

# The Interdisciplinary Practice of High School Teachers of Nature Sciences: Focusing on the Environment in full-time School

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**Abstract**—This research project had the objective of analyzing the interdisciplinary pedagogical practice of the professors of Higher Education Nature Sciences. The interdisciplinary practice in the school environment has been considered primordial in the process of teaching and learning, for enabling it to occur in an innovative, integrative, participative and dynamic way. Considering that Environmental Education is related to the preservation of the environment and sustainable development, the locus of the research was the School of Integral Engineer and Professor Sérgio Alfredo Pes-soa Figueiredo in the city of Manaus, for being located in the vicinity of the Ducke Reserve, one of the most important research centers of the National Research Institute of Amazonia (INPA), given the existence of a great diversity of species of fauna and flora of the Amazon. The study was developed from the descriptive, exploratory bibliographical research with a qualitative and quantitative approach through the case study, a visit to the MUSA (Museum of the Amazon) with students and teachers, where it was possible to observe curricular activities developed by the professors of Sciences of the Nature of the High School. Questionnaires were applied to 181 students, 13 teachers and the school manager, where it was possible to identify pedagogical practices aimed at the preservation of the environment.

**Keywords**—Sciences; Environmental education; Preservation; Environment.

## I. INTRODUCTION

The Ducke Reserve was created through State Law No. 41 of February 16, 1963. "At that time, the Government of the State of Amazonas made a donation of 100,000 square meters of the Forest Reserve named" Ducke "to the National Institute of Amazonian Research (INPA), which has become an important space for study and research of the same" (AMAZONAS, 1963 apud MARQUES et al., 2014, p. 32).

It is a Forest Reserve located in the Cidade de Deus neighborhood, Zona Lesta de Manaus, known for its great

variety of fauna and flora and springs in streams, one of the most visited sites by national and international researchers in the studies and scientific research focused on the environment.

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At present, the Ducke Reserve has in its surroundings a School of Integral Time that according to the Secretary of State of Education (SEDUC, 2018), should be a reference in education in Brazil, since the classes are daily and continuous (morning and afternoon), where programs and pedagogical resources are offered that can foster quality education. In this way, pedagogical and interdisciplinary practices that diminish the environmental impact, present themselves as important alternatives in the indicated context, being essential the muddance of habits and attitudes of the society, having in the school a suitable space for such, possibility of effective integration of the student into the environment.

Pedagogical practices, in this new social context, require the collective construction of knowledge with other teachers, as mediators and guiding the process of teaching learning. The preservation of the environment demands a new educational posture, regarding pedagogical practice which is not limited to expositions only dialogued in the classroom, on the contrary, presupposes a new model of teaching and learning in an interdisciplinary way.

It is in this context that Critical Environmental Education assumes the important function of contributing to the recovery of essential values for a new citizenship, taking an integrated view of the relationships between human beings and nature and between human beings and their peers (GUIMARÃES, 2014). That is, environmental education must consider all the social and political aspects of man and nature, at all educational levels.

Thus, during the process of teaching and learning, the teacher must develop pedagogical practices that awaken the students' environmental perception, making them perceive their daily life and the social environment in which they are inserted, so that they can reflect, and feel subject to the educational process and the preservation of the environment. Morin (2011, p. 37) comments that "education should favor the natural ability of the mind to formulate and solve essential problems and, in a corresponding way, to stimulate the total use of general intelligence." This total use requires the free exercise of curiosity, the most lively and most expansive faculty during childhood and adolescence, which education often extinguishes, and which, on the contrary, is to stimulate, or if it is adoring to awaken.

The relevance of this study is to contribute to the interdisciplinary practice of Science Teachers of the High School in relation to the strengthening of the perception that education constitutes a social space that encompasses many indispensable practices for the formation of critical subjects and environmentally responsible. Based on this assumption, it becomes clear that interdisciplinary doing allows significant learning through the association of theory with environmental practice, engendering new knowledge, concepts and meanings capable of articulating the school space to the environment in which they are inserted.

## II. LAWS, AND RESOLUTIONS AND POLICIES IN ENVIRONMENTAL EDUCATION

The legal bases and backs of the Public Policies for Environmental Management and Education in the three federal, state of Amazonas and municipal districts of Manaus provide conceptual and historical information on the Ducke Forest Reserve in the eastern part of Manaus, in addition to having the function of tourist visits and students of private and public school networks, is the research base of the National Research Institute of the Amazon.

### 2.1 Federal legislation on environmental education and policy

The CF / 88 establishes the National Environmental System (SISNAMA), which is the highest national body to manage the national environmental policy, and has one of its functions to advise the president of the Republic on matters of the area environmental.

According to Law No. 6,938, dated August 31, 1981, the advisory body of the National Environmental System is the National Council for the Environment (CONAMA) and the executive body is the National Institute for the Environment (IBAMA) (BRASIL, 1981).

Brazil is considered to be one of the countries with the most advanced environmental legislation for contemporary ecological needs, but effective data indicate that

this legislation has been idle or obsolete since more than 90% of the fines applied by IBAMA are not actually collected, since the fined individuals tend to resort to justice and slowness tends to cancel the tone of punishment to the owner and the damage caused to nature.

Another fact that deserves attention in a negative critical tone is the paradox between Brazil as a holder of a consistent and plausible legislation to ecology while at the same time being reproved for the devastation of natural forests in the Amazon, of burnings, in the Amazonian rivers and bragging about the pre-salt as a source of exorbitant wealth going against the demands and needs of dies and sources of clean renewable energies unlike fossil fuel oil.

The National Environmental Policy, besides being recommended in the Federal Constitution of 1988, is dealt with in Law n° 6.938/1981:

Art. 2º. The aim of the National Environmental Policy is the preservation, improvement and recovery of the environmental quality conducive to life, aiming to ensure, in the country, conditions for socioeconomic development, interests of national security and protection of the dignity of human life.

In fact, what is observed in the legislation in force for both politics and environmental education, there is no doubt that the Brazilian legislator has approved an ideal system for both actions in the environmental area, but it remains to be verified whether this legislation is fulfilled as it should.

The ABNT (ABNT, 2014) is a legally constituted body to establish standards and enforce them through official inspections carried out by public agencies. In the private area the Environmental Management System / EMS is executed according to the principles: Principle 1 - Environmental commitment and policy; Principle 2 - Planning of compliance with environmental policy; Principle 3 - Implementation; Principle 4 - Measurement and evaluation; and Principle 5 - Critical analysis and improvement of global environmental performance.

Brazil has laws to regulate the exploitation of resources, but does not invest in infrastructure to oversee compliance with these laws in an area that, evidently, needs supervision. The resources applied to satellite monitoring, for example, do not correspond to the on-site monitoring of deforestation authorizations. In order to be effective, the inspection must arrive before, to prevent deforestation from happening, to inhibit the criminal action in its origin. And the Public Prosecution action must be intensified, as provided by the Forest Code, Environmental Policy and the Environmental Crimes Law (SOARES; HIGUCHI, 2006, p. 576).

