

ENVIRONMENTAL AWARENESS AND ITS OPERATIONALIZATION: THE CASE OF UNDERGRADUATE STUDENTS AT CUCEA OF UDEG

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Abstract: The impact of human activities on the environment and the resulting climate change is a crucial issue in today's world. Therefore, it is essential to prioritize raising awareness and measuring environmental awareness as a starting point for building resilience in regions and communities. This paper aims to operationalize environmental awareness by surveying students from a university center of the University of Guadalajara. The results of the survey reveal that the level of environmental awareness is moderate. However, they also highlight the impact of environmental activities taught in traditional family settings. This indicates a significant opportunity to address environmental issues today.

Keywords: environment, environmental awareness, higher education

JEL Classification: Q56

Introduction

Human beings have engaged in a wide range of activities across the globe, ranging from subsistence to productive ones, which have led to climate change. Climate change is defined as the long-term alteration of atmospheric temperature and its impacts on the environment. According to Sishaw and Kassahum (2018), focused

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studies have established that human beings are the primary cause of the deterioration of the global environment. Various reports, including those prepared by the Intergovernmental Panel on Climate Change (IPCC), established in 1998 by the United Nations Environment Program (UNEP) and the World Meteorological Organization (WMO), support this claim.

In its first report published in 1990, the IPCC explained that different regions of the planet would experience varying effects due to climate change. In 2018, the IPCC identified several impacts of climate change, including a rise in sea levels, the alteration of marine and terrestrial ecosystems, and a multitude of social impacts due to a one-degree Celsius increase in the planet's temperature. Later, in 2023, the IPCC stated that more than three million people worldwide live in areas vulnerable to climate change due to water stress, food insecurity, and limited economic growth. In these regions, deaths from storms, floods, and droughts were fifteen times higher compared to regions with lower vulnerability.

Sishaw and Kassahum (2018) warn that unless we reverse the trend of growing climate change, the current generation in universities will encounter severe environmental problems when they become decision makers in governments and companies. Therefore, it is crucial to design an environmental awareness operationalization scheme to formulate strategies and public policies that improve our ability to deal with these impacts. This is not only necessary for current decision-makers, but also for future generations since climate change has significant economic, social, and environmental consequences.

Hence, our objective is to study the degree of environmental awareness among undergraduate students, particularly those at the University Center for Economic and Administrative Sciences (CUCEA). The general objective of this study is to analyze the level of environmental awareness among undergraduate students and to evaluate the hypothesis that undergraduate students of CUCEA at the University of Guadalajara have a considerable level of environmental awareness.

Literature review

From an interactionist perspective, experts have conducted studies on behavior with a focus on psychology. These studies have identified the usefulness of various concepts, including environmental awareness, environmental consciousness, and environmental hyperopia, as well as the theory of rational action. Additionally, case studies are included to illustrate the concepts. The literature review is organized conceptually, with subsections ranging from the simplest to the most complex and from the general to the particular, mirroring the development of these concepts by the authors.

Concepts related to environmental awareness

Piaget (1970) and Paulo Freire (1975) have contributed to our understanding of environmental awareness. Piaget explored the development of conscious thought in individuals, while Freire established the relationship between consciousness and culture. Both concepts are relevant when considering environmental awareness, which Febles (2004) defines as the system of experiences, knowledge, and actively used

experiences when interacting with the environment. Gomera (2008) similarly explains that consciousness encompasses knowledge, perception, behavior, and attitude. Grana (1997) describes environmental awareness as a process of becoming aware that encourages individuals to assume their environmental responsibilities and defend their ecological rights. In another study, Zelezn and Schultz (2000) describe environmental awareness as a predisposition to engage in pro-environmental behaviors. Environmental awareness develops when individuals become more aware of environmental problems and appropriate the concept of sustainability. This leads to an increase in their interest in acting in an environmentally conscious manner. Sishaw and Kassahum (2018) add that the level of environmental awareness can also be influenced by the magnitude of the problem and the experience that individuals have with different environmental impacts. Young people's knowledge, attitudes, and awareness are critical in addressing environmental challenges, and they have a present and future responsibility to help curb the growth of climate change.

