

Validation of an Instrument to Measure Attributes of Education and Environmental Knowledge, Attitudes, and Intentions of University Students in Mexico



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ABSTRACT

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This paper presents a brief analysis of the aspects of environmental education and the role it plays in society, especially since it is related to environmental awareness, behavior and attitudes in students at higher education levels. The aim is to study the initial validation of an instrument to measure the attributes of Environmental education, environmental knowledge, environmental attitudes, pro-environmental behaviors, and intentions through the Cronbach variable.

1. INTRODUCTION

Environmental problems have increased considerably and have led the world to an imminent environmental disaster represented through extreme weather events, natural disasters, among others [1].

The authors [2] suggests that environmental problems are the direct result of poor environmental behaviors by humans. Because of this, in different countries around the world, research is being carried out to study how education and environmental knowledge can increase and shape pro-environmental attitudes, intentions and behaviors that surround the population.

Mexico does not have enough research on environmental education, environmental behaviors, and attitudes. It is believed this is because there is no ecological culture in the daily lives of the Mexican population and even within educational institutions subjects related to environmental education are not taught in the school programs [3].

Thus, this article focuses on validating a questionnaire that collected information from university students at the Autonomous University of Ciudad Juárez in order to analyze the relationship of environmental education on environmental knowledge, behaviors, attitudes, and intentions.

2. THEORETICAL AND CONCEPTUAL FRAMEWORK

For this research the objective is to analyze how universities can integrate different aspects of sustainability in students and thus creating a positive influence on their behavior.

That is why, to quantify and evaluate the effects of environmental education on the levels of environmental

knowledge, behavior, intentions, and attitudes of university students at the Autonomous University of Ciudad Juárez, the research began with a literature review through different articles to identify and conceptualize each of the variables in this investigation. The results obtained for each variable were as follows:

Environmental Education: It is the set of knowledge about current environmental issues and problems [4], in addition to having the objective of promoting and creating knowledge, values and attitudes that allow achieving a sustainable environment of people committed to its improvement [5].

Environmental Knowledge: It is an indicator that shows the awareness that individuals have regarding environmental problems and, as its name says, it is the general knowledge of the facts, concepts and relationships concerning the natural environment and its ecosystems [6].

Pro-environmental behavior: Any action that improves the quality of the environment, being represented by a variety of actions that benefit the quality of the ecosystem that is inhabited [7].

Environmental Attitudes: Psychological expression to evaluate a particular issue, person, problem, or situation from a favorable or unfavorable point of view [2].

Environmental Intentions: Strong stimulus and normally related as the cause of environmental behaviors, so much so that it can indirectly influence the prediction of behaviors [7].

3. METHODOLOGY

In Mexico there is no extensive literature and research on the relationship of environmental education related to environmental knowledge, attitude, pro-environmental behaviors, and intentions.

That is why, to begin with the recollection of information and its subsequent analysis, a questionnaire was designed based on a literature review to ask questions on the subject, dividing it into five main sections. Each section represented each of the variables described in section two of this article. In Table 1, an extract of section II of the questionnaire is showed to exemplify the structure of the questionnaire.

Table 1. Section II of questionnaire

		Scale				
1-Strongly Disagree	2-Disagree	3-Agree	4-Strongly Agree		5-Totally Agree	
			1	2	3	4
	Questions					
1	Is my responsibility to treat nature with respect.					
2	I have the intention to compromise with environmental attitudes to protect the environment.					
3	I try to reduce the contamination to the environment constantly.					
4	I will participate in cleaning efforts and other activities that improve the quality of the environment in my school and the city.					
5	I am satisfied with the environmental actions I performs, because they reflect the person I truly am.					
6	I am willing to give part of my salary to prevent environmental contamination.					
7	I try to act in a responsible way to take care of the environment in my day-to-day life.					
8	I try to reduce the quantity of water and electricity that I used on my day-to-day activities.					