Moreover, in contemporary Brazil and in other countries there is a neoliberal state that acts in concomitance

with interested companies, granting them licenses and tax incentives, as has been the case with Brazil in relation to foreign oil companies and attempt to liberate the Copper and Similar National Reserve in the state of Amapá.

Regarding Environmental Education, especially for children, it is how these paradoxes can be discussed with them in the face of such contradictions that, even, can be configured complacency, prevarication, among other acts against nature.

## 2.2 Legislation of environmental policy and education of Amazonas

What differentiates Amazonas is the Manaus Free Zone that has diverted the common economic matrix in the legal Amazon from vegetable and mineral extractivism to manufactures of electrical and electronic products thus benefiting the region with a clean and untied economy - predatory acts. In addition to the State Department of the Environment, the State has a specific body for the state environmental issue that is the Environmental Protection Institute of Amazonas (IPAAM, 2017).

These units represent 55.47% of the State area distributed as follows as protected areas (Table 1):

Table.1: Protected Areas of the State. (D1).

Áreas Protegidas do Estado		
CATEGORY	% AM	UC
RSD	6,53	16
PAREST	2,20	07
FLORESTA	1,67	08
APA	1,08	06
RESEX	0,56	04
REBIO	0,02	01
<b>TOTAL</b>	<b>12,05</b>	<b>42</b>

Source:SEMA (2015)<sup>1</sup>.

In addition to the data specified in Table 1, the aforementioned source provides the following data specifically cited in Table 2, according to the Amazon Environmental Matrix.

Table.2: Distribution in% and category of Protected Areas in Amazonas.

Protected Areas in Amazonas		
CATEGORY	% AM	Há
Indigenous Areas	27,07	42.205.013,83
Federal UC	15,16	23.630.678,83
State UC	12,05	18.787.397,29
Municipal UC	1,19	1.853.012,10

Source: SEMA (2015).

Regulatory Framework for Environmental Policy for Sustainable Development in Amazonas is thus distributed and organized:

Table.3: Distribution in% and category of Protected Areas in Amazonas.

Regulatory Framework for Environmental Policy / AM	
Climate changes	Law nº 3135/2007
Environmental services	Law nº 4.266/2015
Environmental Licensing	Law nº 3785/2012
Water resources	Law nº 3167/2007
State System of Conservation Units	Law nº 53/2007

Source: SEMA (2015).

In practice, the environmental policy for sustainable development in the State of Amazonas is carried out in the following thematic areas: Conservation Units - UC; Deforestation and burning; Environmental Regulation - CAR; Climate changes; Ecological Economic Zoning - ZEE; Solid Waste; Water resources; Environmental services; Environmental education; Strengthening Municipal Environmental Management; Peoples and Traditional Communities; and Forestry Policy.

## 2.3 Legislation of the environmental education policy of Manaus -AM

The Environmental Policy of the municipality of Manaus is based and legally based on Law no. 605, dated July 24, 2001, through the establishment of the Environmental Code of the Municipality of Manaus, which recommends in its Chapter I, the Principles of said document:

Art 1 - This Code, based on local interest, regulates the action of the Municipal Public Power and its relation with citizens and public and private institutions, in the preservation, conservation, defense, improvement, recovery and control of the ecologically balanced environment, a very diffuse and essential nature to the healthy quality of life.

Art. 2 - The Municipal Environmental Policy is guided by the following general principles:

I - Everyone's right to the ecologically balanced environment and the obligation to defend and preserve it for present and future generations;

II - The optimization and guarantee of the continuity of the utilization of the natural resources, qualitatively and quantitatively, as a presupposition for the sustainable development;

III - The promotion of the integral development of the human being.

<sup>1</sup> Dados da Secretaria de Estado do Meio Ambiente (SEMA). Disponível em: <<http://meioambiente.am.gov.br>>. Acesso em: 8 jan. 2018.

The city of Manaus has an Environmental Policy that advocates environmental licensing and inspection, which due to the greater degree of entronement of the State Ama-zones and greater human settlement presents the most urgent need for action focused on environmental preservation.

### III. MATERIALS AND METHODS

#### 3.1 Typology

The research was qualitative, and based on the classification criteria proposed by Vergara (2011), which distinguishes it in two respects: as regards ends and means. Regarding the ends, the research was characterized as applied and exploratory because it is a case study, which according to Yin (2015, p. 23): Exploratory research is an investigation or survey through case studies, and field and can be treated as important methodological strategies for research where a phenomenon occurs or has elements to explain it, may include interviews application of question-and observations.

So this research was of a basic nature of the non-experimental type where the researcher studied the phenomena without intervening in a systematic way. In this perspective, (MARTINS, 2000, APUD, VERGARA, 2011, p. 1), points out that in this type of study the "... researcher observes, records, analyzes and correlates facts and variables without manipulating them".

#### 3.2 Focus

In its focus the research had as theoretical and methodological contribution also the deductive method, which according to the classic meaning, consists of the method that leaves the general for the particular. Thus, "through a chain of reasoning in descending order of analysis from the general to the particular, where he came to a conclusion. To Gil (2010), "This method uses the syllogism that consists of the logical construction, from two premises, which will base a third one, called of conclusion". In view of the above, the object of this study is the pedagogical interdisciplinary pedagogical practice of the professors of Higher Full-time School of Engineering and Professor Sérgio Alfredo Pessoa Figueiredo in the city of Manaus.

#### 3.3 Study area

The area of study is part of the urban area of Manaus state of Amazonas, located in the District of Cidade de Deus that emerged as another invasion of land occupied by migrants from the interior and other states. At the time, according to residents' reports, nothing was done to stop the landless families from invading the place. It was not until 1993 that the region became a *bair-ro*. Far from the center of Manaus, the neighborhood is close to Cidade Nova, in the North Zone, and Jorge Teixeira, in the East Zone of the Amazonian capital. Therefore the neighbor-

hood is considered border of the zones east and north. The questionnaires were composed of a set of questions whose purpose was to know the important information. Gil (2010), comments that "this type of approach aims to identify knowledge, values, expectations, aspirations, among others." According Goldenberg (2014), "Closed-type questions are standardized, readily applicable, can be analyzed quickly and dispassionately."

#### 3.4 Sample and Study Population

The composition of the sample was based on the dialectical method that Furasté (2015, p. 42), "Dialectics is a way of analyzing reality from the confrontation of theses, hypotheses or theories."

The population that compose the study are the science teachers and students of the High School of this curricular component enrolled in the School of Integral Time. Thus composed of 438 students in high school in the three series 1<sup>a</sup>, 2<sup>a</sup> and 3<sup>a</sup> series, 22 teachers of high school and one manager.

