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*Artículos Científicos*

## **La educación como fundamento orientador hacia una cultura ambiental**

*Education as a Guiding Foundation Towards an Environmental Culture*

*A educação como base norteadora de uma cultura ambiental*

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### **Resumen**

La presente investigación surge de la premisa de que la mujer como madre es considerablemente más sensible hacia el cuidado del medio ambiente, es la que inicialmente tiene un vínculo directo con el individuo y, por lo tanto, es necesario reeducarla para que sea la guiadora inicial hacia la construcción de una cultura ambiental. El objetivo principal fue señalar la importancia de la educación dirigida hacia la conformación de una cultura de este tipo, partiendo de un enfoque de género y su implicación y dirección hacia la generación de una sensibilidad ambiental, en donde se exalte que el acontecer del ser humano impacta directamente en el medio ambiente y, por extensión, repercute en el cambio climático. Se partió de dos preguntas eje: ¿el género y el nivel académico influyen de manera directa en la respuesta sensible del individuo hacia el cuidado del medio ambiente?, ¿la incorporación más directa de la mujer propiciará una educación ambiental que repercutirá en la construcción de una cultura ambiental? La investigación tuvo un enfoque mixto (cuantitativo y cualitativo); se trató de un estudio transversal que incluyó una encuesta semiestructurada. Inicialmente se determinaron dos variables cualitativas nominales-ordinales: Género (dicotómica), variable independiente, y Sensibilidad Ambiental (politómica), esto es, la

conciencia del impacto negativo del comportamiento humano hacia el medio ambiente, como variable dependiente. Posteriormente, por necesidades del estudio, se incluyó la variable Nivel Académico (semestre escolar) (politómica). El análisis se realizó a través del coeficiente ji al cuadrado, utilizando el *software* IBM SPSS Statistics 23 para medir la relación de las variables. Los resultados arrojaron, en primera instancia, que no existe relación directa entre Género y Sensibilidad Ambiental (conciencia del impacto negativo de nuestras actividades cotidianas hacia el medio ambiente del individuo). Sin embargo, con la incorporación de la variable Nivel Académico (semestre), se comprobó que sí existe correlación directa entre las variables, esto es, el género femenino manifestó tener una mayor sensibilidad del impacto que generan sus acciones cotidianas en el medio ambiente. Se concluye que se deben promover acciones que involucren de manera directa a la mujer hacia una reeducación ambiental, en donde se le permita actuar de manera directa en esta acción proactiva y axiológica. Por lo tanto, una propuesta directa es trabajar hacia una educación ambiental, ya que es un factor importante para tomar conciencia del trabajo en pro de un desarrollo sostenible desde casa, completarlo en la escuela y vivenciarlo en la sociedad, todo ello hacia una cultura ambiental.

**Palabras clave:** cultura ambiental, educación ambiental, género, nivel académico, sensibilidad ambiental.

## Abstract

The present investigation arises from the premise that the woman as mother is considerably more sensitive towards caring for the environment, it is the one that initially has a direct link with the individual and, therefore, it is necessary to re-educate her to be the initial guide towards construction of an environmental culture. The main objective was to point out the importance of education directed towards the conformation of an environmental culture, starting from a gender perspective and its implication and direction towards the generation of an environmental sensitivity, where it is exalted that the happening of the human being directly impacts in the environment and therefore has an impact on climate change. Two main questions were started: Does gender and academic level directly influence the sensitive response of the individual towards caring for the environment? Will the more direct incorporation of women promote environmental education, which will have an impact on building an environmental culture? The research was with a mixed approach (quantitative and qualitative); a cross-sectional study with a semi-structured

survey. The study began with the analysis of two nominal-ordinal qualitative variables, Gender (dichotomous) as an independent variable and Environmental Sensitivity, as awareness of the negative impact of human behavior towards the environment (polytomous), as a dependent variable. Additionally, due to study needs, the variable Academic Level (school semester) (polytomic) was subsequently included. The analysis was performed through the chi-square coefficient, using the IBM SPSS Statistics 23 software to measure the relationship of the variables. The results showed, in the first instance, that there is no direct relationship between Gender and Environmental Sensitivity (awareness of the negative impact of our daily activities towards the environment of the individual). Given this situation, the variable Academic Level (semester) was subsequently incorporated. With this adaptation, it was verified that there is a direct correlation of the variables, that is, the feminine gender manifested having a greater sensitivity of the impact that their daily actions generate to the environment. It was concluded that actions that directly involve women towards environmental reeducation should be promoted, where they are allowed to act directly in this proactive and axiological action. Therefore, a direct proposal is to work towards an environmental education, since it is an important factor to become aware of the work in favor of sustainable development from home, complete it at school and experience it in society, all towards an environmental culture.