Operationalization of environmental awareness

We have come across documents that discuss the operationalization of environmental awareness, adding to previous works. The authors Jiménez and Lafuente (2010, p. 740) lay out the dimensions of environmental awareness as follows: cognitive, affective, dispositional, or attitudinal, and active. The first three dimensions are psychological, while the fourth is behavioral. We will begin by explaining the conceptualization of these dimensions as elaborated by the authors. Cognitive refers to the information and knowledge that an individual possesses about the environment. Affective deals with the emotions, feelings, and affects that arise from the relationship between an individual and their environment, according to Pistiner (2007) cited by Prada (2013, p. 237). Attitudinal talks about the predisposition of an individual to respond favorably or unfavorably to certain factors. It has cognitive, affective, and behavioral components that arise from situations and experiences. Finally, Active refers to actions conducted by individuals, both individually and collectively, in favor of the conservation of natural resources to obtain a better quality of the environment, as per De Castro, Cruz & Ruíz (2009). Furthermore, the authors also identified the concept of environmental farsightedness and the theory of reasoned action. Environmental farsightedness is the perception that environmental problems are more serious the further they are from the perceiver, as described by Uzzell (2000). On the other hand, Fishbein and Azjen (1975, cited by Álvarez and Vega, 2009, p. 247) refer to the Theory of Reasoned Action to explain that “people's behavior is conditioned by motivation and competence”, with the former determined by attitude and social norm, and the latter defined by personal ability, self-sufficiency, and contextual opportunities, as defined by Reyes (2007).

Some authors differentiate between environmental awareness and environmental consciousness. Lawrence (2008) talks about consciousness and develops a model based on the ideas of Paulo Freire. This model involves the coherent integration of all the dimensions of environmental awareness, reflected in environmental action. Nevertheless, this consciousness also involves a critical stance in thinking and acting, evaluating, strengthening, and developing personal processes, and generating innovative, revolutionary, or creative behavioral strategies that are useful in the present

and future. Awareness is seen as “the environmental stance that leads to transforming reality through concrete actions” (Unigarro, 1986; cited in Prada, 2013, p. 239).

Having explained and related the analyzed concepts, we can define environmental awareness as an interest in being informed about environmental problems beyond traditional means, achieving an advanced level of knowledge about the environmental situation in one's environment, participating in the design and implementation of collective actions in the family and work environment, improving the style of consumption towards one that is less aggressive for the environment, actively participating in communal interventions, and promoting awareness-raising actions to other groups and sectors, keeping in mind present and future generations.

Review of some case studies with results

Several studies have been conducted on the environmental awareness of university students. Gomera's study at the University of Córdoba found a deficit in the four dimensions of environmental awareness among university students. Although they give significant importance to environmental problems, they do not consider them within their circle of influence. Mediavilla et al. (2020) identified a trend towards environmental farsightedness despite a significant level of environmental awareness.

Chonody and Sultzman (2022) conducted an exploratory study to identify elements associated with environmental issues as part of the professional practice of social worker students in the West and Midwest of the United States. They found that the students had a slight pro-ecological view of the world, a moderate belief in climate change, and acknowledged having moderate knowledge of environmental issues. However, they also identified that the curriculum does not provide the knowledge and skills needed to address social injustice issues, thus the curriculum does not value the teaching of environmental issues. Environmental justice, which ensures that the population does not experience disproportionate environmental risks, should be included as part of the government's environmental policies.

Sishaw and Kassahum (2018) argue that poor countries have a shortage of information and knowledge about the climate and its impact. In developing countries, the population most vulnerable to climate change has little knowledge about it. They recognize that this lack of knowledge generates little collaboration in climate action. The planners of agreements, conventions, and programs do not consider the interest in the pro-environmental actions of young people. Therefore, the level of participation and commitment of the millennial generation is essential to contribute to a reduction in environmental problems, based on gender, the socioeconomic level, and technological level.

