

## **Diagnosis of the Environmental Dimension in the Curriculum of a Telesecundaria of Acapulco, Guerrero, Mexico**

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### **Abstract**

Environmental problems today are an emerging issue that must be considered in the education system through Environmental Education (EE) to promote environmental competencies in students. This study was conducted between April 2017 and October 2018. The objective of this research was to diagnose the environmental issues, as well as, the environmental dimension in the curriculum of a telesecundaria (institution that offers basic education through a television system, similar to a secondary school) belongs to the Secretary of Public Education, Mexico. The object of study was telesecundaria students. The investigation was mixed. The techniques used for the study were the non-formal interview, the field note, the survey and the focus group. Through the design

and application of instruments the information was processed and a qualitative and quantitative analysis was performed. The results showed that students perceive the environmental problems minimally and also could be identified that the curriculum minimally presents the environmental dimension. To promote environmental competences in students that contribute to sustainable development, it is necessary that the curriculum link the environment element transversally or disciplinarily.

**Keywords:** Environmental problems, environmental competencies, sustainability.

## **INTRODUCTION**

Various environmental problems at present have been increasing, they are global, they involve different fields (social, economic and political) and the different positions flow towards education. Faced with the planetary environmental crisis, Environmental Education (EE) arises to create awareness in human beings to act responsibly with the environment. Currently, humanity is immersed in a complex environmental crisis, with many manifestations of deterioration to the environment, the product of anthropogenic activities in an irrational way. Among the environmental problems that affect our home, the land, is, global warming, the thinning of the ozone layer, climate change, loss of biodiversity, pollution, decertification, acid rain, among others, all of them of great impact [1], [2], [3]. For Beck, [4] environmental problems "no longer appear as independent of each other, but rather constitute elements that relate to each other and configure a different reality to the simple accumulation of all of them" (p.99). Given the different environmental problems, the EE arises to raise awareness and change attitudes in humans about caring for the environment to preserve it and reverse the damage caused. The environmental problem can be synthesized in three theoretical references that lead to the analysis and understanding of what concerns EE, these are: a) constructivism, b) skills-based education and c) significant learning. Constructivism has three fundamental principles, which at the same time can be the theoretical pillars under which the teaching and learning processes of EE are developed, these have been explained by Cubero: «a relativistic epistemology, a conception of the person as an agent active, and an interpretation of the construction of knowledge as an interactive process located in a cultural and historical context » [5]. The constructivist approach according to the authors becomes a way to face the challenges of EE. Because the individual builds his knowledge through experiences, from interaction with the environment, with society, and with himself; on the other hand, the competences depend on the context, so they are described on the basis of the expected learning in a

concrete way and not on the basis of general and ethereal criteria [6].

From this perspective, the authors argue that the competency approach not only manages knowledge, but there must be a correlation in the social and affective fields, in addition, capacities to collaborate for the benefit of society must be triggered, so the problem can be addressed environmental education, taking into account the perceptions of the students, their relationship with the environment and knowing the environmental problems in the educational environment, and applying the skills to solve environmental problems. The third reference mentions that the achievement of meaningful learning is the true educational purpose. This Novak proposal is also shared [7], which considers significant learning as an underlying concept of the different constructivist proposals on human learning. This same author adds that the significant learning originally raised by Ausbel and later developed by Novak and Gowin is one of the most useful concepts for improving school learning [8]. To instill an environmental culture that favors the care of the environment and species according to [9] it is important to do so from a very early age. Basic education is an appropriate level to implement environmental issues so that students attending this level acquire knowledge that favors the care of the environment.

### **Telesecundaria as an educational modality in Mexico**

Telesecundaria is an educational modality in Mexico, at the secondary education level. Since its creation, the telesecundaria enrollment has grown considerably. In the 2012-2013 school year, this modality served 1 318 288 students, representing 21% of the national secondary education enrollment. At that time, there were 18,326 telesecundarias in the country, which represented 49% of the country's secondary schools [10]. The main difference between telesecundaria and the other modalities of secondary education is in its operation and organization. A teacher teaches all subjects [11]. Telesecundaria is an educational modality of secondary education in Mexico that serves just over 20% of the country's enrollment in the secondary education level, which establishes its schools in areas of high social marginalization [12]. Students are the central part of the educational process.