**Keywords:** environmental culture, environmental education, gender, academic level, environmental sensitivity.

## Resumo

A presente investigação parte da premissa de que a mulher como mãe é consideravelmente mais sensível ao cuidado com o meio ambiente, é ela quem inicialmente tem um vínculo direto com o indivíduo e, portanto, é necessário reeducá-la para ser o guia inicial. para a construção de uma cultura ambiental. O principal objetivo foi apontar a importância da educação voltada para a conformação de uma cultura desse tipo, com base na abordagem de gênero e suas implicações e direcionamento para a geração de uma sensibilidade ambiental, onde se destaca que os eventos do ser humano afeta diretamente o meio ambiente e, por extensão, afeta as mudanças climáticas. O ponto de partida foram duas questões centrais: gênero e nível acadêmico influenciam diretamente a resposta sensível do indivíduo em relação ao cuidado com o meio ambiente? A incorporação mais direta de mulheres promoverá educação ambiental que terá impacto na construção de uma

cultura ambiental? A pesquisa teve uma abordagem mista (quantitativa e qualitativa); foi um estudo transversal que incluiu uma pesquisa semiestruturada. Inicialmente, foram determinadas duas variáveis qualitativas nominais-ordinais: gênero (dicotômico), variável independente e sensibilidade ambiental (politômico), ou seja, conscientização do impacto negativo do comportamento humano sobre o meio ambiente, como variável dependente. Posteriormente, devido às necessidades do estudo, foi incluída a variável Nível Acadêmico (semestre letivo) (politômica). A análise foi realizada através do coeficiente de qui quadrado, utilizando o software IBM SPSS Statistics 23 para medir a relação das variáveis. Os resultados mostraram, em primeira instância, que não há relação direta entre gênero e sensibilidade ambiental (conscientização do impacto negativo de nossas atividades diárias no ambiente do indivíduo). Porém, com a incorporação da variável Nível Acadêmico (semestre), verificou-se uma correlação direta entre as variáveis, ou seja, o sexo feminino se manifestou com maior sensibilidade ao impacto gerado por suas ações cotidianas no meio ambiente. Conclui-se que ações que envolvam diretamente as mulheres na reeducação ambiental devem ser promovidas, onde elas podem atuar diretamente nessa ação pró-ativa e axiológica. Portanto, uma proposta direta é trabalhar em prol da educação ambiental, pois é um fator importante conhecer o trabalho a favor do desenvolvimento sustentável em casa, concluí-lo na escola e vivenciá-lo na sociedade, tudo em prol de uma cultura ambiental.

**Palavras-chave:** cultura ambiental, educação ambiental, gênero, nível acadêmico, sensibilidade ambiental.

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## Introduction

Currently, through the adoption of the 2030 Agenda (United Nations Educational, Scientific and Cultural Organization [Unesco], 2018), which is part of a global movement to eradicate poverty through 17 objectives From sustainable development to 2030, education has gained new momentum. Specifically, objective four of this agenda aims at the universalization of an inclusive and permanent education (Unesco, 2018).

For Unesco (2018), education is considered as a basic human right and, in addition, the base on which to build peace and promote sustainable development. Education for sustainable development is understood as one that fosters changes in knowledge, skills, values and attitudes to allow a more sustainable and just society for all. It aims to empower and equip current and future generations to meet their needs using a balanced and integrated approach: it takes into account the economic, social and environmental dimensions of sustainable development (Unesco, 2018). An example of this is the volunteer network called Guardarenas, which aims to change the lifestyle of children, youth and adults at community level, raising awareness about the fragility of marine and coastal environments and the need to use them wisely. . This network puts scientific foundations into action in an interdisciplinary way, with uses ranging from geography to art, from poetry to mathematics (Unesco, 2010).

Thus, in the face of natural disaster events, caused by environmental deterioration and climate change, education for sustainable development is presumed not to be an option but a priority (Unesco, 2005, 2006a). Along these lines, sustainable development involves a different vision, promoting an attitude that is proactive enough to visualize a quality of life for all, both present and future generations, seeking a balance between economic and social growth and the protection of the environment (Unesco, 2005, 2016a). Sustainability, like resilience, can be applied in any field, presupposes an inclusive response that involves the ability to identify strengths and weaknesses, manifest an adaptation response, be disruptive and face challenges, especially maximizing available resources to ensure a long and, of course, productive life for the benefit of those interested, all in partnership (KPMG en México, 2018).