In this context, the subjects participating in the research were considered only randomly selected. Thus, the sample consisted of 13 (thirteen) teachers; One (1) manager and 181 (one hundred and eighty-one) high school students.

##### 3.4.1 Inclusion criteria

Acceptance was made by teachers and high school students to participate in the research and the proposed study with the permission of the school board.

##### 3.4.2 Exclusion Criteria

Students and teachers who did not agree to participate in the study were excluded or were not included in the inclusion criteria.

#### 3.5 Data collect

Data collection was carried out from the observation and application of questionnaires with closed-ended questions with the teachers and students of the High School of the Engenheiro Tempo Integral School and Professor Sérgio Alfredo Pessoa Figueiredo since it is an instrument planned for the purpose of responding to established objectives.

#### 3.6 Procedures

The researches were exploratory and descriptive defined for the proposed study, since both are usually carried out by researchers who are concerned with the practical action. Thus, "exploratory research is developed with the aim of providing an approximate overview of a given fact" (GIL, 2010, p. 27).

As for the descriptive research, it is emphasized that its main purpose is to "describe [...] the characteristics of a given population or phenomenon or the establishment of

relations between variables. [...] one of its most significant characteristics is the use of standardized techniques of data collection" (Gil, 2010, p. 28).

For the proposed study, the mis-ta approach was used to integrate quantitative and qualitative research, making it possible to cross-reference information more reliably, "since data collection is not from a single procedure" (GOLDENBERG, 2014). Thus, it is quantitative because it represents the space of the scientist that can be translated objectively, and in mathematical and qualitative ones, by aiming to work with the universe of meanings, motives, aspirations, beliefs, values and attitudes, "which corresponds to a deeper space of relationships, processes and phenomena that can not be reduced to the operationalization of variable" (MINAYO, 2011). The procedures used were the bibliographic research, field research and case study carried out as a procedure to analyze the results.

The bibliographical research, according to Lakatos e Marconi (2017, p. 17), consists of the "[...] survey of all the bibliography already published, in the form of books, magazines, separate publications and the written press. Its purpose is to enable the researcher to come into direct contact with all material written on a particular subject [...]" . In this way, the bibliographic research will subsidize the analysis, interpretation and attribution of meanings to the data collected in the field research and case study.

To Yin (2015), "[...] a case study is an empirical investigation that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly defined." Therefore, the case study is applicable when there are many interested in a complex and changeable circumstance, whose answers have not yet been fully found, as is the case of the researched topic.

#### IV. RESULTS

##### 4.1 School profile

The school works with Elementary School Years and High School levels. It is part of the Metropolitan Region of the City of Manaus, located in the "Cidade de Deus" Neighborhood, approximately 20 km north of the city, in a straight line, access by BR-174, at the geographical coordinates in 3° 0' 27" S, 59° 56' 22.92" W -3.0075, -59.9397° S W. It is limited with the districts: New City, Golden Field, Sweet Creek, Alfredo Nascimento, Jorge Teixeira, Francisca Mendes 2, according to figure 1.



Fig.1: Neighborhoods around (EETI).

Source: Google Maps (2019).

The research was carried out at the State School of Integral Prof. Eng. Sérgio Alfredo Pessoa Figueiredo next to the botanic botanist of Manaus - Adolpho Ducke, as shown in Figure 2.

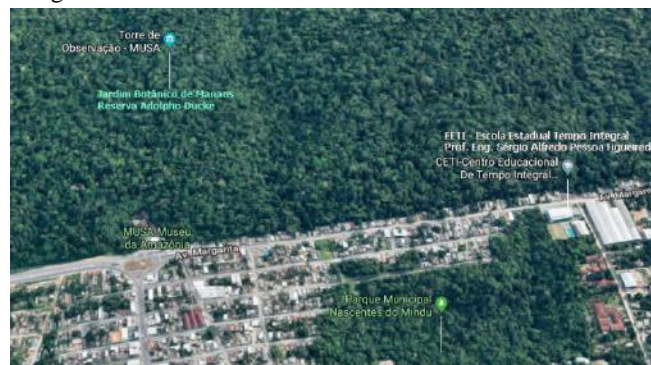


Fig.2: Forest Reserve AdolphoDucke.

Source: Google Maps (2019).

The State School Full Time Prof. Eng. Sérgio Alfredo Pessoa Figueiredo, executes the activities in partnership with 54 employees, according to Census data, 2017 the physical structure has 24 classrooms; Board room; Teacher's room; Computer lab; Science lab; Indoor sports ground; Kitchen; Library; Bathroom inside the building; Conference room; Refectory; Warehouse; Auditorium and Green Area.

To understand what prevails in the school environment, that is, the interdisciplinary practice of nature science teachers in a School of Integral Time in the Municipality of Manaus - AM. The institution chosen as a field of research was the State School of Integral Prof. Eng. Sérgio Alfredo Pessoa Figueiredo. The school has an administrative staff composed of: one (1) Manager; one (1) Secretary; one (1) Pedagogue; two (2) middlemen; three (3) administrative; six (6) general services and 40 Teachers, of which 18 are teachers from the 6th to 9th year of elementary school, and 22 teachers from the 1st to 3rd grade of High School. The school has a Library, a Computer Room, Laboratory, sports court, and cafeteria. The school has a number of classes: a) three (3) 1st grade classes, with a

total of 155 students; b) three (3) 2nd grade classes, with a total of 140 students; c) four (4) third grade classes, with a total of 143 students. The teachers are distributed in the disciplines according to table 4.

Table.4: Number of teachers for each discipline (EETI).

Number of teachers for each discipline	
Portuguese language	05
Mathematics	05
Methodology	02
Religious education	01
Geography	03
Sciences	04
Story	03
Physics	02
Chemistry	02
Biology	02
Ed. Física	04
English	02
Spanish	02
Arts	02
Computer lab	01
Total	40

Source: Authors (2018).

Founded on January 31, 2013 through Government Decree 32,081 / 2012. The name of the school pays homage to the Engineer and Professor Sérgio Alfredo Pessoa Figueiredo. The School Belongs to the Distrital V Coordination and is located in the Cidade de Deus neighborhood, at Avenida Uirapuru, no. 1532. Serving the students of the adjacent communities offering them the Middle and High School. Having as its first manager and current Amílís Barroso dos Santos. The patron of the School Engineer and Professor Sérgio Alfredo Pessoa Figueiredo, born on December 14, 1948 in Manaus. He graduated in Civil Engineering from the Federal University of Amazonas and worked as a professor at the same University in the Department of Hydraulics and Sanitation. He joined the state public service as a technical assistant. He passed away at age 57 in 2005, leaving a legacy of professionalism and responsibility for the public cause and development of the northern region.

