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PERSPECTIVES OF ENVIRONMENTAL AWARENESS IN UNIVERSITY STUDENTS

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KEYWORDS

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ABSTRACT

To practice environmental awareness is to leave a legacy for a better world and this will be achieved with the support of students and society, for this reason the main objective of this research is to describe and analyze the perspectives of environmental awareness in university students, for which the methodology of quantitative approach is used, correlational between its elements and predictive, in which 1324 university students who responded to a survey of 17 questions divided into four dimensions participated.

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1. Introduction

In recent years, environmental awareness has become one of the most important social objectives in the world, reaching a great political and social consensus, despite this, in many countries human attitudes have contributed to the deterioration of the environment (Ait et al., 2021), likewise, environmental uncertainties have become a serious problem, this is due to the damage caused by climate change and are constantly growing (Piscitelli & D'Uggento, 2022). The issue of eco-cultural development in society is important due to the fact that a large amount of natural resources are currently used to meet human needs, but exploiting the potential of these resources puts a lot of pressure on the environment (Voronin et al., 2022), thus, today's world requires severe solutions before environmental problems reach a point of no return and this can be achieved through education (Handoyo et al., 2021), in turn, universities have a great impact on preparing future generations to build sustainable societies, since they can shape the personality of students with a focus on sustainability (Coronado et al., 2020).

The accelerated growth of the urban population has resulted in increased waste generation and environmental problems related to water quality, toxic gas emissions and contaminated soils (Abegaz et al., 2021), for such reason it is necessary to mention higher education students who are seen as the key actors of social change, therefore, their environmental knowledge is fundamental to solve the threat posed by solid waste and other environmental problems in their community (Owojori et al., 2022), furthermore, effective waste management strategies applied by many universities are recognized efforts to achieve sustainability (Budihardio et al., 2021), similarly, fellow students are believed to be the driving force for future sustainability and environmental awareness (Yang et al., 2021), certainly, the study of factors that reduce solid household waste of university students result in the proposal of new policies to manage waste in universities (Pan et al., 2022), with respect to air quality, university campuses are increasingly free of tobacco smoke, but as far as it is known, no university is 100% free of this pollutant (Mullin et al., 2023), It is necessary to emphasize that air pollution is associated with a large number of physical, mental and behavioral health risks, and 153 million premature deaths worldwide are also attributed to it (Ullah et al., 2021), on the other hand, another problem recognized worldwide as an environmental, health and aesthetic problem is anthropogenic marine debris (Cárdenas-Farfán et al., 2022). During the outbreak of the covid-19 pandemic, several facilities developed recommendations that maximize environmental quality within their facilities, practically the pandemic raised awareness of air quality risks in the daily environment (Coronado et al., 2022), also governments have played a key role during the pandemic by sharing environmental and health information with the public (An et al., 2022).

Ecological awareness is known as the ability to establish relationships with the natural world around us according to the laws of sustainable development (Krasilnikova & Kuznecova, 2021), likewise, environmental awareness is a key factor that helps to understand how sustainable is the environmental behavior of students (Wang et al., 2023), in addition, it is believed that education is a great opportunity to solve the environmental problems that are currently seen, but it is poorly developed in university students (Amador-Alarcón et al., 2022). Science is advancing day by day and in recent years environmental awareness has received much attention thanks to population growth (Makhtar et al., 2021) and in recent years there has been a steady increase in the conscious behavior of people seeking to care for the environment (Kota et al., 2022), simultaneously students should explore environmental knowledge in order to apply it in their day to day life (Sigit et al., 2021), since, integrating environmental protection in university education is a feasible way to seek sustainable university education and in turn, spreading sustainability and ecological awareness corresponds to contemporary educational objectives (Hao, 2021) for this, teachers play a key role in the development of environmental literacy of the next generations (Dolenc & Kovač, 2021), because in the century in which we live, the level of environmental awareness, knowledge and competence of aspiring teachers is of great importance because it allows training people with high ecological culture (Durmus & Kinaci, 2021) and thus protect our environment from human-induced pressures (Kuruppuarachchi et al., 2021).