Currently in Mexico the goal is to start improving the material conditions of the country's schools, and thereby guarantee access for all young people to education (Presidency of the Republic, 2019). This is due, in part, to the fact that the percentage lag of Mexican youth between 25 and 34 years of age with higher education is below the average for the Organization for Economic Cooperation and Development [OECD] (2019) (44%), including the despite increasing

from 16% to 23% during the 2007-2017 period. In 2018, the Ministry of Public Education (SEP) invited the OECD to carry out a review of this condition. The intention is that it undertake a new study to examine the strengths and weaknesses of governance and the strategies that guide this system, as well as the analysis of external mechanisms of quality assurance, conditions for equity, among other aspects. (OCDE, 2019).

### **We are going towards an environmental education**

It is pertinent to mention that Unesco, belonging to the United Nations (UN), is the only one with the privilege of getting involved in all aspects of education. Along these lines, in the document Sustainable Development Data Digest: Laying the Foundation to Measure Sustainable Development Goal 4, Unesco (2016b) specifies specific strategies and fundamental actors, directly involved in promoting sustainable development through education.

Taking into account the above, the complementary questions that guided this research were the following: how familiar are the students towards an environmental education? How do the elements that involve an environmental education influence their evolution? What is the effect? What does being proactive in their academic future have for students? What is the knowledge that students have about environmental information? How many students have knowledge of their environmental environment? How does this information impact their daily actions? What is the manifestation regarding environmental sensitivity? How many students are aware of the impact on the environment by their daily activities? What is gender awareness of environmental impact? What is the academic effect on the responsibility of take care of the environment, being aware of the impact of daily events?

Finally, the following research questions were defined: do gender and academic level directly influence the sensitive response of the individual towards caring for the environment? Will the more direct incorporation of women lead to environmental education that will have an impact in building an environmental culture?



## Environmental education

Each country has its own set of laws that help control emissions of polluting gases and lessen the negative impact on the environment by industries and society. These laws and regulations are accompanied by fines or penalties that must be followed to the letter in order to guarantee a real change in society. However, to achieve the stated objective, a radical change in the human being is required: dispense with the punitive approach and move towards an environmental culture. According to Miranda (2013):

Environmental culture is the way in which human beings relate to the environment, and to understand it, one must begin by studying values; these, in turn, determine beliefs and attitudes and, finally, they are all elements that give meaning to environmental behavior (p. 94).

On the other hand, regarding the gender issue, it was based on the definition used by the researcher Leticia Santín del Río (2011), who states, similarly to the above, that “the best form of gender parity it is the one that does not have to be promulgated or declared as something obligatory, but is the result of a social advance ”(p. 305). It is vitally important to consider the important role that women have in environmental impact, since, by nature, they are inclined to preserve life. Therefore, in this search for gender equality, women should be seen not as a victim, but as a central actor to advance towards sustainability. However, at the international level, negative consequences are emerging due to gender differences. In the document Global Gender and Environment Outlook of the United Nations Environment Program [UNEP] (2016), developed by a team of almost 50 experts, it is clear that gender inequality is one of the most widespread threats to the sustainable development. Gender inequality has negative impacts on the access, use and control of a wide range of resources, and on the ability to comply with human rights obligations regarding the enjoyment, by women and men, of a clean environment, safe, healthy and sustainable (UNEP, 2016).

At the Latin American level, in the late 1990s, a paper was presented in Chile where the need for knowledge about the ways in which women from different groups and sectors of society have participated in development was presented, and was highlighted the interconnection between gender, environment and sustainability (Rico, 1998).

In Mexico, on the other hand, considering the long experience in environmental education and culture present in the country, it has been possible to consolidate one objective: to generate

opportunities for the development of knowledge, skills, aptitudes and values necessary to build a sustainable future. (Secretaría de Medio Ambiente y Recursos Naturales [Semarnat], 2019)

Now, in the Organic Law of the National Polytechnic Institute [IPN] (May 28, 1982), in its article 3, subsection II, it is founded that “scientific and technological research must be carried out with a view to advancing knowledge, developing of technological education and the best social use of natural and material resources ”(p. 1). Co-responsible, the Higher School of Engineering and Architecture (ESIA) Tecamachalco Unit of the IPN seeks to train leading professionals in the area of engineering and architecture. “Professionals with leadership capacity in the development of the design, construction and conservation of habitable spaces (urban-architectural). All this under the principle of sustainability ”(ESIA Unidad Tecamachalco, para. 1). As its name and the aforementioned previously anticipates, this academic unit offers the degree of Architect engineer, which is governed by a system of summation of credits (264.44 in total), distributed in eight levels, along which there are subjects related to sustainability.