Other research has focused on measuring environmental awareness not only among the general population (Moreno et al., 2020) but also among primary school pupils (Díaz & Fuentes, 2018; Hernández, 2020; Esteban, 2001), teaching staff, administrative and university students, and workers (Rojas Carranza et al., 2014; Godínez Cira et al., 2010).

The research conducted by Díaz and Fuentes (2018) analyzed the development of environmental awareness in pupils in their last year of primary school in a public school in Xalapa, Veracruz. The study was qualitative, correlational, basic, and synchronous in nature. The findings suggest that it is important to consider the affective,

conative, active, and cognitive dimensions in the process of developing environmental awareness. Therefore, these dimensions should be included in the reformulation of curricula and programs to contribute to a sustainable education that addresses current environmental problems.

Hernández (2020) conducted a mixed approach study to investigate the development of environmental awareness in eighth-grade pupils in Bucaramanga, Colombia. The study was carried out on a sample of 28 pupils, and the author employed a questionnaire with a Likert scale to measure the impact of the development of environmental awareness in the students. The results suggest that it is possible to develop environmental awareness after implementing the didactic sequence, considering the affective, cognitive, conative, and active dimensions.

Esteban (2001) acknowledged the importance of environmental education in repairing the damage caused to the planet and preventing it from happening again. The author conducted a comparative study between France, England, and Spain, in which he concluded that the structures of the countries' education systems determine how environmental education is integrated into the curricula, responding to global strategies. Environmental education is recognized as a globalizing perspective focused on the acquisition of attitudes and behaviors, recognizing that the idiosyncrasies and cultures of each country are behind their approaches.

Research methodology

The study is considered descriptive in nature since it provides a detailed explanation of how environmental awareness is operationalized and constructed based on the method used by Jiménez and Lafuente (2010). The method involves four dimensions which are derived from eight variables. Nonetheless, for this particular study, nine variables were used instead, which included high-cost pro-environmental activities. These nine variables were calculated from a group of seventeen questions and their responses were obtained from the Student Survey on the Relationship between Tourism and the Environment (EETMA). The survey was administered to undergraduate students and the questions, along with their corresponding answers, are presented in Table 1.

Table 1. Operationalization of Environmental Awareness

Concept: Environmental Awareness		Interest in being informed about environmental issues beyond traditional media, achieving an advanced level of knowledge about the environmental situation in their environment, being able to participate in the design and implementation of collective actions in the family and work environment, as well as improving the style of consumption towards one less aggressive to the environment, an active participant in community interventions and a promoter of awareness actions to other groups and sectors thinking about present and future generations.	
Dimension	Variable	Indicators	Survey Reactions
Affective	Perception of the severity of environmental conditions	Assessment of environmental conditions in tourism activities	Question 64 What is your opinion on the impact of tourism activities on climate change?