With this questionnaire, information was collected to carry out an initial validation and therefore determine if the data collected was a useful instrument to obtain information from students regarding the variables. If so, it would serve to later carry out a model that shows the relationships between them and their impact.

During the period of April-May 2022, the questionnaire was applied to the student population of the Autonomous University of Ciudad Juarez, mainly the engineering institute. Google Forms was used to share the questionnaire electronically to facilitate the recollection of answers from which an initial database was obtained.

To carry out the validation of the questionnaire, the SPSS 21.0 software was used from 211 complete questionnaires collected within two months.

4. RESULTS

The validation of the questionnaire consists of calculating

its reliability and viability using the Cronbach's Alpha index, to find out if the questions result in the appropriate information and align with the subject of study. This index refers to the internal consistency between the items (questions), which is nothing more than the variance and correlation that occurs between them and the rest of the sections of the instrument. Acceptable values above 0.8 are suggested or even 0.7 can be established as a lower limit [8].

When performing the validation using this index, the results shown in Table 2 were obtained. It is observed that the sections that make up the environmental aspects to be studied have Cronbach's Alpha values greater than 0.7, which are considered acceptable. This means that the study can continue with the data collection to make a model that analyzes with further details the relationships between the variables.

Table 2. Cronbach alpha results

Section	Cronbach Value	No. of Items
Environmental knowledge	0.737	12
Environmental intentions	0.787	8
Pro-environmental behavior	0.735	7
Environmental education	0.774	9
Environmental attitudes	0.730	11

5. CONCLUSIONS

Even though this questionnaire was created from various studies in other countries, the adaptation to a Spanish-speaking University environment was adequate, which was demonstrated with the results of the validation for Cronbach, which had values greater than 0.7. Thus, demonstrating that in fact the answers for the questionnaire can be used for future research regarding the analysis on the relationship between the variables. This subscribes to the continuation of the analysis to evaluate the impact that the environmental education has and its relationship with knowledge, attitudes, intentions, and pro-environmental behaviors in university students. It also means that when validated, it can be used in research related to the environmental issues raised in universities throughout the country, to find significant inferences about environmental education as part of the student's educational formation.

REFERENCES

- [1] World Economic Forum. (2019). The Global Risks Report 2019 (14th Edition).
- [2] Liu, P., Teng, M., Han, C. (2020). How does environmental knowledge translate into Pro-environmental behaviors. *Science of the Total Environment*, 728: 138126. <https://doi.org/10.1016/j.scitotenv.2020.138126>
- [3] Montaña, F. (2012). La educación ambiental en México ante la crisis ambiental. *Revista Vinculando*. <https://vinculando.org/ecologia/la-educacion-ambiental-en-mexico-ante-la-crisis-ambiental.html>
- [4] Zsóka, Á., Marjainé, Z., Széchy, A., Kocsis, T. (2013). Greening due to environmental education?

- Environmental knowledge, attitudes, consumer behavior and everyday pro-environmental activities of Hungarian high school and university students. *Journal of Cleaner Production*, 48: 126-138. <https://doi.org/10.1016/j.jclepro.2012.11.030>
- [5] Molano, A., Rodríguez, I., Lozano, W., Zamorano, B., Peña, F., Parra, V. (2012). Conocimiento, percepción y actitud ambiental en estudiantes de secundaria. *Revista Didáctica Ambiental*.
- [6] Gkargkavouzi, A., Halkos, G., Matsiori, S. (2019). How do motives and knowledge relate to intention to perform environmental behavior? Assessing the mediating role of constraints. *Ecological Economics*, 165: 106394. <https://doi.org/10.1016/j.ecolecon.2019.106394>
- [7] Ates, H. (2020). Merging theory of planned behavior and value identity personal norm model to explain pro-environmental behaviors. *Sustainable Production and Consumption*, 24: 169-180. <https://doi.org/10.1016/j.spc.2020.07.006>
- [8] Supo, J. (2012). Cómo validar un Instrumento (No. 2012-04073).