## Materials and methods

This work has a mixed approach: quantitative and qualitative aspects were addressed. As required, it was a study aimed at higher level students, in this case, students from the ESIA Tecamachalco of the IPN. The research arises from an inductive condition, based on an inference to know the attitude towards caring for the environment and its relationship with gender issues.

The IPN, as an educational institution, is fully committed to society, providing it with co-responsible and committed professionals and, above all, with a social conscience. The ESIA Unidad Tecamachalco is a professional trainer in the area of engineering and architecture. As already mentioned, it offers society architects engineers committed to its humanistic work and with a very defined social sense.

It is an exploratory type research, mainly to know the relationship of gender and academic level with environmental sensitivity. Methodologically, the corresponding pilot was carried out randomly with 40 students (Padua, 2016), specifically who had knowledge related to the national legislative framework that considered aspects of environmental care. The measurement instrument was validated with the Cronbach coefficient; the result was 0.79.

Following Hernández, Fernández and Baptista (2004), once the instrument had been validated, it was applied to a probabilistic-stratified sample of 173 elements from a population of



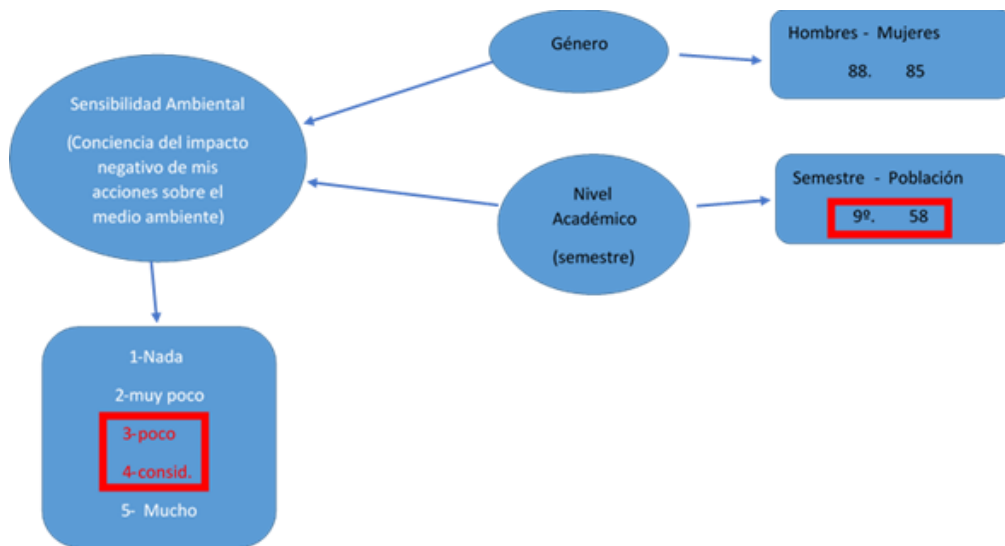
690 students in 2017 at the ESIA Unidad Tecamachalco of the IPN. The research in said educational unit was applied only to the student community.

To substantiate the hard results, statistical analysis was performed through the chi-square test, using the IBM SPSS Statistics 23 software package (statistical package for social sciences) to analyze the relationship of the variables. Firstly, two were considered: Gender as an independent variable and Climate Sensitivity (the negative impact of their daily activities on environmental deterioration) as a dependent variable. Subsequently, the variable Academic Level (school semester), also independent, was included.

It was based on the inference that gender and academic level directly impact the individual's response to caring for the environment. Thus, the H0 (null hypothesis) was proposed, where it is stated that these variables are not related.

Subsequently, due to the results observed at the beginning (and which manifested no relationship), a third variable, Academic Level, was included, as mentioned above. Next, in figure 1, the proposed model is described.