Environmental education is fundamental to promote the development of environmental citizenship; and to increase environmental awareness, some countries have collaborated in education projects aimed at developing sustainable development capacity (Finder et al., 2021), this because timely

implementation of climate change and ecology related topics are fundamental to the development of sustainable environmental awareness (Konovalova et al., 2021), furthermore, it is well recognized that environmental literacy can provide a consistent basis for future environmental awareness and support the transition to a more sustainable society and a healthier lifestyle (Shri & Tiwari, 2021). There are several factors that are associated with creating environmental awareness (Hidayat, 2023), for example, geographical space is an influential factor as there are differences in terms of environmental awareness among students of different nationalities (Bernaciak, et al., 2022), there is also difference in environmental awareness among students of different faculties , meanwhile, recognizing the main influential factors on human behavior will help to ensure the successful implementation of new environmental policies (Díaz et al., 2020). The rapid economic development has generated new problems and the edification of ecological civilization has become a great social concern, but the advancement of technology has generated new trends in the dissemination of environmental information (Ren & Zhao, 2023) and students should become aware as there is a large amount of environmental knowledge available nowadays (El Senousy & Alsharoa, 2021). There is certainly a large amount of scientific material on environmental awareness and safety, yet there is still a lack of research on environmental awareness in individual groups (Maltseva et al., 2021), at the same time, studies on greening of university campuses are limited (Sima et al., 2022), and there is little research examining the association between psychological stress and air pollution (Zhang et al., 2021). Public awareness of the health risks of pollution is increasing (Carducci et al., 2021), but very little is known about how young people perceive this concept (Szeberényi et al., 2022-a), therefore, there is currently a great deal of research on the perception of higher education students on environmental issues (Sánchez et al., 2022).

The use of green products can generate a great impact on the achievement of environmental and sustainability goals existing in society (Abidin et al., 2022), it cannot be denied that the use of renewable energies and green technologies plays a fundamental role nowadays as it significantly influences people's lifestyles and quality of life (Szeberényi et al., 2022-b), on the other hand, the interest in greening schools, universities and work areas is growing due to the great ecosystemic contribution offered by trees (Balasha et al., 2022). Given the great ecological and socioeconomic problems worldwide produced by hyper competitive approaches introduced by corporate organizations in recent years it is necessary to focus on commercially sustainable strategies (Pascucci et al., 2022), therefore, a great goal that is sought to be achieved in the industrial sector is the implementation of responsible business practices by entrepreneurs thus contributing to responsible economic growth (Del Brio et al., 2022), since, unsustainable and irresponsible consumption and production threaten nature and therefore the human being, for this reason, throughout the world many professionals focus on sustainability issues and adopt ecological strategies to preserve the environment (X. Wang et al., 2022). Since a few years ago, developing countries are generating more and more waste in daily life (D. Want et al., 2022), for this, a way to quantitatively evaluate the sustainability of study centers is applying the ecological footprint method based on its application and consumption (Genta et al., 2022), on the other hand, the school and preschool stage play a fundamental role in environmental education and in the formation of good attitudes towards the environment (Zhakupova et al., 2022), because public awareness about the care of the environment plays an important role in the implementation of environmental strategies and policies (Gherhes et al., 2022).

Large or small companies are part of the products that generate environmental pollutants, while educational institutions are part of the collection of pollutants, but even so they are not supplied to balance the polluting part because there are more companies than educational institutions, in this effort also joined the non-governmental organizations (NGOs) to train and teach the use of the 3R (collect, recycle and reuse) for some polluting materials. The accelerated production of polluting materials in urban-rural areas are not being addressed as it should be and this indicates that there is no adequate study to address such pollution (Coronel-Chugden et al., 2023), even the same energy used by the entire population generates pollution so it should be prioritized in the use of renewable energy and avoid pollution (Muda et al., 2023), it is for that reason that in this research the main objective is to describe and analyze the perspectives of environmental awareness of university students, where the following specific objectives are also raised:

- To analyze and describe the cognitive perspective of the environmental awareness of university students.