This research was to know the perception of environmental problems and identify the environmental dimension in the curriculum of Telesecundaria Ma. Del Carmen Eugenia Rojas Martinez de Acapulco, Guerrero, Mexico. Telesecundaria students were necessary in this study. Telesecundaria belongs to the basic education of public education in Mexico. To accomplish this objective, four techniques were applied: non-formal interview, field note, survey and focus group. The research was developed

through a mixed methodology. The results of the research were, environmental problems are minimally perceived by students and the curriculum minimally is presented in the curriculum, therefore, it is necessary, environmental education should permeate the curriculum.

### **Environmental education as an alternative to environmental deterioration**

Given the various environmental problems, Environmental Education arises, in the words of [13], the object of study of this is the environment. The EE proposes, through the development of various pedagogical strategies, to contribute to the formation of an awareness of the responsibility of the human race in the continuity of the different forms of life on the planet, as well as the formation of critical and participatory subjects before environmental problems. On the other hand [4], he points out that education is necessary for every human being, because well oriented and comprehensive can serve to interpret their reality, since it relates its different components and forms a universe of possibilities, learns and sustains its location in the society, in general, and life, in particular. However, [14], he points out that current educational strategies do not show indicators that highlight the role of Environmental Education (EE) in the enrichment of values for collective living, and in this regard, the care of resources. It is worth mentioning that Environmental Education is a viable strategy to train students with environmental competencies to act responsibly towards the care of the environment.

### **Emergence of Environmental Education at the Basic Level**

[15] point out that at the beginning of Miguel de la Madrid's Hurtado administration, 1982–1988, environmental education was mentioned as a topic to be included in the teaching curriculum, but that in fact it never happened. At the time that happened, the administration of that government created the Ministry of Urban Development and Ecology. [16] analyzed the content of the free textbooks used during the period 1985–1986, to identify the environmental dimension included in the primary education curriculum, the concept of the environment, and the psychological implications of the man-nature relationship. In Mexico, the EE within the school education is present since the Educational Reform of 1993; In the curricula of the Federal District, from 1994 the optional subject of EE in the third grade was offered; later the matter disappears. The EE was incorporated in 2006 in a transversal way in the Comprehensive Reform of the Basic Education (preschool, primary and secondary). In the Reform of Secondary Education, the EE is linked to the contents of the problems of the environment and sustainability in the different subjects [17]. In the 1997-1998 school year, the “School

Crusade for the preservation and care of the environment” program is implemented, which is supported by a set of school and extracurricular activities. The approach of the secondary education curriculum establishes the need to link the sciences and phenomena of the natural environment, with the intention of stimulating in the students’ attitudes of responsibility in the care of their health and the environment [18]. Mexico in the National Development Plan (2013-2018) in one of its sections, sustainability and environmental education are not transversal axes of the document. Environmental education remains in the margins of the plan, since it is stated only once in the document, and it is not clarified how it will be integrated into the National Educational System [19]. In our country, educational reforms arise due to the need to integrate aspects such as equity, quality, terminal efficiency, adapt education to social needs to achieve better living conditions. For [20] educational reforms worldwide, they tend to be a response to globalization, directly impacting the social. Despite the educational reforms carried out in the history of education in Mexico, the study plans and programs have failed to permeate environmental education in the curriculum. For this, a real change must be made in the educational policy in our country.

### **Environmental competences at the basic level**

The environmental competence seen from Education provides “the mechanisms to gain an understanding of knowledge about global problems and facilitate the development of capacities to learn and manage the complexity of social phenomena that affect nature” [21]. To achieve meaningful learning among students at the basic level about environmental care, it is necessary to use appropriate teaching strategies to facilitate the understanding of these issues and interest by students.

