologies inside and outside the classroom is becoming increasingly necessary to achieve higher quality education. However, government investment is necessary for schools to acquire these technologies. (Maricato et al. 2000). Among the benefits generated from technologies in schools, we can highlight the speed at which content can be accessed, the scope and the power to choose which subjects are most relevant to certain situations, in addition to offering innovation, generating new ideas that lead to elaborate new ways and methodologies of approach and content dissemination. Thus, technologies in general are strong allies in the teaching-learning process (Oymar, 2011; Artuso, 2008). However, training of teachers in

schools is necessary to be able to use technology in their favour and not against.
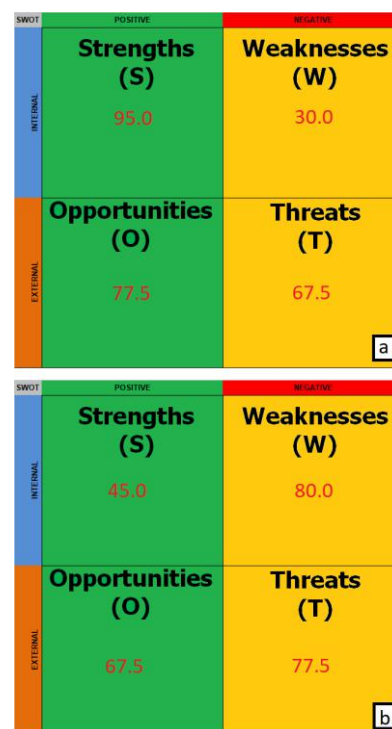

Fig. 2: Graphical representation of the scores found by the SWOT analysis when analyzing the internal and external environments between the positive points (green column) and negative points (yellow column) of: A) Urban school and B) Rural School in the municipality of Marabá located in the state of Pará, Brazil.

IV.   FINAL CONSIDERATIONS

In view of the analysis of the data collected and interpreted by SWOT, it is evident that there is a concern on the part of schools in relation to environmental problems and the development of educational processes that encourage the teaching practice of environmental education. We found that there is an administrative effort to provide students with projects that raise environmental awareness in schools in the areas: urban and rural. Despite the insufficient support of the government (municipal, state or federal), the difficulty that the rural school has in relation to government visibility, as well as the acquisition of resources to develop socio-environmental projects, is clear in this work. Allied to this, the rural school goes through several "weaknesses and threats" in relation to the internal and external environment, the same occurs for the urban school, but in smaller proportions. Despite the innumerable challenges faced by rural schools, the importance that education has for these rural communities is notorious. After all, education in the rural and urban

environment provides citizens with better intellectual performance, starting to adopt critical and productive behaviours, identifying themselves as transforming members of the environment. Thus, valuing the identity of this country and city population, as well as their respective culture (Ribeiro, 2014). We highlight the importance of the partnerships reported in this study by schools by the University and research institutions. Where, the public-school needs partners who contribute to raise the school environment and that this quality does not depend exclusively on government efforts. This project is still in continuity, because schools need support from universities and universities need the schools to build a better world.

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