The data were collected through applied and dialectical research, the data collected were tabulated and analyzed in three parts with: teachers, students and managers. For the research, research questions were elaborated. Through documentary analysis it was possible to collect data such as: the interdisciplinary practice of exact and natural science teachers, and how this interferes or not in the process of teaching and learning of students, in order to identify the level of environmental perception of stu-

dents, with relation to the content delivered in class, related to the conservation and protection of the environment. For the questionnaire, a script was prepared with twelve questions, for students, manager and teachers, in the direct observation was used photos where the researcher filled in according to his personal analysis.

The study sought to emphasize the interdisciplinary practice of the Faculty of Natural Sciences and the environmental perception so that it is possible to measure the effectiveness of the knowledge and application of content delivered in the classroom related to the preservation of the environment in the school.

In this aspect the data were empirically collected with students, and the questionnaires were applied inside the school, in the classroom itself of the class in which the students are enrolled and with the presence of the teacher (a) and the researcher, and the result was kept in a safe place, in order to guarantee the confidentiality of the information, preserving the individual's right to freedom of expression and privacy, environmental education and educational actions that contribute to the training of conscientious citizens in relation to the preservation of the environment capable of taking decisions on environmental issues necessary for sustainable development.

We surveyed 40 teachers, and only 22 (teachers) worked in high school, but the survey respondents were exactly 13. Among them, 31% were male and 69% female. Among the participants of the research, 15% are between 20 and 30 years old; 61% between 31 and 40 years; 23% from 41 to 50 years and only 1% with age above 51 years. Regarding marital status, of the 13 teachers, 54% are married and 46% are single. 69% of the teachers in the school have an effective link with the State Department of Education and 31% in the PSS (Simplified Selective Process) regime.

The training of the 13 participants was based on the interviews with the teachers, where they can affirm their respective ones where (2), science teachers, and (2), Portuguese speakers the other 9), distributed in the formations according to figure 3.

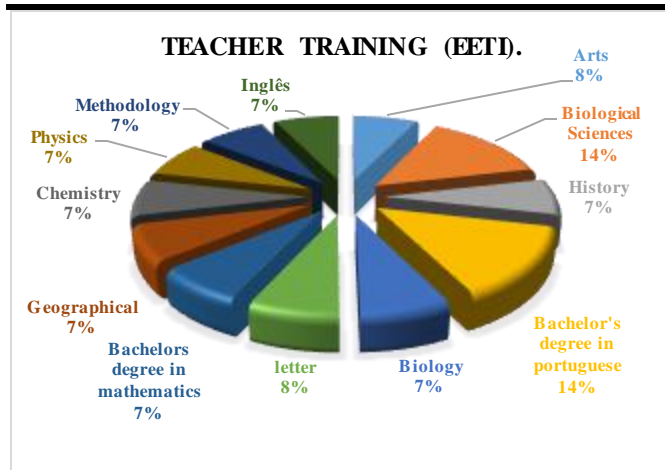


Fig.3: Teacher Training.

Source: Authors (2018).

As for the discipline that teachers teach, it is possible to identify that the majority of science and the language of Portuguese is the ones, but as shown in Figure 4.

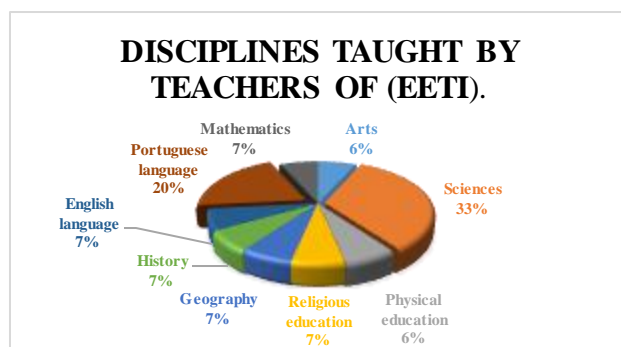


Fig.4: Disciplines Taught by Teachers of (EETI).

Source: Authors (2018).

As for the time worked in school, it was possible to identify that, of the (13), teachers only (2), have 6 years of work time and (4), teachers are in school for 3 years; (1), teacher at 5 years; (1), teacher at 4 years; (1), teacher at 2 years; (1) teacher at 1 year and the others at months, as shown in figure 5.

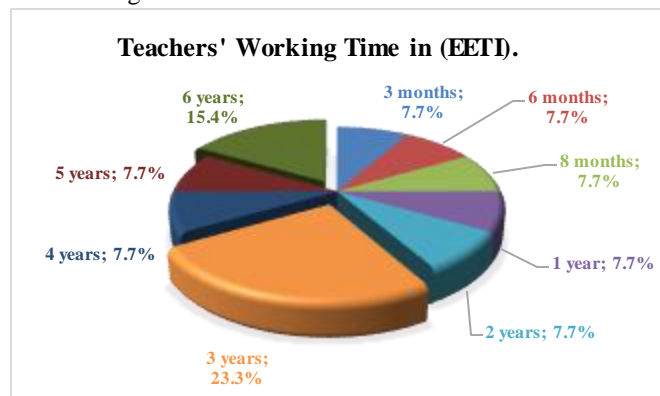


Fig.5: Teachers' Working Time in (EETI).

Source: Authors (2018).

The profile of the science classes are the same in the classroom in its highest level of teaching and the lectures, figure 6 shows this disposition well.

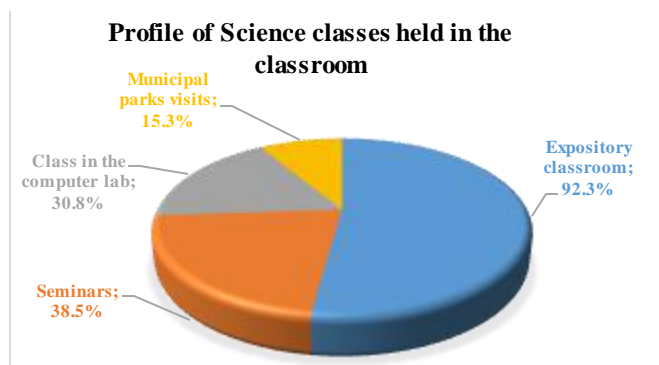


Fig.6: Profile of the Science Classes in Sala.

Source: Authors (2018).

Environmental issues are addressed as often as in the classroom, according to teachers the main issues are about global warming; water bodies / rivers and seas; selective collection and the environment in general, as shown in figure 7.

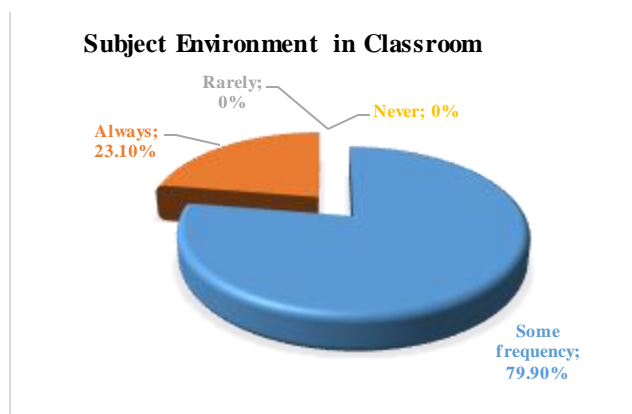


Fig.7: Subject Frequency Environment in the Classroom.