**Figura 1.** Variables del modelo



Fuente: Elaboración propia

**Tabla 1.** Análisis de variables

<b>Variabes</b>	<b>Conceptualización</b>	<b>Dimensión</b>	<b>Indicadores</b>	<b>Parámetro de medición</b>
Sensibilidad Ambiental	Variable dependiente  Vinculación del término en su devenir y conciencia del impacto negativo de su acontecer en el medio ambiente.	ESIA Unidad Tecamachalco del IPN	Nivel del impacto negativo en el medio ambiente del 1 al 5	Escala ordinal del 1 al 5, donde 1 es nada y 5 es mucho.
Género	Variable independiente  Especie humana	ESIA Unidad Tecamachalco del IPN	Hombre Mujer	Escala excluyente y respuesta directa descriptiva-nominal:  • H • M
Nivel Académico	Variable independiente  Semestre académico cursado por el encuestado	ESIA Unidad Tecamachalco del IPN	Del 3.º al 11.º semestre	Directa ordinal:  • Del 3.º al 11.º

Fuente: Elaboración propia

## Measuring instrument

As a strategy to obtain the information, a survey of the school population was carried out; A questionnaire was applied, which was complemented with informal interviews with administrative staff, academics and students, in order to probe information related to some topics, namely environmental education, environmental information and environmental sensitivity, to appreciate the knowledge they had of the institutional actions to facilitate the care of the environment and to perceive their personal attitudes and actions for the care of their environment. For the first validation of the questionnaire, as already mentioned, the corresponding pilot was carried out randomly with 40 students (Padua, 2016). The measurement instrument was validated with the Cronbach coefficient; a result of 0.79 was obtained.

The direct questionnaire was applied to the student community (sample), where the following aspects were considered: general data, socioeconomic data, data on their home, sustainability in the teaching-learning processes. Aspects such as: knowledge of sustainability, academic link with the term, importance of sustainability with education (home-educational institution), appreciation of the commitment of its academic unit to the subject, knowledge of climate change and, finally, were highlighted. , on personal behavior and its negative impact on climate change. On this last point, they were asked to respond in a timely manner: how much do you consider that your daily habits impact on climate change in a negative way? The instruction was "Respond from 1 to 5, where 1 is nothing and 5 is much."

To estimate the degree of association of the two qualitative variables, the chi-square test was considered, with the formula below: the sum of the observed frequency minus the expected frequency between the expected frequency (Levin y Rubin, 2004):

$$x^2 = \frac{\sum(f_o - f_e)^2}{f_e}$$

We started from the observation of two qualitative variables, one nominal dichotomous, Gender, and the other ordinal, by categories, Environmental Sensitivity (appreciation of the negative impact of their behavior on five levels, where 1 is nothing and 5 is much). Subsequently, a third was included, which was Academic Level.

The analysis of these variables was carried out through the IBM SPSS Statistics 23 package..

## Results

In general, regarding knowledge of the concept of sustainability, 96% stated that they were familiar with the subject, which apparently facilitated the study. They were also asked about knowledge of the origin of the concept and only 54% were positive.

Likewise, 69% resolved that it is very important to relate the subject with education. Something very worrisome was the response expressed towards the great lack of knowledge (72%) in relation to the promotion and environmental care programs of their academic unit. Here, unfortunately, it is inferred that the communication channels are either insufficient or inadequate, because the students ignore them.

Another worrying issue was that few are aware of the current problems of environmental deterioration: only 45% refer knowledge about it.

To perform the analysis, both descriptive and inferential and using the SPSS software, the model designed to see the relationship of the variables was taken as a reference. Table 2 shows the total population, divided by sex.

**Tabla 2.** Datos de la población por sexo

		<b>Frecuencia</b>	<b>Porcentaje</b>	<b>Porcentaje válido</b>	<b>Porcentaje acumulado</b>
<b>Válido</b>	Hombre	88	50.9	50.9	50.9
	Mujer	85	49.1	49.1	100.0
	<b>Total</b>	173	100.0	100.0	

Fuente: Elaboración propia

Table 3, meanwhile, presents the result regarding knowledge of the negative impact of their daily habits on climate change (it is worth remembering: 1 is nothing and 5 is a lot). Unfortunately, it is appreciated that there is still a degree of unconsciousness regarding the problem and its consequences, since 38% indicate that their daily habits impact something negatively and 30% consider that they impact highly. It is also appreciated how women are more sensitive in caring for the environment, despite the fact that the population of men surveyed is greater due to school conditions.