- To analyze and describe the affective perspective of the environmental awareness of university students.
- To analyze and describe the conative perspective of college students' environmental awareness.
- To analyze and describe the active perspective of college students' environmental awareness.

2. Development of the investigation

In the present research the methodology of correlational type between its dimensions has been developed in a descriptive way with cross-sectional and quantitative approach (Hernánez et al., 2014).

In this research university students participated in a total of 1324, in which participated students with ages from 16 years to more than 30 years as indicated in Table 1, it is observed that the majority of students (71. 6%) are between the ages of 16 to 20 years; where the student as a university student can freely participate in surveys or research that does not affect him emotionally, economically, academically and any other personal harm, so the student makes the decision to participate or not because the survey is totally free, voluntarily and above all anonymously, the second majority is 21.5% representing students aged 21 to 25 years and the remaining 6.9% are students aged 26 years and older. Female university students represent 49.5% and male students 50.6%, as well as university students from state universities represent 72.4% and from private universities 27.6%. The participating students are from professional careers in the basic sciences (58=4.4%), engineering (423=31.9%), health (194=14.7%), social sciences (72=5.5%), humanities and letters (577=43.5%).

Table 1. Distribution according to age, sex and type of institution

Age	N°	Sex	N°	Type	N°
16 - 20	948	F	489	E	365
				P	124
		M	459	E	338
				P	121
21 – 25	284	F	128	E	84
				P	44
		M	156	E	109
				P	47
26 - 30	41	F	18	E	13
				P	5
		M	23	E	16
				P	7
31 a más	51	F	19	E	11
				P	8
		M	32	E	22
				P	10

Note: F: Female, M: Male, S: State university, P: Private university.

In order to select the instrument, information on environmental awareness was sought, finding four doctoral theses and after a consensus and hard debate, the instrument validated by Gomera (Gomera, 2008) was selected, in which he mentions environmental awareness in university students.

This research is focused on the study of environmental awareness in university students with 17 items divided into four dimensions (Cognitive, affective, conative and active) where the number of items in the cognitive dimension is four Cg1: Considers that the level of information on environmental issues is sufficient to act responsibly; Cg2: Has knowledge about the environmental problems presented at the university; Cg3: Considers that the responsible authorities should have full knowledge on environmental issues to improve management and Cg4: Knows the institutional environmental plan of the university.

The affective dimension has four items Af1: You consider that the level of importance shown by students in environmental issues is fundamental to develop environmental awareness in them; Af2: You

consider that the degree of appreciation of green areas and gardens shown by students is essential to live in a better world, Af3: You consider that your university is interested in improving the environmental awareness of all students and Af4: You feel concern for the environmental state of your university.

The conative dimension has four has Cn1: Your authorities set an example through eco-efficient practices, since the best way to teach the student is by example; Cn2: Find availability in students to learn to recycle; Cn3: Find availability in the authorities to learn about the student garden and Cn4: Consider that the environmental sustainability of the university is fundamental to meet the objectives of the environmental plan of your institution.

And the last dimension refers to whether they maintain active environmental awareness, which has 5 items, Ac1: The personnel in charge maintain the green areas and gardens, Ac2: The university student makes adequate use of water in the restrooms, Ac3: The university promotes the use of differentiated garbage cans for better solid waste management, Ac4: Lectures are given on personal hygiene habits for university students and Ac5: All personnel who work and study at the institution participate in disaster drills.