Source: Authors (2018).

The students of Escola de Integral Engenheiro and Professor Sérgio Alfredo Pessoa Figueiredo are very interested in the Environment Theme, although most of them live near the school that is next to a forest reserve, figure 8 shows this disposition well.

**Students' Perception of the Environment Theme***Fig.8: Environment theme.*

Source: Authors (2018).

At school there is a Selective Collection Project, in some environments, according to teachers' reports, so figure 9 shows the classification of the collection.

**Selective collection in (EETI).***Fig.9: Selective collect.*

Source: Authors (2018).

The Environmental Themes are inserted in the middle classes, mostly through specific projects; Class planning, figure 10 shows the percentage of this provision.

**Environmental Issues Inserted in High School Classes***Fig.10: Subjects inserted in high school classes.*

Source: Authors (2018).

The activities carried out in the AdolphoDucke Reserve with the students are frequent according to the teachers' reports, figure 11 shows in percentages these activities.

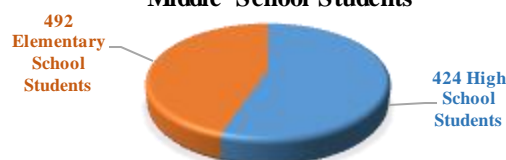
**Activities Held at the Adolpho Ducke Reserve.***Fig.11: Activities in AdolphoDucke Reserve.*

Source: Authors (2018).

In this way, the interviews with the in-wanted teachers were carried out in the research process entitled: The interdisciplinary practice of high school teachers of natural sciences (Physics Biology and Chemistry): focusing on the environment in the full-time school prof. eng.Sérgio Alfredo Pessoa Figueiredo in the municipality of Manaus-AM.

### 5.1 RESULTS OF THE RESEARCH WITH THE MANAGER

The manager is over 51 years of age and his or her position in the School is statutory has a degree in Literature. The time of service in the School is 6 years, reported that the school attends the Secondary School and Final Years as shown in figure 12.

**Quantitative Study of Elementary and Middle School Students***Fig.12: Student Quantitative.*

Source: Authors (2018).

The teachers who work in the school are 18 of the High School and 22 of the high school, figure 13 shows this percentage.

**TEACHERS (EETI), FUNDAMENTAL AND MEDIUM***Fig.13: Elementary School Teachers and High School Teachers.*

Source: Authors (2018).

According to the manager the school has specific projects to work Environmental Education with the students, these projects are already developed in the school, such as: Selective Collection; management of fruit plants; Study of water bodies; global warming. There are specific didactic materials in the school to work with Environmental Education, since it is located next to a reserve. In this aspect, two (2) teachers develop Environmental Education Projects in the Integral School of Engenheiro and Professor Sérgio Alfredo Pessoa Figueiredo thus making the interest sharpened by the issue of the environment, it says that it is not possible to measure the quantitative assessment of interested students, but states that most of the students are very interested in the environmental issue, which shows that the manager's statement is true, where in an interview with the 181 students, it was possible to identify how interested the students are with the question of the environment, as shown in figure 14.

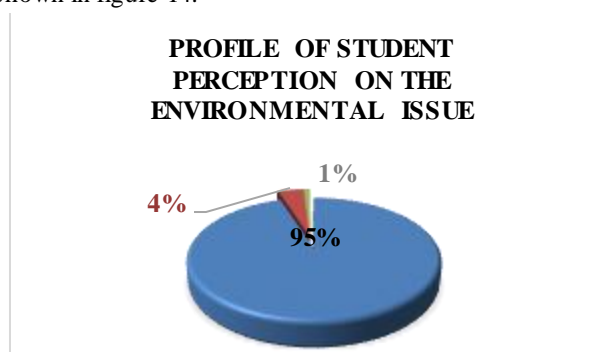


Fig.14: Profile of Students' Perception on the Environment.

Source: Authors (2018).

The manager affirms that there are Environmental Education projects per Area of Specific Knowledge, and that the science teachers are focused on the plans of lectures aiming at the AdolphoDucke reserve as the main lesson instrument.

## 5.2 RESULT OF RESEARCH WITH STUDENTS

In the field of research the data of the 181 students questioned in the study were asked the questions of the questions made with them and placed in a graph form where the data were presented on the school perception in the scope of Environmental Education and identified in their respective contexts, starting with the series as shown in figure 15.

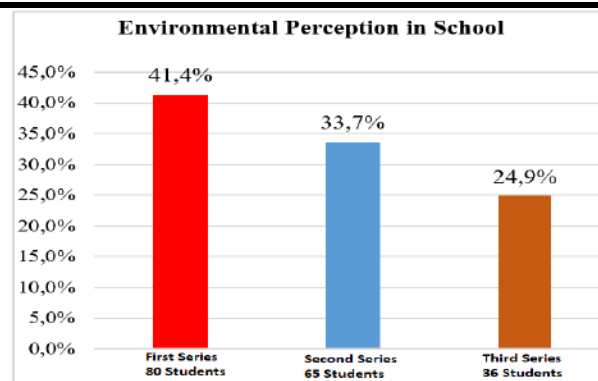


Fig.15: Environmental perception.

Source: Authors (2018).

It was possible to identify that the majority of the students of the State School Time Integral Prof. Eng. Sérgio Alfredo Pessoa Figueiredo are female, as shown in Figure 16.

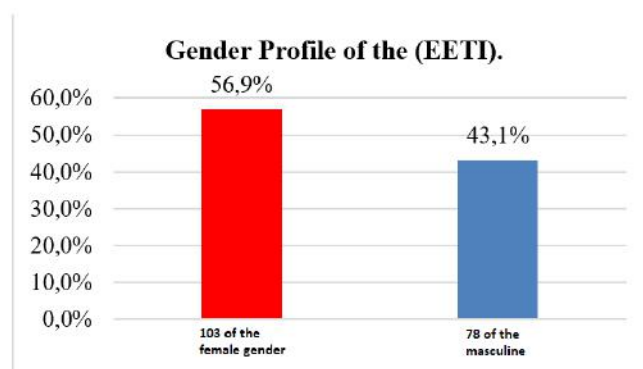


Fig.16: Gender Profile of Students.

Source: Authors (2018).

As for the question of interests, for the Environment of the students, in this sense it was easy to identify that in the majority the interest is very significant, although, there are still a significant number of students dispersed in relation to the environment in which they lived. Figure 17 shows this arrangement.