**Tabla 3.** Resultado de tabla cruzada entre variables

Variables			Sexo		Total
			Hombre	Mujer	
imp-neg	Nada	Recuento	1	2	3
		Recuento esperado	1.5	1.5	3.0
		% dentro de Sexo	1.1 %	2.4 %	1.7 %
	Casi nada	Recuento	30	23	53
		Recuento esperado	27.0	26.0	53.0
		% dentro de Sexo	34.1 %	27.1 %	30.6 %
	Algo	Recuento	27	38	65
		Recuento esperado	33.1	31.9	65.0
		% dentro de Sexo	30.7 %	44.7 %	37.6 %
	Considerablemente	Recuento	18	12	30
		Recuento esperado	15.3	14.7	30.0
		% dentro de Sexo	20.5 %	14.1 %	17.3 %
	Mucho	Recuento	12	10	22
		Recuento esperado	11.2	10.8	22.0
		% dentro de Sexo	13.6 %	11.8 %	12.7 %
<b>Total</b>		Recuento	88	85	173
		Recuento esperado	88.0	85.0	173.0
		% dentro de Sexo	100 %	100 %	100 %

Fuente: Elaboración propia

Table 4 shows the analysis of the chi-square test: the result obtained is greater than 0.05. In this section, the H0 is accepted, which refers to the fact that they are independent, that is, that sensitization (the answer) does not depend on gender.

**Tabla 4.** Pruebas de ji al cuadrado

	Valor	gl	Significación asintótica (bilateral)
<b>Ji al cuadrado de Pearson</b>	4.451 <sup>a</sup>	4	.348
<b>Razón de verosimilitud</b>	4.476	4	.345
<b>Asociación lineal por lineal</b>	.123	1	.726
<b>Núm. de casos válidos</b>	173		

<sup>a</sup> Dos casillas (20 %) han esperado un recuento menor que cinco. El recuento mínimo esperado es 1.47.

Fuente: Elaboración propia

Taking this into account, it was considered necessary to include a third variable, Academic Level, and to specify the semester of current study of the participant.

Table 5 shows the distribution by semester.

**Tabla 5.** Semestre en curso

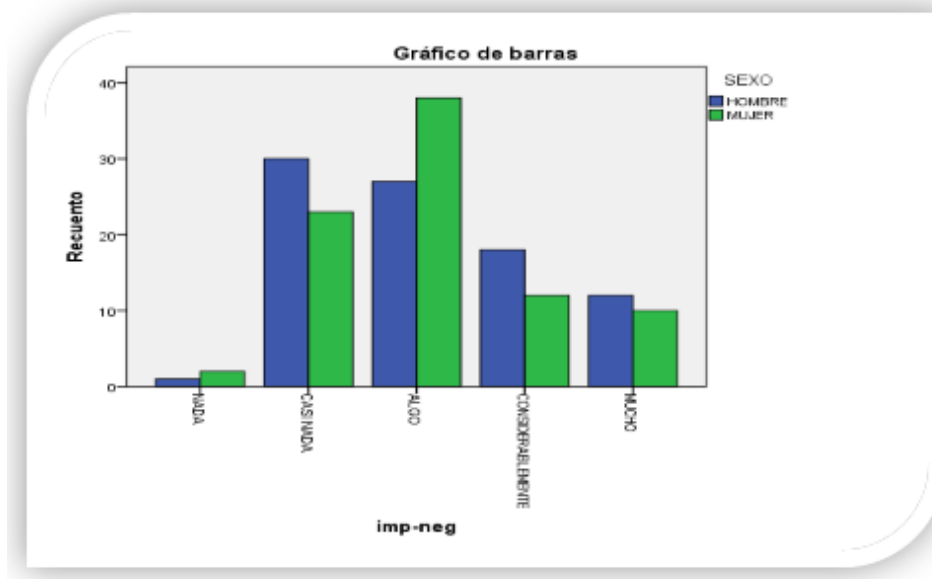
		Frecuencia	Porcentaje	Porcentaje válido	Porcentaje acumulado
<b>Válido</b>	3	7	4.0	4.0	4.0
	5	5	2.9	2.9	6.9
	6	10	5.8	5.8	12.7
	7	57	32.9	32.9	45.7
	8	26	15.0	15.0	60.7
	9	58	33.5	33.5	94.2
	10	8	4.6	4.6	98.8
	11	2	1.2	1.2	100.0
	<b>Total</b>	173	100.0	100.0	

Fuente: Elaboración propia

Looking distributively, in figure 2 it can be seen that there is a dependency, where women report a greater awareness of the negative impact that their daily activities can have on the environment.