The dimensions have been measured through the five-point Likert scale: Never=1, Almost never=2, Sometimes=3, Almost always=4, Always=5, then to measure the level of environmental awareness the score intervals of [1 to 2[is in the very low level; [2 to 3[is in the low level, [3 to 4[is in the good level and [4 to 5] is in the very high level with reference to the environmental awareness of university students will be used.

The research began when the students returned to the classroom and found in the classroom the trash can full of garbage, bottles, papers, food and other types of environmental pollutants, when in fact without university students the classrooms remained clean, then despite having lived in a time of Covid-19 where the indications were to keep clean the places we will use, this seems to have been forgotten once consumed their food. That is why it was proposed to do the research from January to April, for which an online survey was generated respecting all the standards and recommendations of the Declaration of Helsinki for good practices in research. The survey conducted is completely anonymous and voluntary, the online survey was distributed among teacher's researchers of this manuscript and distributed in several universities nationwide between private and state universities, the survey was scheduled to answer only once from an institutional or personal mail, participation and / or support for this work was voluntary among university students. Once all the data was collected, it was downloaded from the Google Forms form for its respective analysis and data control, then it was formatted in the Statistical Package for the Social Sciences data package known as SPSS version 25.

Then we proceeded to perform the respective tests such as reliability, where we found the value of Cronbach's Alpha (0.926); ANOVA with test for non-additivity of Turkey (intra subjects with the sum of squares 1988.767, F=180.232 and Sig. 0.000) and Non-Additivity (with the sum of squares 26.277 F=38.814 and Sig. 0.000) and the Hotelling's T-squared test (1265.018, F=78.167 and Sig. 0.00). Kaiser-Meyer-Olkin test of sampling adequacy 0.944; Bartlett's test of sphericity with Chi-square approximation 11672.729, gl=136 and Sig. 0.000. Goodness-of-fit test with Chi-square 611.940, gl=0.88 and Sig. 0.000. Means (M), standard deviation (SD), skewness and kurtosis were also analyzed.

3. Results

Table 2 shows the results with statistical methods for each item of the dimensions studied as cognitive aspects (Cg), affective aspects (Af), conative aspects (Cn) and active aspects (Ac), showing that the highest mean within the four dimensions is the affective aspect 3. 688 which means that the university students do manage to see the importance of environmental issues, valuing green areas and gardens to live better, they consider that the university does make them aware of the environment and the students themselves are concerned about the environmental state of their own universities.

Table 2. Distribution of the total means and of each item of the study variables

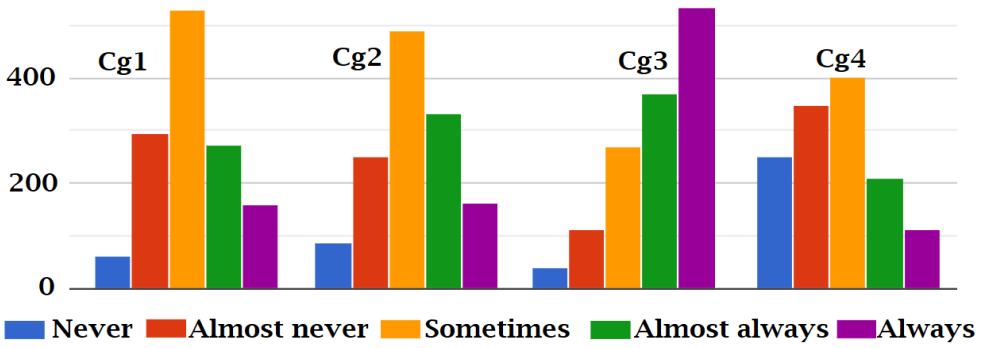
	NCAm	Total mean	Mean	Standart deviation	Variance	Asymmetry	Kurtosis
Cg1	3.380	3.233	3,128	1,0426	1,087	,130	,134
Cg2			3,173	1,0829	1,173	-,083	,134
Cg3			3,939	1,1018	1,214	-,803	,134
Cg4			2,690	1,1938	1,425	,253	,134
Af1		3.688	3,639	1,0850	1,177	-,328	,134
Af2			3,792	1,0937	1,196	-,511	,134
Af3			3,356	1,0402	1,082	-,222	,134
Af4			3,648	1,1113	1,235	-,488	,134
Cn1		3.258	3,256	1,0332	1,067	-,041	,134
Cn2			3,110	,9902	,980	,051	,134
Cn3			3,074	1,0209	1,042	-,050	,134
Cn4			3,592	1,0844	1,176	-,345	,134
Ac1		3.342	3,462	1,0786	1,163	-,241	,134
Ac2			3,246	1,0619	1,128	-,059	,134
Ac3			3,415	1,1374	1,294	-,277	,134
Ac4			3,215	1,1110	1,234	-,103	,134
Ac5			3,372	1,1387	1,297	-,220	,134