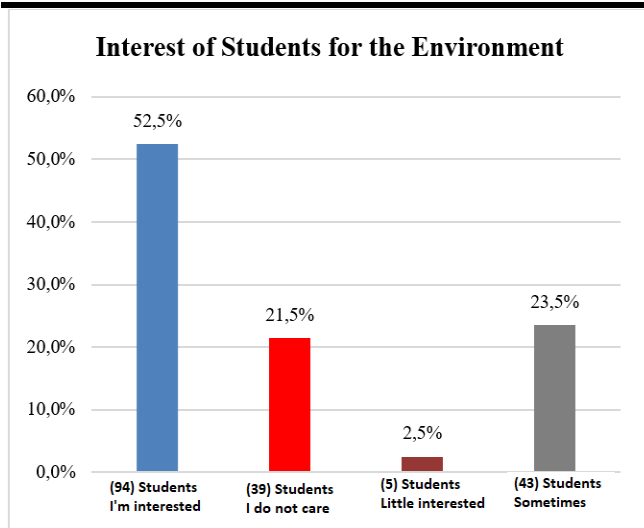


Fig.17: Interest in the environment.

Source: Authors (2018).

About where the students of Escola de Tempo Integral En-genheiro and Professor Sérgio Alfredo Pessoa Figueiredo acquired knowledge about the Environment of the (7), alter-nativas the pioneer is still the T.V. Figure 18 shows this provision.

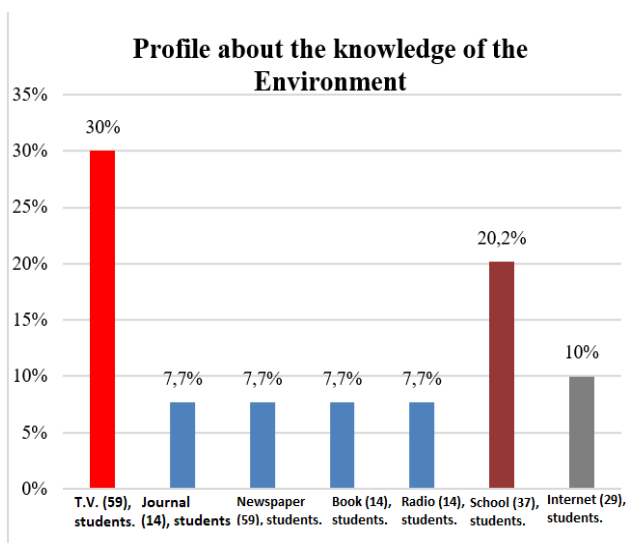


Fig.18: Where you learned about the Environment.

Source: Authors (2018)

Concerning the concern with environmental problems, the majority of students, as shown in figure 19, are concerned with the environment in which they live.

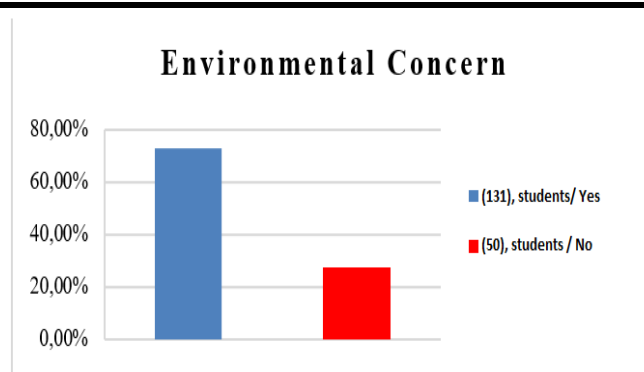


Fig.19: Concern about the Environment.

Source: Authors (2018).

On the students' knowledge about Environmental Preservation, it was possible to identify that most of them have knowledge about this subject as shown in figure 20.

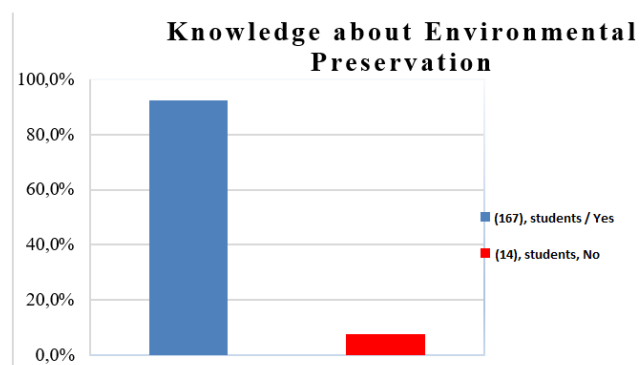


Fig.20: Knowledge about Environmental Preservation in (EETI).

Source: Authors (2018).

In the Integral Time School Engineer and Professor Sérgio Alfredo Pessoa Figueiredo in the classroom the teacher addresses environmental issues, as shown in chart 21.

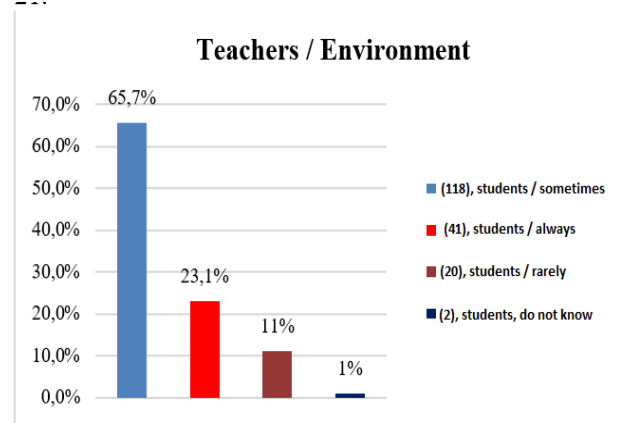


Fig.21: Teachers / Environment.

Source: Authors (2018).

On what occasion the theme "Environment" according to the students is approached Figure 22 shows this perspective.

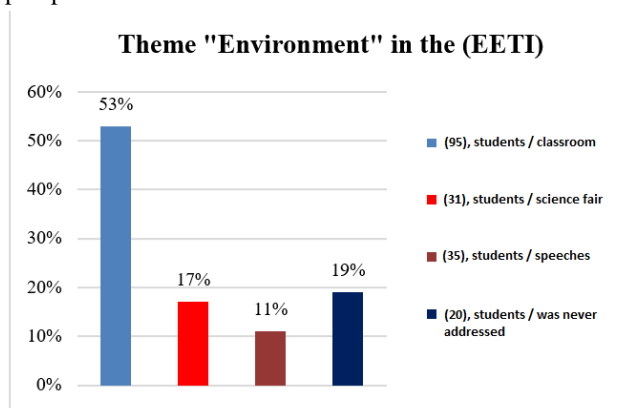


Fig.22: Theme "Environment".

Source: Authors (2018).