**Figura 2.** Correlación entre género y sensibilización ambiental



Fuente: Elaboración propia

The test was carried out again with the three variables and, emphasizing in the ninth semester, a direct dependence between environmental awareness and female gender is visualized. Table 6 shows that there is a dependency on the variables. The result is less than 0.05, that is, H0 is rejected (the variables are independent) and H1 is accepted: the variables are dependent.

**Tabla 6.** Pruebas de ji al cuadrado

Semestre		Valor	gl	Significación asintótica (bilateral)	Significación exacta (bilateral)	Significación exacta (unilateral)
3	Ji al cuadrado de Pearson	0.467 <sup>b</sup>	1	0.495		
	Corrección de continuidad <sup>c</sup>	0.000	1	1.000		
	Razón de verosimilitud	0.738	1	0.390		
	Prueba exacta de Fisher				1.000	0.714
	Asociación lineal por lineal	0.400	1	0.527		
	Núm. de casos válidos	7				
5	Ji al cuadrado de Pearson	1.875 <sup>d</sup>	1	0.171		
	Corrección de continuidad <sup>c</sup>	0.052	1	0.819		
	Razón de verosimilitud	2.231	1	0.135		
	Prueba exacta de Fisher				0.400	0.400
	Asociación lineal por lineal	1.500	1	0.221		
	Núm. de casos válidos	5				
6	Ji al cuadrado de Pearson	4.286 <sup>e</sup>	3	0.232		

	Razón de verosimilitud	5.487	3	0.139		
	Asociación lineal por lineal	0.536	1	0.464		
	Núm. de casos válidos	10				
7	Ji al cuadrado de Pearson	2.339 <sup>f</sup>	4	0.674		
	Razón de verosimilitud	2.729	4	0.604		
	Asociación lineal por lineal	0.821	1	0.365		
	Núm. de casos válidos	57				
8	Ji al cuadrado de Pearson	2.170 <sup>g</sup>	4	0.705		
	Razón de verosimilitud	2.564	4	0.633		
	Asociación lineal por lineal	0.262	1	0.609		
	Núm. de casos válidos	26				
9	Ji al cuadrado de Pearson	9.510 <sup>h</sup>	3	0.023		
	Razón de verosimilitud	10.481	3	0.015		
	Asociación lineal por lineal	0.968	1	0.325		
	Núm. de casos válidos	58				

10	Ji al cuadrado de Pearson	3.733 <sup>i</sup>	3	0.292		
	Razón de verosimilitud	5.040	3	0.169		
	Asociación lineal por lineal	0.614	1	0.433		
	Núm. de casos válidos	8				
11	Ji al cuadrado de Pearson	2.000 <sup>j</sup>	1	0.157		
	Corrección de continuidad <sup>c</sup>	0.000	1	1.000		
	Razón de verosimilitud	2.773	1	0.096		
	Prueba exacta de Fisher				1.000	0.500
	Asociación lineal por lineal	1.000	1	0.317		
	Núm. de casos válidos	2				
Total	Ji al cuadrado de Pearson	4.451 <sup>a</sup>	4	0.348		
	Razón de verosimilitud	4.476	4	0.345		
	Asociación lineal por lineal	0.123	1	0.726		
	Núm. de casos válidos	173				

<sup>a</sup> Dos casillas (20 %) han esperado un recuento menor que cinco. El recuento mínimo esperado es 1.47.

<sup>b</sup> Cuatro casillas (100 %) han esperado un recuento menor que cinco. El recuento mínimo esperado es 0.29.

<sup>c</sup> Solo se ha calculado para una tabla 2 x 2.

<sup>d</sup> Cuatro casillas (100 %) han esperado un recuento menor que cinco. El recuento mínimo esperado es 0.40.

<sup>e</sup> Ocho casillas (100 %) han esperado un recuento menor que cinco. El recuento mínimo esperado es 0.30.

<sup>f</sup> Tres casillas (30 %) han esperado un recuento menor que cinco. El recuento mínimo esperado es 0.47.

<sup>g</sup> 10 casillas (100 %) han esperado un recuento menor que 5. El recuento mínimo esperado es 0.46.

<sup>h</sup> Tres casillas (37.5 %) han esperado un recuento menor que cinco. El recuento mínimo esperado es 2.33.

<sup>i</sup> Ocho casillas (100 %) han esperado un recuento menor que cinco. El recuento mínimo esperado es 0.38.

<sup>j</sup> Cuatro casillas (100 %) han esperado un recuento menor que cinco. El recuento mínimo esperado es 0.50.