### **Environmental education for sustainable development**

Environmental education is a way to develop awareness in the population about the care of the environment, instills a culture and responsibility in society to make proper use of natural resources. Referring to [22], “environmental education, due to its potential for critical and constructive elements, is a tool to achieve sustainable development” (p. 5). For [23], (p.16) “the goal of Environmental Education is Education on Sustainable Development”, an environmentally educated person, acts with greater responsibility towards the care of the environment, educational institutions must take actions in favor of the environment through EE. According to [24], secondary education “represents an opportunity to consolidate the environmental values of adolescents in favor of a sustainable future” (p. 4).

## MATERIALS AND METHODS

The investigation was mixed. [25], the central premise of the mixed method is that, the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than any independently used approach. The universe of study was formed by the telesecundaria Ma. Del Carmen Eugenia Rojas Martinez, located in the suburban part of Acapulco, Guerrero, Mexico. The staff of telesecundaria was integrated as follows: a principal, seven teachers who teach all the subjects of a group, an administrator, a prefect and a service assistant. The enrollment of telesecundaria students was 173 students distributed in seven groups: two, 1st grade groups (2018-2021 generation), two, 2nd grade groups (2017-2020 generation), and three 3rd grade groups (2016- generation 2019). The ages of the students range from twelve to 15 years.

The population was made up of 173 students. To determine the sample size considering that it is a finite population. The following formula was applied [26].

$$n = \frac{N * Z\alpha^2 * p * q}{d^2 * (N - 1) + Z\alpha^2 * p * q}$$

Where:

n= Sample size to choose

N= Total population

$Z\alpha^2 = 1.96^2$  (95% security)

p= Expected Proportion (in this case 5%=0.05)

q= 1-p (in this case 1-0.05= 0.95)

d= precision (in this case we want 3%)

$$n = \frac{173 * 1.96 * 0.05 * 0.95}{0.03^2 * (173 - 1) + 1.96^2 * 0.05 * 0.95}$$

<b>n = 93</b>
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The sample was represented by 93 students: 31 students for each grade level. The diagnosis of the problem and the environmental dimension in the curriculum of the telesecundaria Ma. Del Carmen Eugenia Rojas Martinez was applied using instruments

to collect data: non-formal interview, field note, two surveys and two focus groups.

A non-formal interview was designed and applied to the principal of Telesecundaria to assess the feasibility of carrying out the study. For the realization of it, the instrument contemplated 11 questions with environmental issues, competencies and curriculum. The information processing was through the qualitative method. The questions were analyzed and the results described. Likewise, the field note technique was used to collect data in the research, with the objective of observing and describing the environmental problem according to the elements of the environment in the institution. The field note described environmental problems of the school taking as reference the components of the environmental axis: water, air, soil and energy. Tours were made at the school, recording observations, and a camera was used to collect data. Two surveys were also designed and applied to students. The surveys were conducted with students of the Telesecundaria Ma. Del Carmen Eugenia Rojas, 1st grade, 2nd grade and 3rd grade. The sample to which both surveys were applied was 31 students of each grade, giving a total of 93 students for each survey. Survey 1: The objective of the first survey was to identify the understanding of the environmental problem. For the design of the survey was based on [27], it states that the contents of the environmental axis are composed of four topics: water, air, soil and energy. The tool used was made up of 40 items, grouped into the variables "water, air, soil and energy". The options "Strongly disagree", "Disagree", "Indifferent", "Agree and" Strongly agree "served to answer the questions. Survey 2: The objective of the second survey was to identify environmental competencies in the academic training of the students of the Telesecundaria.

The design of the survey was based on the fundamentals of [28], which refers to the components of the environmental element that will be transformed into knowledge, skills, attitudes and values. The tool used consisted of 22 items, grouped into four variables: a) Professor's environmental competencies, b) Teaching strategies and techniques of environmental education by the Professor, c) Identification of students' learning or environmental competencies, d) Curriculum and environmental education". The questions were answered using five answer options "Strongly disagree", "Disagree", "Indifferent", "Agree and" Strongly agree ". The surveys were processed in the Microsoft office Excel 2016 program and analyzed qualitatively. The focus groups are based on qualitative epistemology and are defined as a space of opinion to capture the feeling, thinking and living of individuals, causing self-explanations to obtain qualitative data [29]. Two focus group instruments were designed and applied. Focus groups 1 and 2 were constituted by grade and were integrated with 10 1st grade students, 10 2nd grade students and 10 3rd grade students. [30] suggests that the size of the focus groups varies depending on the topic: three to five people when deep emotions