Note: NCAm: level of environmental awareness

The values of the mean of each dimension Cg=3.233, Af=3.688, Cn=3.258 and Ac=3.342 are values that are within the accepted level to be able to mention that the level of environmental awareness of university students is high, which in the future we will be able to recover our environment and thus continue to preserve our planet in a state of balance.

Table 2 also shows the value of the level of environmental awareness in university students, that is to say that they have a high level (total mean=3.380) which means that it is within the range of the high level of environmental awareness, but more work is still being done in the environmental aspects from each university forming environmental leaders, environmental conservation groups and others with the unconditional support of the university students themselves. In Figure 1 we will analyze the level of environmental awareness of university students with respect to the Cognitive, where it is shown that the lowest value is Cg4 (2. 690) which corresponds to the lack of knowledge of the institutional plan with respect to the environment, since these plans are not shared with teachers, students or administrative staff because they are focused on university responsibilities leaving aside the presentation of the work plan; while the highest point is Cg3 (3.939) which corresponds to the fact that students demand that the authorities should have full knowledge in environmental matters and be able to improve environmental management.

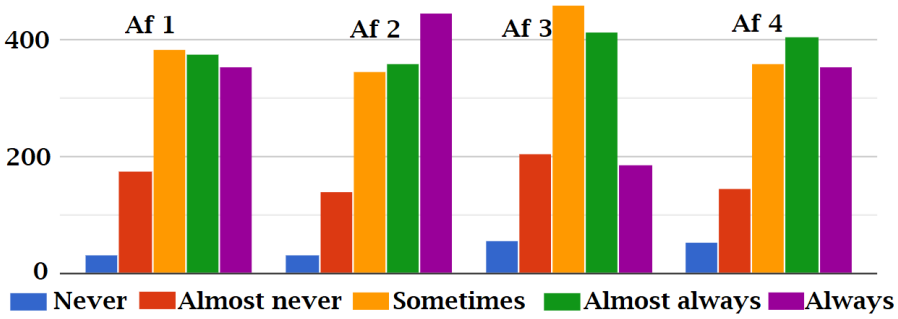
Figure 1. Histogram of the environmental awareness of the Cognitive dimension



In Figure 2 we will analyze the level of environmental awareness of university students with respect to the affective, where it is shown that the lowest value is Af3 (3. 356) which corresponds to that the university has interest in improving the quality and environmental awareness among students, but the score obtained from the mean is not at all despised because it is within the allowed ranges according to the level of environmental awareness, it is for that reason that the students are the most interested and