	Support for the world overview	Level of agreement with statements related to the population's perception of environmental damage when traveling or planning to travel	<p>Opinion 4 How much do you agree with the following sentence “I think that it is in people's interest not to damage the environment when planning tourism”, by degree, in percentages.</p> <p>Opinion 5 How much do you agree with the following sentence “I think that the interest of the population when they arrive at the destination is not to damage the environment with their activities (generate garbage, consume resources, damage ecosystems, damage the historical and natural heritage, etc.)”, by degree, in percentages.</p> <p>Opinion 6 How much do you agree with the following sentence “I think that the interest of the population when they arrive at the destination is not to damage the sites of the destination (pyramids, beaches, forests, colonial cities, etc.)”, by degree, in percentages</p>
	Support for specific environmental measures	Approval/disapproval of various measures to reduce the environmental impact of tourism activities in the vicinity	<p>Opinion 7 How much do you agree with the following sentence “I believe that the number of visitors to tourist destinations should be controlled”, by degree, in percentages.</p> <p>Opinion 9 How much do you agree with the following sentence “I consider that environmental impact is the cost of generating income for tourist regions, so the population should be made aware of it”, by degree, in percentages</p>
Cognitive	Information and knowledge	Degree to which respondents perform pro-environmental actions, so it is considered that the greater the number of actions, the more informed they are about environmental issues	<p>Question 14 Overall, on a scale of 1 to 5, how would you rate yourself in terms of the number of actions you take care of the environment (where 1 is no action and 5 is more than 10 actions) reflects the respondents' degree of knowledge.</p> <p>Question 18 In which space do you carry out the greatest number of environmental protection actions (indicate only one), it can be evaluated, for example, that if it is at home the knowledge is basic, in a company it is intermediate, so it can be recoded in another variable that can reflect in a better way what the table indicates.</p>
		Specific environmental knowledge index	<p>Question 16 Where did you obtain the information that motivated you to conduct these environmental protection actions?</p>
Disposition	Attitude towards individual pro-environmental behavior (norm personal morale and self-efficacy)	Level of agreement with statements related to your behavior when traveling or planning to travel	<p>Question 69 Opinion on the interest of taking care of the environment when planning future tourism activities: Regarding future travels for tourism activities:</p> <p>Opinion 1 How much do you agree with the following sentence “I will make travel plans trying not to impact the environment”, by degree, in percentages.</p> <p>Opinion 2 How much do you agree with the following sentence “I will carry out tourism activities trying not to damage the environment of the destination (generate garbage, consume resources, damage ecosystems, damage historical and natural heritage, etc.)”, by degree, in percentages</p> <p>Opinion 3 How much do you agree with the following statement “I will not travel or plan to travel in the future”, by degree, as a percentage?</p>
	Attitude towards the personal costs of pro-environmental measures	Level of agreement with statements related to pro-environmental measures in tourism	<p>Question 70 Opinion on the interest of taking care of the environment when conducting tourist activities.</p> <p>Opinion 8 How much do you agree with the following sentence? “Tourism is an activity that generates resources for destinations, so there should be no environmental restrictions on destinations”, by degree, in percentage.</p> <p>Opinion 11 How much do you agree with the following sentence “I believe that there should be a strategy to fine visitors who have an environmental impact or do other types of damage to the destination”, by degree, in percentages</p>

Active	Participation in low-cost individual behavior	Level of low-cost environmental actions	Question 19a in general, your environmental protection actions are aimed at (1, 2, 4, 8, 10, 11) Decreasing the consumption of food with packaging that generates a large amount of inorganic waste; 2. Increasing the consumption of locally produced goods; 4. Decreasing water consumption; 8. Using service companies with a clear philosophy and actions to protect the environment; 10. Purchasing second-hand clothing, sharing clothes, donating, or giving away clothes and shoes for second-hand use; 11. Segregating waste for recycling.
	Participation in high-cost individual actions	Level of high-cost environmental actions	Question 19b in general, your environmental protection actions are aimed at (3, 5, 6, 7, 9, 12) 3. Decreasing organic waste; 5. Decreasing the use of electricity; 6. Decreasing fuel consumption in transportation; 7. Decreasing water pollution; 9. Purchasing products in general from companies with a clear philosophy of environmental protection actions; 12. Producing compost from organic waste.
	Participation in pro-environmental collective actions	Environmental activism index	Opinion 10 I believe that the environmental damage caused by tourism activities at destinations is generated by everyone, so we must all assume the costs of reducing the impacts or rehabilitating damaged areas, not only the government.