or complex issues are expressed and 6 to 10 participants if the issues to be discussed deal with more everyday issues, although in sessions they do not must exceed a manageable number of individuals. Focus group 1: the objective was to identify general knowledge that students have about environmental issues in a general aspect, based on the four topics: air, water, soil and energy. With the same basics of the first survey. Focus group 2: with the objective of identifying environmental competences in the academic training of the students of the Telesecundaria. The elaboration of the instrument was based on the competences according to [31], and [28]. They had the same fundamentals as in the second survey. The logistics of focus groups 1 and 2 for its achievement was the space, acoustics, duration and programming of the sessions, script of topics, strategies to approach students, among others. As well as an audio and video recorder to record the exchange of comments made in the focus groups. The moderator led the dialogue and encouraged participation. Within the investigation the comparative approach was implemented in the focus groups to know if in the three grades of telesecundaria the students identified general knowledge about the environmental problem and environmental competences in the academic training of students of telesecundaria.

## **RESULTS**

This section presents the results obtained in the development of this research process. The analysis of the results was based on the information generated by the techniques and instruments applied in the telesecundaria (non-formal interview, field note, surveys 1 and 2 and focus groups 1 and 2).

### Non-formal interview to the principal

The environmental problems are perceived in the school are: the most complex lack of drinking water, so there is a need to buy water every week, another problem is the lack of garbage collection, because the waste collection service does not arrive in the colony, so every month, basic sanitation is contacted by telephone to take the waste away. Regarding the curricula with reference to the environment, environmental education projects are not carried out. Likewise, the institution has not offered courses or workshops on environmental education by any public or private agency.

Field note

The results of the field note analysis are specified in table I:

**Table I.** Field note of the elements of the environment

<b>Element of the environment</b>	<b>Registry</b>	<b>Commentary</b>
Water	There is no drinking water service.	The students come to draw water from the cistern.
	Water is wasted in the bathroom.	The toilets do not have a tank and the water is wasted at the time of withdrawing water from the tank, as well as when used for the toilets, it is spilled.
	The water is contaminated.	Occasionally in the cistern students drop different objects when they draw water.
Air	Contamination of odors from toilets	The absence of drinking water and lack of hygiene.
Soil	Garbage accumulates in the institution.	<p>There are only 2 containers to deposit waste, they are insufficient for the whole school. Therefore, garbage spills and is on the ground. The basic sanitation service does not reach that colony, so they are in need of contact by telephone and also pay an amount that ranges between \$ 150 and \$ 200 each time the waste is taken. The toilets in the toilet are observed with waste. There are also residues in the planters, classrooms and multipurpose court. They do not carry out waste separation and therefore there is no solid waste management in the institution.</p> <p>An informal contact was made with the service assistant, in charge of performing the cleaning service at the institution. He commented that at the end of the break time there is garbage in the different spaces of the institution.</p>

<b>Element of the environment</b>	<b>Registry</b>	<b>Commentary</b>
	Students leave trash on the multipurpose court, hallways and planters.	
Energy	The lights and the air conditioning are on the total duration of classes.	Electricity consumption is excessive; therefore, gas emissions pollute the environment.

According to the previous information, the Ee was minimally evidenced by the students and the institutional community in general.

#### Surveys

The analysis of the responses yielded the following:

#### Water

In the water aspect the students of the three grades of telesecundaria expressed their agreement and totally agree that water is wasted in household activities.

The students of the three grades with 40% said they agreed to take actions to avoid water losses in the institution.

First, second, and third grade students said 33%, 52%, and 26% respectively agree and totally agree on the trash and leachate that contaminate the waters.

#### Air

Regarding the air aspect, with respect to whether the air conditioning harms the environment, first and second grade students manifest 45% (strongly disagree, disagree and indifferent). Third grade students manifest 45% (disagree and indifferent). Therefore 45% of students state that the air conditioning does not harm the environment.

With respect to burning garbage pollutes the air, first grade students with 32% and second grade students with 16% expressed their disagreement (strongly disagree and disagree) while the other respondents showed their agreement and totally agree in

which burning garbage pollutes the air.