The visit to the MUSA, is frequent most of the students, know the reserve AdolphoDucke those who do not know are mostly newcomers at school and others have not had the opportunity to meet, figure 23, discusses this provision.

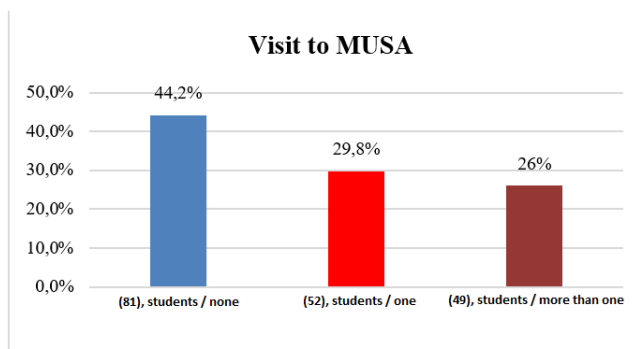


Fig.23: Visit to MUSA.

Source: Authors (2018).

The school has a Selective Collection project according to the students, figure 24, illustrates this provision well.

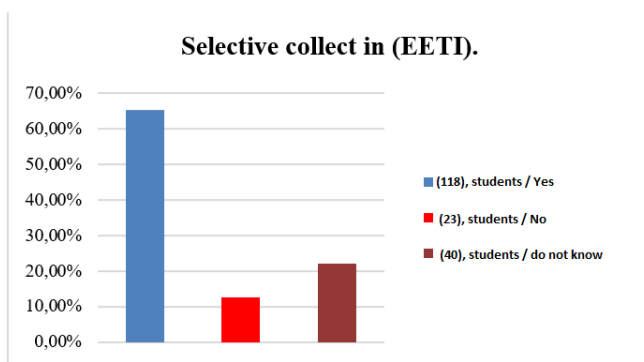


Fig.24: Selective collect

Source: Authors (2018).

The main discipline that the teacher addresses the environment issue most often is Science, as shown in figure 25.

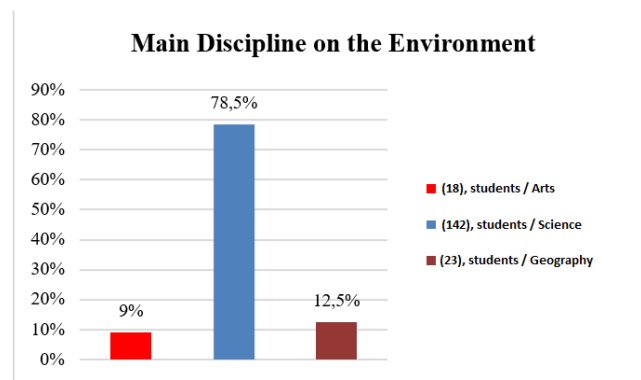


Fig.25: Main Discipline on the Environment.

Source: Authors (2018).

In this way, the importance of the interdisciplinary practices of the Science Teachers as a pedagogical intervention in the Environmental Education of the high school students in the School of Integral Time in the Municipality of Manaus - AM was worked out in the form of a conversation wheel.

With the focus on analyzing the interdisciplinary pedagogical practice of professors of Sciences of the High School of Prof. Eng. Sérgio Alfredo Pessoa Figueiredo, located in the city of Manaus, it was possible to identify through the analysis of the results that the Teachers have Interdisciplinary Practices, besides the classes through seminars, lectures and visits to the (MUSA).

The Museum of the Amazon - Musa completes 11 years of creation. Located in the AdolphoDucke Forest Reserve, in the eastern part of Manaus, it has developed events and activities for 11 years in order to popularize and deepen the historical, cultural and scientific significance of the communities and biomes of the great Amazon Basin. means of research and exhibition for educational and tourist purposes. The Muse for the School of Integral Engenharia and Professor Sérgio Alfredo Pessoa Figueiredo has the purpose of presenting the students to nature, plants and animals, where they grow and reproduce. For this to be possible, students should be well informed before entering the world of the forest, Figure 26 illustrates the students of the School of Integral Engineer and Professor Sérgio Alfredo Pessoa Figueiredo visiting the MUSA, leading the pedagogical practices of teachers



Fig.26: Interdisciplinary Practices of Teachers and Students of the (EETI).

Source: Authors (2018).

Thus, teachers in their classes in the forest correlate the didactic content to the students' school space, so that they understand and value the objectives and teachings of the science discipline, developing in each one an interest in preserving the environment.

Therefore, it is necessary to ensure that these students, who live in a city with countless natural beauties, can become aware of the implementation of environmental actions, aiming in particular for the sustainable development of the same, since according to the understanding of Wagner et al. (2011), environmental education may be the only way to minimize the negative environmental effects of tourism in natural and protected areas by giving real examples of appropriate behavior for visitors. An example of this is the AdolphoDucke Reserve as shown in figure 27.



Fig.27: Environmental Education Reserve AdolphoDucke.

Source: Authors (2018).

According to Torres, Almeida and Vasconcelos (2015), the teaching of sciences can reflect in students the abstract knowledge built on the environment, in addition to developing their autonomy and competence in relation to

communication, critical thinking and decision-making, which form the basis for lifelong learning.

According to the first specific objective whose idea was to raise theoretical-practical-methodological data used in the process of teaching science learning in this aspect of the science classes, they are carried out in the classroom mostly as reported by teachers in classes expository

According to Zaballa (2010, p. 119), "it is necessary to provide opportunities for students to participate more and more intensively in the resolution of activities and in the process of personal development, rather than simply copying and reproducing instructions or explanations of teachers ". Therefore, the student of the Escola Estadual Tempo Integral Prof. Eng. Sérgio Alfredo Pessoa Figueiredo is invited to search, discover, construct, critique, compare, dialogue, analyze, experience the process of knowledge construction itself in the exposition classes as shown in figure 28.



Fig.28: Exhibition classes.

Source: Authors (2018)

Environmental issues are addressed as often as in the classroom, according to teachers the main issues are about global warming; water bodies / rivers and seas; selective collection and the environment in general.

The second specific objective It sought to know the interdisciplinary practice of the professors focused on the use of the natural space of the AdolphoDucke Reserve in Science classes, where they questioned about their interest the students of the School of Integral Engineer and Professor Sérgio Alfredo Pessoa Figueiredo they are very interested in the environmental theme, although most of them live next to a forest reserve, and 53% of these students, as shown in graph 10 of the results analysis, are Trobat (2015, p. 34), states that "in order to achieve the goals of environmental education it is necessary to know how people think and act, with a view to planning educative, formative, informative and motivational actions that promote responsible behaviors.

In this context, the third specific objective contextualized that it is noticeable that the AdolphoDucke Reserve,

provides students with useful information, through pedagogical practices that favor daily interaction, which is fundamental for the individual's learning and their relationship with the environment that lives, starting to interact with the pedagogical process.