Source: Adapted from Jiménez and Lafuente (2010)

Population and sample

We define the population by undergraduate students of the Centro Universitario de Ciencias Económico Administrativas (CUCEA) of the Universidad de Guadalajara in Zapopan, Jalisco, Mexico. According to the Fourth Report of Activities 2022-2023 (Padilla, 2023), the student population of the undergraduate educational programs (PE) in 2022 was 21,614 students, belonging to 14 degree programs: International Business, Public Accounting, Administration, Marketing, Financial Administration and Systems, Human Resources, Tourism, Gastronomic Business Management, Public Relations and Communication, Business Engineering, Economics, Information Technology, Government Administration and Public Policy, and Environmental Management and Economics.

The sample calculator of the SurveyMonkey (2023) application was used to calculate the sample size with the following formula:

$$\text{Sample size} = \frac{z^2 xp(1-p) / e^2}{1 + \left(\frac{z^2 xp(1-p)}{e^2 N} \right)} \quad (1)$$

Data:

Population size = 21,614

Confidence level = 99%

Margin of error = 5.51%

Sample size = 537

Selection of the technique and design of the research instrument

The Student Survey on the Relationship between Tourism and the Environment (EETMA) was used to collect data. It was created as a questionnaire with the Google Forms tool and consisted of 70 questions on unsustainable actions in the context of climate change. The aim was to understand the impact of tourism on the environment and the actions taken by the respondents to protect it considering the current climate change situation. From the results, four dimensions of environmental awareness were constructed: affective, cognitive, dispositional, and active. These dimensions were created using nine variables, which were named after the design variables presented by Jiménez and Lafuente (2010). The group of seventeen questions and answers derived from the questionnaire was used, as presented in Table 1. It is worth noting that most of the answers were coded using the Likert scale, with five being the most desirable response and one being the least desirable response.

We invited active undergraduate students registered in the 2022 “B” school cycle to respond to the questionnaire using institutional emails. The questionnaire was available from October 7 to November 29, 2022. We received 537 responses from students across all the bachelor's degree programs.

Results

In this section, we present the overall results of the dimensions that were calculated from the variables presented in the previous section. We will explain in detail the totals of the dimensions and the variables that comprise them. The results were analyzed according to degree and gender, but it is essential to note that they only represent the study group and are not representative of all CUCEA students.

Affective dimension

According to Jiménez and Lafuente (2010), the term “affections” refers to the emotions, feelings, and attitudes that people have towards the environment. Pistiner, (2007) as cited by Prada (2013), explains that this is based on the relationship between humans and the environment.

The respondents answered questions related to their experiences with the environment, which helped construct the variables for the dimension. This dimension received the second highest score (3.66 points) in the survey, just slightly lower than the Disposition dimension. The perception of the severity of environmental conditions (4.19 points) was the variable that contributed the most to this score. In the study, this was related to the impact of tourism activities on the environment.

The respondents who recognized the impact of tourism activities on the environment the most were those from the fields of business engineering, management, environmental economics, and tourism. In contrast, those in economics, public accounting, and information technology were the least likely to recognize this impact. This may reflect the level of information students have about the impact of tourism activities on the environment.

The study also found that women had a slightly higher score (3.67 points) than men (3.59 points). Women had a higher level of perception of the severity of environmental conditions, while men had a higher level of perception of the general view of the world. These results are comparable to a study by Walchholz et al. (2014) as cited by Chonody and Sultzman (2022), as well as Sishaw and Kassahum (2018).