With regard to knowing measures to avoid contaminating the air, third grade, first grade and second grade students by 33%, 26% and 19% were (totally disagree, disagree and indifferent) respectively who know no measures to avoid Polluting the air.

### Soil

As for the deterioration of soils due to erosion, lack of nutrients, etc., the first grade students in 42% were (totally disagree, disagree and indifferent). Second grade students stated that they were 39% (totally disagree, disagree and indifferent). Third grade students said they were 45% (totally disagree, disagree and indifferent). Therefore, students show that soil deterioration is not due to erosion and lack of nutrients.

In relation to the actions to avoid contaminating the soil, first grade students expressed 32% being (totally disagree, disagree and indifferent), second grade students expressed 48% being (totally disagree, in disagree and indifferent), third grade students said they were 32% (totally disagree, disagree and indifferent). Students show that they do not perform actions to avoid contaminating the soil.

With respect to the fact that the soil is paramount for living beings, the third and second grade students expressed 84% and 87% respectively that they totally agreed; while in the first grade in the same category they expressed 70% totally agreed. The results of the three grades are significant and understand that the soil is paramount for living beings.

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### Energy

The energy aspect. The students of the three grades stated with 32% being (totally disagree, disagree and indifferent) that excessive use of electrical appliances does not cause environmental problems.

First and second grade students stated with 32% being (totally disagree, disagree and indifferent) that solar energy does not reduce environmental energy problems.

First, second and third grade students said that 32%, 35% and 42% (strongly disagree,

disagree and indifferent) respectively that avoiding leaving the phone charger connected when not in use does not reduce environmental problems.

## Survey 2

The analysis of the responses showed the following:

### Environmental competences of the teacher

Regarding the question: The teacher has knowledge on the subject he teaches, third grade students answered 10% indifferent, first grade students 10% totally disagreed, second grade students were 6% indifferent, while the rest of the respondents agree that the teacher has knowledge about the subject he teaches.

To the question: The teacher who teaches has knowledge about the environment, first grade students answered 10% totally disagree, while the rest of the respondents agree that the teacher has knowledge about the environment.

### Strategies and didactic techniques of environmental education by the teacher.

With respect to whether activities related to environmental care are carried out in the classroom, first grade students manifest 29% (strongly disagree, disagree and indifferent), second grade students manifest 32% (strongly disagree, disagree and indifferent), third grade students express 32% (disagree and indifferent). The students state that there are no activities in the classroom that relate to the care of the environment.

In relation to whether activities related to garbage recycling are carried out at school, first grade students manifest 33% (totally disagree, disagree and indifferent), second grade students manifest 19% (totally disagree, in disagree and indifferent), third grade students manifest 23% (strongly disagree, disagree and indifferent). Students show that they do not perform garbage recycling activities.

### Identification of students' learning or environmental competencies

In relation to team activities regarding the care of the environment, first grade students express 26% (totally disagree, disagree and indifferent), second grade students express 36% (totally disagree, disagree and indifferent), Third grade students manifest 32% (strongly disagree, disagree and indifferent). Students show that they do not do team activities to take care of the environment.

Students in all three grades understand that water, air, soil and energy are necessary for life and must protect them.

Students in all three grades agree and strongly agree that what they learn from caring for the environment at school applies it at home and / or elsewhere.

#### Environmental Education and Curriculum

The students of the three grades agree and totally agree that the classes do not relate to the environment.

Some classes relate to the environment first grade students manifest 32%, second grade students manifest 39%, third grade students manifested 22%. Students mentioned some classes do not relate to the environment.

#### Focus groups

The following section describes the results obtained from the two focus groups developed.

#### Focus group 1

Focus group 1 focused on identifying the general knowledge that students have about environmental issues. The instrument considered different aspects: environmental problems in general, water, air, soil and energy problems, presented in Table III. Students were asked questions related to these dimensions, however, the questions were asked according to the age level and the school grade of the students. The focus group was applied separately, one day it was done in first grade, the next day with second grade and the third day with third grade. The results were processed individually, however, there was a need to group them to make a comparison of what happens in each grade. The results of focus group 1 are shown in table II.