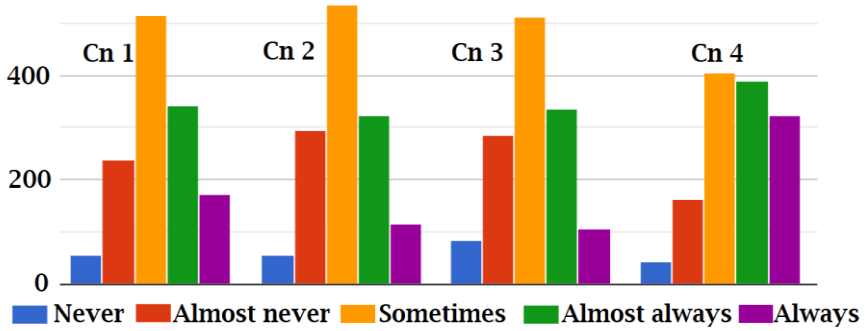
are the ones who raise awareness at home about the use and good management of solid waste, while the highest value is Af2 (3. 792) which corresponds to the degree of valuation that the students make with respect to green areas and gardens and they state that it is very essential to be able to live better.

Figure 2. Histogram of environmental awareness of the Affective dimension



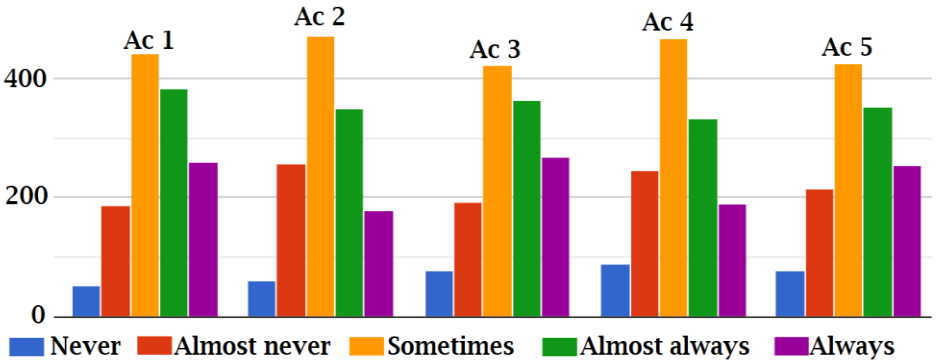
In Figure 3 we will analyze the level of environmental awareness of university students with respect to the conative, where it is shown that the lowest value is Cn3 (3.074) which corresponds to the availability of the authorities to learn about student gardens and participate with them in the improvement of the environment, while the highest value is Cn4 (3.592) which corresponds to the consideration of the environmental sustainability of the university itself for the sole purpose of meeting the objectives of the institutional environmental plan.

Figure 3. Histogram of environmental awareness of the dimension with respect to the conative



In Figure 4 we will analyze the level of environmental awareness of university students with respect to the active, where it is shown that the lowest value is Ac4 (3.215) which corresponds to the realization of lectures on personal hygiene habits where they motivate and encourage the care of the environment and not to pollute water sources, while the highest value is Ac1 (3. 462), which corresponds to whether the personnel in charge maintain the green areas and gardens in optimal conditions or if they are neglected; the universities always try and do their best to maintain the green areas in good condition because it represents a good image before society and is their letter of introduction.

Figure 4. Histogram of environmental awareness of the active dimension



4. Conclusions

The sustainable behavior of taking care of the environment with small actions such as closing faucets, turning off the light or appliances influence the lifestyle of each person which provides environmental awareness and reduction of pollutants (Pisciteli & D'Uggento, 2022) to prioritize the development of students in ecological culture among adults and students (Voronin et al., 2022), where the results of green behavior is still negative in students, but with the activities related to the environment is thought to improve and have environmental sustainability outside and inside the university (Handoyo et al., 2021). The results presented by the companies in front of the society are transversal to education and sustainability (Coronado et al., 2020); despite the existence of good practices of waste disposal there is still a lack of awareness in society to mitigate the abundance and inadequate use of reusing some pollutants (Abegaz et al., 2021) to minimize in small quantities and improve management with activities involving recycling projects to improve the environmental awareness of each institution (Owojori et al., 2022).