Table 2. Dimensions and Global Indicator of Environmental Awareness

Degree	Affective	Cognitive	Disposal	Active	Global Environmental Awareness Index	Students surveyed
Total	3.64	2.64	3.66	2.44	3.10	537
Administration	3.65	2.66	3.69	2.42	3.10	122
Government Administration and Public Policy	3.54	3.50	3.73	2.00	3.19	5
Financial Management & Systems	3.78	2.59	3.60	2.44	3.11	9
Public Accounting	3.26	2.47	3.27	2.38	2.84	15
Economy	3.05	2.85	3.43	2.23	2.89	10
Environmental Management and Economics	3.83	2.76	3.72	2.79	3.28	47
Business Engineering	3.84	2.42	3.68	2.54	3.12	40
Marketing	3.60	2.47	3.61	2.37	3.01	108
International Business	3.66	2.73	3.71	2.43	3.13	54
Human resources	3.52	2.75	3.48	2.22	2.99	20
Public Relations & Communication	3.58	2.70	3.80	2.43	3.13	44
Information Technology	3.42	2.33	3.40	2.53	2.92	5
Tourism	3.82	2.76	3.61	2.33	3.13	24
Gastronomic Business Management	3.63	2.81	3.79	2.51	3.18	33
Another bachelors degree (another University Center / another University)	3.67	1.67	4.50	2.33	3.04	1
Gender	3.64	2.64	3.66	2.44	3.10	532
Female	3.67	2.60	3.72	2.47	3.12	335
Male	3.59	2.71	3.56	2.40	3.07	197

Source: Data from the Survey of Students on the Relationship Between Tourism and the Environment (EETMA) was analyzed

Cognitive dimension

According to Jiménez and Lafuente (2010), environmental literacy refers to the knowledge and information that people have about the environment. This can include knowledge about the impact of human activities on the environment and the well-being of populations. However, compared to other measured dimensions, this level of knowledge is low, with an average score of 2.64.

The results also show that the students in government administration, economics and gastronomic business management have the highest scores in this dimension, while the students in information technology, business engineering, marketing, and

public accounting have the lowest averages. Furthermore, men have a higher average score than women by 0.11 points, indicating that men are more knowledgeable about environmental problems. These results are aligned with those reported by Faver and Muñoz in 2013, as cited by Chonody and Sultzman (2022).

It is important to note that the respondents' knowledge is primarily formed within the family home, which is also where they carry out most of their activities in favor of the environment. Basic education (primary and secondary school) comes second, while high school, university, and work contribute little to advanced knowledge on this subject. This represents a weak point that is reflected in the results of the active dimension and the variables that make up it.

Dimension layout

The concept of disposition refers to an individual's inclination to respond to certain factors in a particular way. It is made up of cognitive, affective, and behavioral components (Jiménez & Lafuente, 2010). This means that it is a more advanced level of attitude than the affective one. After recognizing the impact of anthropogenic activities on the environment, an individual may convert this information into a willingness to act in a moral and ethical manner toward the environment, which can involve accepting certain levels of restrictions and costs related to it. In the context of this study, the respondents expressed a certain level of willingness to accept restrictions and costs related to tourism activities at destinations.

The average score obtained for disposition was 3.66 points, which is the highest score among the analyzed four dimensions. The attitude towards the personal costs of pro-environmental measures contributed the most to this score. This may be because this variable is related to the willingness to fine tourists those who damage or destroy the destinations the most, and the respondents did not consider themselves to be part of this population group. This is evident from their responses to the affective dimension, where they believed that they could carry out tourism activities without damaging the destinations.

The bachelor degree students with the highest scores in this dimension were public relations and communication, business management, management in gastronomy and government administration, while those with the lowest scores were public accounting, information technology, and economics. Women in general are more inclined towards an environmental attitude and are more supportive of the imposition of environmental costs. The females scored 3.72 points in Disposition, while the males scored 3.56 points in the same area.

Active dimension

Actions that people undertake individually or collectively to benefit the environment are referred to as environmental actions (De Castro et al., 2009). These actions can be categorized as low and high cost, as well as adaptation, mitigation, and restoration, which can help determine the resilience of cities and regions.

The average score obtained for this dimension was 2.44 points, which was the lowest score among the four dimensions. This reflects the level of consolidation of

the other three dimensions and shows a direct relationship: the greater the consolidation of the other dimensions, the greater the consolidation of the active dimension.

Participation in collective actions in favor of the environment is the variable that contributes the most to this dimension, while participation in high-cost individual actions is the one that contributes the least and has the lowest score among the nine variables constructed for the four dimensions. The respondents most frequently mention actions such as decreasing water consumption, decreasing electricity use, and decreasing food consumption with packaging that generates a great deal of inorganic waste. This is related to the level of advanced knowledge that the respondents have.