Fuente: Elaboración propia

The results obtained indicate (specifically in the ninth semester) that there is a dependency on the response by sex, where the woman shows greater sensitivity in caring for the environment.

## Discussion

It is contrasting to analyze that, despite being a theme worked on since yesteryear (more than three decades), the involvement of women in different human activities continues to be handled at a theoretical or discursive level.

In a first instance, the results showed that there is no relationship between gender and environmental sensitivity. It could be because the population where the study was carried out is predominantly male and they are enrolled in a degree in engineering. It would be convenient, in a later study, to increase the sample size or extend the study to other schools or institutions.

Paradoxically, it is a situation of little formal involvement of women in matters of care and impact on the environment. Many discourses exist to keep men and women in their seemingly separate worlds of highly valued science, economics, and defense, thereby devaluing social reproduction and private domestic duty on the other. Masculinist discourses shape the problem in ways that effectively exclude women (MacGregor, 2010).

On the other hand, it should be noted that the more direct involvement of women in caring for the environment has been marginalized, as well as the inclusion in aspects of impactful decision-making. In this educational institution, higher assignments are held by men, for this reason it is convenient to work on actions that involve women in leading projects that directly impact their immediate environment, such as their home and social environment, as it could be a reason to generate family income, as has been done since the 80s in Nepal, where projects were worked to integrate women in specific aspects to help themselves and other women to improve their economic situation (Molnar, 1987). These programs have stated that decision makers must observe the fact that income generation projects for and by women are viable and have important roles in regional development. (Molnar, 1987).

There is little information on the difference of what is the behavior by gender on the responsibility that has to take care of the environment. In an article published by Unesco, referring to the role played mainly by women in relation to water indicators, it is stated that it is impossible to measure progress towards the objectives of sustainable development (Seager, 2015). Unfortunately, the role of women in such important aspects as climate change is only somewhat symbolic. Women physically represent the minimum numbers, but they do not necessarily have a decisive opinion (Sharma, 2013). This is why women emerged as a force, not only in support of adequate environmental management, but also in demands for a better quality of life and greater social equity (Rico, 1998).

The present investigation allows to visualize in an objective way the human commitment, to integrate as a responsible society and to go through an integral education and under axiological principles that lead to an environmental culture. The main strength is that it opens the door to broader studies to support and vindicate the role and commitment of women as a person, with a capacity for response, to work together and equally with men, with the opportunity to promote well-being.

## Conclusions

It is necessary to emphasize that the subject matter addressed in this research, the correlation of gender and academic level with environmental sensitivity (awareness of the negative environmental impact of the individual in his future), is not a highly studied topic, especially in questions of impact; most studies remain at a level of intent and strategic formulation.

The general objective was met by pointing out the importance of education directed towards the formation of an environmental culture, starting from a gender and academic level approach with its involvement and direction towards the generation of environmental sensitivity, complementing the above with the Collateral responses indicated in the questionnaire and in the interviews (semi-structured questionnaire).

The feminine tendency was manifested in terms of the awareness of having a lesser impact on environmental deterioration when approving the H1 in the quantitative part, from the statistical point of view. At the end of the study, it was found that gender and academic level directly influence the sensitive response of the individual towards caring for the environment, and that women can promote environmental education from home so that the individual complements it in



the school, and above all, can live and enjoy it in society, which will affect the construction of an environmental culture.

As a basis, the following are mentioned: it is paradoxical that the terms related to climate change and environmental deterioration: almost all the respondents knew and were familiar with them, however, only 69% of the participants considered it pertinent to relate them in the field educational. It was also worrying that 72% did not know if the academic unit in question had specific programs or promoted actions in favor of sustainability. Unfortunately, it can be inferred that the communication channels are either insufficient or inadequate. Something also no less worrying was that only 45% are aware of the current problems of environmental deterioration.

On the other hand, it is necessary to continue conducting research that measures human impact in different environments, and to place special emphasis on gender, since, as Unesco says, not by decree or good political-social intentions, the individual will change behavior and to be fully aware of our axiological and pragmatic co-responsibility to manifest a sustainable culture that positively impacts the environment so that we continue to enjoy what nature provides us, we can preserve it and guarantee joy to future generations.

To strengthen this result, it is recommended to continue with a study that applies the Pearson's phi coefficient or Cramer's V (adapting the contingency tables) for a more specific interpretation and to measure the level of significance of the correlation.

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