According to Dantas (2014, 247), writes that "the student is not only the subject of learning; it is also the one who learns from the other what the social group produces: values, language and knowledge itself." Thus it becomes clear the necessity of an education conception based on principles that involve participatory action and practice of knowledge in a context of continuous construction.

Therefore, the students of the School of Integral Engenheiro and Professor Sérgio Alfredo Pessoa Figueiredo, visit the (MUSA), Museum of the Amazon frequently, and also know the AdolphoDucke reserve the ones they do not know for the most part are newcomers to school and others have not yet had the opportunity to know each other. In this respect, Dias (2014, p. 32) argues that "environmental education should act as a set of environmental contents and practices, aimed at solving day-to-day problems with an interdisciplinary and active and responsible participation of each student".

The fourth specific objective identified the level of environmental perception of the students, in relation to the contents taught in the classroom, related to the conservation and protection of the environment, so the students, for the most part, seek to be perceptive, Schultz (2010) explains that, "Unquestionably, environmental problems are social issues caused by human behavior and their solution will require changing individual and social behavior." Therefore, it was important to know that the students of the School of Integral Engineer and Professor Sérgio Alfredo Pessoa Figueiredo, have the perception of the problems that exist around them.

Although the obligation to think about means that benefit groups of students to know the problems of their environment, Freitas (2017) clarifies that "student must develop their activities, encouraging their perceptions in order to reflect on the medium in which they are inserted. Visualizing the possible spaces of action; realization and understanding of the role for the conservation of the environment.

According to Davi (2011), conceptualizes that perception "is the procedure of reservation of the interpretation of methodological data (practice), teacher to develop a teaching with awareness of the environment, clearly showing the perception." Morin (2013) considers that "environmental perceptions are not static and the reflective look towards the environment allows a holistic vision capable of inducing behavioral changes".

The environmental perception of the students of the Escola Estadual Tempo Integral Prof. In this natural habi-

tat the students practically live and make a point of preserving, figure 29 illustrates how important is the perception.



Fig.29: Perception of the students.

Source: Authors (2018).

It is in this context that the students of the School of Integral Engineer and Professor Sérgio Alfredo Pessoa Figueiredo are environmentally educated, it is important to affirm that this environment is not an alternative but a privilege for the conscientization, in relation to the need to preserve the natural patrimony.

The fifth objective of the study was to elaborate a proposal for preservation and conservation of the environment at the Integral School of Engineering and Professor Sérgio Alfredo Pessoa Figueiredo Educational School of Integral Time in the city of Manaus with a view to consolidating the basic environmental principles in this thinking Dantas (2014), who teaches that "it is of utmost importance to preserve nature, to preserve the environment is fundamental to maintaining the health of the planet and all living beings living in it." "To celebrate the effort to protect natural resources, ecology is the science that studies the relationships between living beings and the environments in which they live" (WAGNER et al., 2011).

The proposal is to make the student participatory in some way so that this happens, it is enough to elaborate a lesson plan that follows the following steps during the school year where the students can have knowledge of the schedule proposed to them as shown in table 5.

Table.5: Proposal Schedule.

Program for the Preservation and Conservation of the Environment in the (EETD).				
Preservation / Conservation	1º Semester	2º Semester	Month/Year	Expository classroom
Watersaving	X		18/02/2019	Adolpho Forest Reserve
Energy saving		X	05/08/2019	Musa / Museum

Shopping Savings	X		18/03/2019	Classroom
Selective collection practice		X	05/09/2019	Adolpho Forest Reserve
Recycling practice	X		18/04/2019	Adolpho Forest Reserve
Management of fruits		X	05/10/2019	Musa / Museum
Seed management	X		18/05/2019	Adolpho Forest Reserve
Identification of sheets		X	05/11/2019	Adolpho Forest Reserve
Management of wild animals	X		15/06/2019	Musa / Museum
Disposable products		X	05/12/2019	Adolpho Forest Reserve

Source: Authors (2018).

The School Prof. Eng. Sérgio Alfredo Pessoa Figueiredo, through the circular informs a week before how, when and who will minister the class extraclass.

The objective of the proposal was to promote an adequate methodology to generate changes in the environmental realities, having as real motivation the liberating consciousness and the struggle for transformations, that is, the desire for change. Zaballa (2010), states that "this approach is qualitative and characterized as an action study in which teachers must adopt the method of participant observation, which entailed the construction of workshops in which students were proposed to reflect and develop an understanding of the importance of the environment and the search for improvements in the environment and life. "O sexto objetivo foi propor o desenvolvimento de práticas pedagógicas interdisciplinares em (EA), como ferramenta, para compreensão dos problemas ambientais local.

According to Carvalho (2016: 71), (EA), "it is initially analyzed as a prevention of ecological movements with the practice of awareness, being able to draw attention to the poor distribution of access to natural resources," as well as to their exhaustion, and thereby involve citizens in environmentally-minded social actions.

In the conception of Dias (2014), the (EA) "in school should not be a conservationist, that is, one whose teachings lead to the rational use of natural resources and the maintenance of an optimal level of productivity of Natural or managed ecosystems by Man, but that education focused on the environment that implies a profound change

of values, in a new vision of the world, which far surpasses the conservation state. " Environmental Education is a topic that is much discussed today because of the perceived need to improve the world we live in, because it is easily seen that we are increasingly regressing in our quality of life, letting ourselves be carried away by our obligations daily. (GUESTS, 2016).

Environmental education plays a transformative role in the lives of educators, although it is a great challenge to overcome the aim of changing habits and attitudes of the human being with the environment.

## V. CONCLUSION

The study sought to analyze the interdisciplinary pedagogical practice of teachers of High School Sciences in the School of Integral Prof. Eng. Sérgio Alfredo Pessoa Figueiredo, located in the municipality of Manaus. In view of the fact that every school has norms and rules, it is difficult to suggest interdisciplinary pedagogical practices that will be an integrative action of the disciplines, in a enriching Perspective in Environmental Education, overcoming the fragmentation of knowledge and promoting the interaction of humans with nature.

The conservation of the environment demands a new educational posture, with pedagogical practices, where the classes are not limited to the dialogical expositions in the classroom, on the contrary, it requires a new model of teaching and learning in an interdisciplinary way as well as the collective construction of knowledge by teachers and students in the course of the educational process.

Thus, the Integral Time School Engineer and Professor Sérgio Alfredo Pessoa Figueiredo uses practical methodological data with the interest of trying to make environmental themes a constant presence in classrooms, Environmental Education is inserted in the school curriculum, as theme. According to the National Curricular Parameters (NCPs)

Therefore, the interdisciplinary practice of teachers turns to the use of the Ducke Reserve's natural space in science classes and thus bring Environmental Education into classrooms and show young people that preserving the environment is not a luxury, but a need urge you to preserve the planet.

## VI. ACKNOWLEDGMENT

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