**Table II** Results of focus group 1, developed in all three grades.

<b>Element</b>	<b>First grade</b>	<b>Second grade</b>	<b>Third degree</b>
Water	<p>First grade students felt that there is waste of water in the school. Water is transported in pipes due to the lack of drinking water in the institution.</p> <p>When the stored water in their homes is finished, they sometimes use buckets and drink water from the stream for the different needs of the home.</p>	<p>In the school there is no drinking water, they use water pipes, there is a shortage of water, however they throw water to go to the bathroom and wet their hair.</p> <p>They pointed out that there is water pollution, in rivers, streams, lagoons etc. Students believe that water scarcity creates health problems. In their homes they reuse water for the toilet. They suggest not to litter in the rivers and use only the necessary water.</p>	<p>There is no drinking water at school, they buy it. Sometimes the water in the tank smells bad because they litter by accident.</p> <p>They commented that they observe contaminated water in the stream, because there are unconscious people, who throw trash, chemicals and dead animals. Sometimes they bring water in a bucket from the stream to their homes and / or place pipes to collect it. In their homes the water with which they wash the dishes reuse it to water the patio. The water used to wash clothes is reused for the toilet.</p>
Air	<p>They mentioned that there are unpleasant odors in the bathrooms due to the lack of hygiene and the absence of drinking water</p> <p>They pointed out that the air is contaminated due to</p>	<p>They commented that in their school there are unpleasant smells in the bathroom and on the court.</p>	<p>Unpleasant odors are perceived in the bathroom due to hygiene and water shortages.</p>

Element	First grade	Second grade	Third degree
	<p>factories, burning garbage and the gasoline used for the car.</p> <p>They suggested using a bicycle to avoid contaminating the air. When asked about smog, they don't know the term.</p>	<p>Means of transport and factories pollute the air. As well as burn trash and count them. And therefore affects health.</p> <p>They said that polluted air damages the ozone layer. In their homes they don't talk about air care. They propose to walk and use the bicycle to avoid contaminating.</p>	<p>They mentioned that the polluted air is caused by means of transport, factories and when they burn trash. Do not pass the garbage car in the colony and burn trash every week.</p> <p>When asked what is smog? It was the only focus group that answered that they knew, and said it was smoke and / or polluted air.</p>
Soil	<p>They commented that in the school they throw garbage in the patio that damages the plants and therefore the human beings. They also point out that they have observed that they use gasoline to burn garbage and that said liquid substance contaminates the soil.</p>	<p>In their school they comment that in the bathroom of the toilets they throw garbage and hair, and in addition there is no basket near the toilets. Trash is not separated in the institution. There are two containers at the entrance of the school and they are insufficient leaving trash on the floor.</p> <p>Some participants mentioned that they sometimes separate cans and sell them. Banana peels are placed on plants.</p>	<p>The soil is contaminated because they burn trash and have a specific place in front of your house. It is contaminated with chemicals because substances are added so that the grass does not grow and eliminate pests. People do not want to clean continuously and are not interested in the soil being contaminated.</p> <p>The soil is contaminated because they burn trash and have a specific place in front of your house. It is contaminated with chemicals because substances are added so that the grass does not</p>

Element	First grade	Second grade	Third degree
			<p>grow and eliminate pests. People do not want to clean continuously and are not interested in the soil being contaminated.</p> <p>At home they are not taught actions to take care of the soil.</p>
Energy	<p>The students expressed that electric energy can cause fires. In their school they have saving bulbs. Turn off the light and air conditioning at the end of classes. There is no staff in charge of supervising that everything is turned off.</p> <p>They mentioned that they are not aware of the energy expenditure because sometimes they leave the charger connected without the cell phone and the television is on and they are not watching it.</p>	<p>When asked if the air conditioning in any way contaminates, they did not associate it with the environment, but from the economic point of view, in their homes they are told to take care of the light because otherwise the receipt will come very expensive.</p> <p>They mentioned that garbage can be used to generate electricity, this information was heard on television.</p>	<p>In relation to energy, they commented that they have heard that there are other types of energy: solar energy and wind energy. They take care of the light in their homes so that the electricity bill does not generate a very high cost, not because it generates an environmental problem.</p> <p>In their homes they use energy saving light bulbs. They connect the cell phone in their homes. At school they are not allowed to connect the cell phone.</p>