The bachelor's degree students of environmental management and economics, business engineering, and tourism are those that contribute the most to this dimension. On the other hand, the students of government administration, human resources, and economics are those with the lowest scores. Men have a more active participation in high-cost individual behaviors, while women participate more in low-cost behaviors and collective actions for the environment. Overall, females scored higher than males by 0.07 points (2.47 and 2.40, respectively).

Global Environmental Awareness Indicator

The data were analyzed by calculating the averages of four dimensions, both for the degree and the overall score, resulting in 3.10 points. The result suggests an exceptionally low level of environmental awareness among the respondents, which is close to the average. Based on this, we can infer that the respondents have moderate awareness of the impact of anthropogenic activities on tourism and their daily actions.

Out of the fifteen bachelor's degrees offered at CUCEA, the students of the bachelor's degree programs in environmental management and economics (3.28 points), Government Administration and Public Policy (3.19 points), and Gastronomic Business Management (3.18 points) scored the highest in terms of environmental awareness. On the other hand, Public Accounting (2.84 points), Information Technology (2.92 points) and Economics (2.98 points) scored the lowest in terms of environmental awareness. In terms of gender analysis, women scored 0.05 points higher than men, with scores of 3.12 and 3.07, respectively.

These results are significant and there are several reasons for them. The first reason is that the Mexican educational system needs improvement. The second reason is that public institutions involved in this issue need to improve their information and awareness strategies. Finally, the respondents' environmental hyperopia is also a contributing factor.

Conclusions

The study shows a global average of 3.10 points out of five in terms of environmental awareness, which, when compared to the hypothesis "CUCEA undergraduate students at the University of Guadalajara have a high level of environmental awareness", leads to the rejection of the hypothesis. These findings have a significant

importance for decision-making, not only for the educational system but also for various levels of government and institutions involved in environmental issues.

The disposition dimension had the highest score (3.66 points), followed by the affective dimension (3.64 points). The combination of these two dimensions can be summarized as “I understand and am willing to act”. On the other hand, the active dimension received the lowest score (2.44 points), followed by the cognitive dimension (2.64 points). The combination of these two dimensions can be summarized as “I am taking action in favor of the environment because I have enough knowledge to do so”. There is a considerable difference between the two dimensions. The first dimension reflects an individual who feels adequately informed about environmental problems in their surroundings and in the world, while the second is more related to concrete actions resulting from the level of knowledge and the ability to intervene in actions that help the environment and reduce climate change and its impact. Low scores in this category represent the inability to act with concrete measures due to a lack of knowledge or information. This may lead to a feeling of wanting to act but not being able to do so, or perhaps frustration at not being able to do anything because what the individual does in his environment may not have a significant impact on environmental problems elsewhere, such as the melting of the polar ice caps or the pollution caused by the fast fashion industry, which is related to environmental hyperopia.

Based on our analysis, we have concluded that the respondents have a decent level of comprehension and willingness to act regarding environmental issues. However, their knowledge and implementation of actions to support the environment are limited. Therefore, it is crucial to improve both aspects. Regarding comprehension, there is a need to improve the quality of information and knowledge, while simultaneously improving the speed with which the government and institutions communicate this information to the public. This communication should be through reliable means of communication, tailored to the various characteristics of the population segments. To achieve this, traditional training methods must be replaced with more advanced sources, such as universities and the workplace, where information and implementation are prioritized over low-cost and high-cost actions.

To increase the implementation of actions, it is necessary to move from a limited number of low and high-cost actions to a more considerable number of both types of actions. For example, instead of only including actions to reduce water and energy consumption and the use of products with harmful packaging, which are the most mentioned actions by our respondents, other types of collective action should be taken, such as waste separation, recycling, and delivering recyclable products through appropriate channels for treatment. Other collective actions, such as the production of organic compost in municipal parks and gardens with the participation of the community, can be taken to eliminate chemical fertilizers, among other multiple actions.