The combined contribution shows that there is proportion between students, teachers, administrative staff and green areas that represent environmental awareness to reduce high pollutant waste on university campuses whose impact is greater on society (Budihardjo et al., 2021), as university students demonstrate knowledge of waste classification (Yang et al., 2021) effect of policies that each university implements to collect data and perform their respective analysis (Mullin et al., 2023). Air pollution is shown to impact health negatively, so plans, controls and laws should continue to be implemented to protect the environment (Ullah et al., 2021) and can be achieved through environmental awareness that achieves a direct impact (An et al., 2022) from educational institutions (Krasilnikova & Kuznecova, 2021) as students manage to become aware of the environment and decide to take more drastic measures in effective habits to minimize pollution (Amador-Alarcón et al., 2022), which shows much value in environmental awareness (Makhtar et al., 2021).

Environmental awareness is high in university students because they manage to contribute from the beginning of their education due to the implementation and importance of environmental education in educational institutions and where environmental awareness is best developed is when the teacher has training related to ecological and/or environmental education because they are the ones who emphasize environmental awareness (Durmus y Kinaci, 2021) throughout their performance and environmental development, requesting that these practices should be disseminated through the media such as TV and radio to raise awareness among the entire population (Kuruppuarachchi et al., 2021). These analyses are demonstrated by international cooperations that have been working on environmental awareness and building a green city, which would contribute to reduce global warming, in addition to the need for university literacy in environmental care with committed, optimistic students who contribute to environmental awareness and care (Shri & Tiwari, 2021).

In many universities of careers related to environmental care, there are impacts on the learning of natural risks, this implies that by reducing natural risks, the environment and people are being cared for , despite having approaches and policies for environmental conservation, the implementation of the emphasis on educating and motivating society to support both awareness and protection of the environment (Díaz et al., 2020) is still moderate, but it has significant effects within this great challenge of practice and theory. The component of affective valuation was very successful in university

classrooms due to the support of teachers and environmentalist social groups (Maltseva et al., 2021) whose model of pollution had effects on student stress, showing new evidence of the danger that is growing with the passage of time (Zhang et al., 2021), these behavioral attitudes are of concern to the mental health sector, so it is time to encourage them with the importance and application of new renewable energies to protect the environment (Szeberenyi et al., 2022-a).

The perspective of university students on environmental awareness goes from normal to bad, but with important changes even though they cannot improve environmental awareness in many people to have a quality and healthy life because they still consider that renewable energies are too expensive for a poor sector of the population (Szeberenyi et al., 2022-b), but if they are willing to plant trees that would fulfill several functions within society and even because of environmental awareness students are undertaking and attacking the problem of pollution (Del Brio et al., 2022). In many countries candidates are subjected to questions of ecological competencies, environmental sensitivity, environmental awareness and environmental volunteering to take into account a future full of hope and economic growth since the use of these renewable energies will be priorities of many countries (Muda et al., 2023) and scholarships and internships will have to be given in order to make some change within our national curriculum as well as in productive technical educational centers to train more environmentally conscious professionals (Herrera-Gutiérrez et al., 2022).

Environmental awareness in university students is still at a medium-high level despite the existence of willingness to work and support, but it is demotivated by the lack of support from society.

The perspective with respect to the cognitive aspect of the environmental awareness of university students is low with respect to the other dimensions due to the lack of practice of environmental awareness outside the university, since the awareness within the university is constant and there is support from their own classmates, teachers and administrative personnel.

The perspective with respect to the affective is a very strong point within the environmental awareness of university students because it exists and they show affectivity towards the environment with the support of the university and support groups, but with few results due to the lack of specialty inputs and support from specialists in the area.

The perspective with respect to the motivation of environmental awareness in university students is also within the standard values to continue to motivate them and raise awareness more than one with the support of society and specialists in the subject.

The perspective with respect to always keeping the environmental awareness of university students active is only a matter of time and support, because by carrying out university activities with environmental profiles they will always be the first to support with the sole purpose of having a better healthy life free of pollutants.

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