### Focus Group 2

The focus group 2 the objective was to identify environmental competences in the academic training of the students of the telesecundaria, an interview guide was applied that contained questions related to the environmental competencies of the teachers, strategies and didactic techniques of environmental education by the teacher,

identification of students' learning or environmental competencies and environmental curriculum and education, these questions were raised for the three grades, however, they were raised according to the age level and the school grade of the students. The focus group was applied separately, one day was held in first grade, another day in second grade and the third day with third grade. The results are presented below grouped in Table III.

**Table III** Results of focus group 2, developed in all three grades.

<b>First grade</b>	<b>Second grade</b>	<b>Third degree</b>
<p>According to the information provided by the students, they considered that the teacher teaches them to take care of the plants, pick up the garbage and take care of the water. They considered that their Professor has knowledge of the environment, in particular of water. The actions they mentioned are carrying out sweeping sports fields, watering plants, depositing garbage instead. Students realize that there is garbage in different areas of the school. There are no field trips. With reference to the environmental care campaigns they mentioned that they have only heard them through the television.</p>	<p>When asked if your teacher has knowledge of the environment. The students answered yes, because it teaches them to take care of plants, water. About the ground they indicated that their teacher tells them not to litter. They mention that occasionally they talk about respecting the environment. Some matter with the care of the environment: biology, civic and ethical training. In the first grade they carried out environmental education one day a week, the activities they carried out: Watering the plants, sweeping, cleaning benches, organizing books. Field trips do not. Campaigns for the care of the environment, only one student mentioned that he was going to reforest the Papagayo Park externally. The activity was done over the weekend and only involved sweeping. In general they do not carry out extracurricular activities.</p>	<p>They consider that their Professor has knowledge of the environment, they mentioned that regulate. The topic they focus on the most is water. They talk about respecting the environment: do not litter the plants, sweep the yard, deposit the garbage in its place. Matter with environmental care: biology. The teacher mentions the importance of taking care of the water, due to the shortage of the liquid. There are no field trips. Nor have they participated in workshops and / or campaigns in the community. They have heard about separating waste on television. At school they do not separate waste because there are no containers. They commented that what they have learned in school and have applied it outside the home is to have the house clean and not litter on the road.</p>

In general, it is perceived that the EE is insufficient in the institution. The results of focus group 1 showed that students in the three grades of telesecundaria in relation to environmental aspects identified some environmental problems. Focus group 2 referring to the environmental competencies in the academic training of the students showed that in the institution they are only limited to cleaning the school. In this way, the results of the information obtained through the instruments applied in focus groups 1 and 2, emphasized the need to carry out appropriate activities that lead to interdisciplinary environmental education.

## **DISCUSSION**

This investigation allowed us to know that the Telesecundaria Ma. Del Carmen Eugenia Rojas Martinez, due to its geographical location or being located in a marginalized area of the Municipality of Acapulco, presents a series of environmental problems, which are related to the elements of the environment (water, air, soil and energy).

With regard to water, the absence of drinking water services is perceived. The absence of the vital liquid leads to socio-environmental problems, such as health or hygiene problems in people. As established in [32] Latin America has 33% of the world's renewable water resources, however, it faces serious shortages, since 77 million people (51 million in rural areas and 26 million in urban areas) do not have access to water and 100 million lack basic sanitation. The lack of water in telesecundaria gives access to students to be affected their health, when the school has the water resource, the students waste it. As indicated in [32], water is already scarce in other parts of the world and therefore it must be taken care of, therefore, students must have an education that gives value to this resource. In addition to the above, it was found that students have a minimum EE regarding to water care. In a study [33] conducted with young people on water care, it is pointed out that water is wasted, that they fear it will run out, identify the existence of liquid leaks, floods and natural disasters. With respect to the aforementioned, it is important to identify the importance or value given to the water resource by young people of secondary level and, in response to this, some formal or non-formal environmental education actions or programs can be designed or routed so that they perceive the importance of this resource.