The role of the educational system in creating environmental awareness is crucial. Nevertheless, it is essential to design “information and knowledge scales” that support the formation of diverse levels of consolidation of environmental awareness necessary to implement actions identified as complex by the population. High school is a perfect space to provide advanced information and knowledge to achieve actions that contribute to a greater extent to reducing environmental problems. This could

even lead to students pursuing professional careers dedicated to the care and preservation of the environment. In addition, advanced training on these topics should be included in university studies since they are competencies for life, not just for the individual but also for the planet. Hence, it is important to include advanced training and specialization courses, including the implementation of actions by the university community and teachers with their students, both in the university environment and in their place of residence. Universities should promote participation in citizen groups, and governments and institutions should help build strategic plans for the intervention of the entire population.

Although CUCEA offers a degree in environmental management and economics, it was found that the overall average environmental awareness is 3.28 points, indicating a wide area of training opportunities, which is important. Among the degree students with lower scores, there is a greater potential in information technology since this profession should be seen as an ally in reducing environmental problems. It is in technology that most of the solutions to environmental problems are expected to be found.

Regarding the analysis by gender, a slight difference in the results is identified. Women, in general, have greater environmental awareness than men according to the results of the global index. It was found that women are more sensitive to environmental problems, while men are slightly better informed about them. There is also a greater willingness among women to adopt an attitude towards the environment and to accept environmental costs. On the other hand, men report that they carry out more high-cost individual environmental support activities, while women participate more in low-cost individual environmental support activities and collective pro-environmental actions.

Sishaw and Kassahum (2018) found that younger generations have limitations in dealing with environmental challenges. Although we did not compare with other age groups, we found that the scores of the global environmental awareness index are close to the average and lower in the active dimension. This indicates that the respondents do many fewer environmental protection activities than expected and they do a low level of high-cost individual activities. They are the ones that could help the most with environmental resilience.

In this regard, government institutions must intervene in matters of environmental interference to establish strategies that, together with the education system, contribute to the necessary levels of training to advance the degree of consolidation of environmental awareness. Therefore, it is necessary to move from individual work to collaborative work in all scenarios and by all actors. A significant percentage of the government's citizen participation strategies must be focused on this purpose.

Finally, it can be mentioned that a greater number of more studies focused on measuring environmental awareness, as well as its operationalization, need to be carried out. These studies should identify the elements that influence environmental awareness in the short term and in different environments. They should also include different intervention approaches, such as the quintuple helix model and other types of strategies according to the relevance of this issue.

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ŚWIADOMOŚĆ EKOLOGICZNA I JEJ OPERACJONALIZACJA: PRZYPADEK STUDENTÓW STUDIÓW LICENCJACKICH NA UNIWERSYTECIE UDEG

Streszczenie: Wpływ działań antropogenicznych na środowisko i zmiany klimatu są obecnie tematem o istotnym znaczeniu, dlatego świadomość ekologiczna i sposób jej pomiaru powinny być jednym z priorytetów, ponieważ stanowi ona dla społeczeństwa i rządów punkt wyjścia dla prężności regionów. Celem niniejszego artykułu jest operacjonalizacja świadomości ekologicznej w oparciu o ankietę przeprowadzoną wśród studentów z ośrodka uniwersyteckiego Uniwersytetu w Guadalajarze. Wyniki wskazują na średni poziom świadomości ekologicznej, ale przede wszystkim odzwierciedlają wpływ działań proekologicznych, nauczanych w środowiskach rodzinnych, a które są uważane w tym badaniu za tradycyjne, co wskazuje obecnie na istniejący duży potencjał obszaru możliwości w tym temacie.

Słowa kluczowe: środowisko, podnoszenie świadomości ekologicznej, szkolnictwo wyższe

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