With respect to the environmental problems of the air, the students mentioned that unpleasant odors are perceived in the institution, coming from the toilets due to the lack of hygiene and the absence of drinking water, and consequently in the quality of life of the students. As stated in [34], air pollution constitutes an environmental problem because anthropic action generates an effect on an environmental component (air) and

its deterioration affects the survival and quality of life of man. The students do not know measures to avoid contaminating the air, therefore it constitutes an environmental problem and this can generate negative effects on health can have an impact on their state of health. [35] refers that air pollution is one of the most severe environmental problems worldwide. It is presented in all societies, without making a distinction at the level of socioeconomic development, and constitutes a phenomenon that affects the health of the human being. For all the above, it should be noted that it is essential to mitigate environmental problems with respect to air, to develop in students an environmentally friendly awareness through EE.

In relation to soil problems, some effects were also found. In the telesecundaria there is a problem that has to do with Solid Waste (SW). The garbage collection service in the area does not reach the neighborhood where the school is located. The institution only has two garbage containers that are insufficient, because they do not carry out proper handling of this waste. Solid waste contaminates the environment as a whole including soils, water, air, etc. As noted by [36] the increasing increase in SW and their mismanagement continues to generate pollution of water, soil and air, putting human health at risk, and reducing biodiversity, due to the mortality of animal populations and the contamination of plant species of social and economic importance. The student community of the telesecundaria can be affected by the unpleasant smells that are generated in the institution. Students report that throwing garbage on the floor of the institution damages plants. These negative actions affect the contamination of the soil and consequently one of the affectations are the plants and the environment in general. According to [37] soil pollution is devastating to the environment and has consequences for all life forms it affects. Contaminated soil can release contaminants in groundwater that then accumulate in plant tissues and pass to grazing animals, birds and finally humans that feed on plants and animals.

As for the environmental problems related to energy, the institution in question, in its classrooms have air conditioners and spotlights, both remain on the total duration of classes, there is no service staff responsible for supervising that everything is turned off. Students do not perceive that energy consumption leads to health problems, air pollution and the effect of climate change. Abundant in this regard, [38] it states that air emissions associated with energy consumption have negative consequences, such as air pollution and greenhouse gas emissions, associated with climate change that have a negative impact on the health of the population and sustainability of various ecosystems. Therefore, it is necessary to act at all educational levels. The EE plays a very important role in mitigating environmental problems. It is essential that students present changes in attitudes, habits, implies that students reflect on the environmental

problems of energy associated with climate change and assume an active role for the benefit of the environment.

It was found that students do not perceive the environmental problem, this occurs because the telesecundaria curriculum lacks or minimally has the environmental dimension. Classes do not relate to the environment. Regarding the identification of students' learning or environmental skills, they do not carry out activities to take care of the environment. However, students understand that the elements of the environment (water, air, soil and energy) are necessary for life and must protect them. They believe that what they learn about the environment at school, they apply at home and / or elsewhere.

In the telesecundaria they hardly promote environmental competencies because their classes only focus on the objectives of the subject, but the environmental element is not inserted in a transversal way. As regards teaching strategies and techniques of environmental education by the teacher, they do not carry out activities related to the care of the environment, this is because it is not implemented the EE in the curriculum on a transversal form. It is important that institutions identify their environmental problems with the aim of not affecting the development and health of students in this regard to have a school that gives importance to the environment. This research reflects that the perception of the EE of the students is minimal, therefore it is necessary that the students assume the environmental problem and that the environmental axis be incorporated into the telesecundaria curriculum.

## **CONCLUSIONS**

The study suggests the need to incorporate the environmental element in the telesecundaria with a transversal approach to promote environmental competencies in students and thereby minimize environmental problems to contribute to sustainable development. Therefore, EE is essential to achieve sustainability.

Due to the lack of promotion to the EE, the institution requires an intervention in EE. As proposed in this research and according to the results, it is proposed to implement the students in a non-formal EE program to promote environmental competencies and new generations achieve a change in the planet to face and solve environmental problems and thus contribute to the social sustainability that is intended.

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