Salud, Ciencia y Tecnología - Serie de Conferencias. 2024; 3:678
doi: 10.56294/sctconf2024678

Category: Arts and Humanities

ORIGINAL

Exploring pro-environmental behavior in Peruvian basic education students: A cross-sectional study

Explorando el comportamiento proambiental en estudiantes peruanos de educación básica: Un estudio transversal

Edwin Gustavo Estrada-Araoz[1], Yesenia Veronica Manrique-Jaramillo[2], Víctor Hugo Díaz-Pereira[2], Jenny Marleny Rucoba-Frisancho[2], Néstor Antonio Gallegos-Ramos[3]

[1]Universidad Nacional Amazónica de Madre de Dios, Facultad de Educación. Puerto Maldonado, Perú.
[2]Escuela de Educación Superior Pedagógico Público Nuestra Señora del Rosario. Puerto Maldonado, Perú.
[3]Universidad Nacional Amazónica de Madre de Dios, Facultad de Ingeniería. Puerto Maldonado, Perú.

Cite as: Estrada-Araoz EG, Manrique-Jaramillo YV, Díaz-Pereira VH, Rucoba-Frisancho JM, Gallegos-Ramos NA. Explorando el comportamiento proambiental en estudiantes peruanos de educación básica: Un estudio transversal. Salud, Ciencia y Tecnología - Serie de Conferencias. 2024; 3:678. https://doi.org/10.56294/sctconf2024678

Submitted: 08-11-2023 **Revised:** 15-03-2024 **Accepted:** 23-04-2024 **Published:** 24-04-2024

Editor: Dr. William Castillo-González

ABSTRACT

Introduction: pro-environmental behavior constitutes an essential topic within contemporary environmental research. In a global context where awareness of environmental challenges is constantly growing, understanding how students relate to their environment and adopt practices that promote sustainability becomes imperative.
Objective: to assess the pro-environmental behavior of fifth-grade secondary education students.
Methods: a quantitative, non-experimental, and cross-sectional descriptive study was conducted. The sample consisted of 164 students of both sexes who were administered the Environmental Behavior Questionnaire, an instrument with adequate metric properties. Descriptive statistics were used for analysis, and the non-parametric Chi-Square test was employed to determine if pro-environmental behavior was significantly associated with proposed sociodemographic variables.
Results: it was found that the pro-environmental behavior of 28 % of students was occasional, 23,7 % was uncommon, 19,5 % was habitual, 18,8 % was not habitual, and 10 % was very habitual. When evaluating dimensions, it was also found that recycling and reusing, resource conservation, and environmental purchasing were predominantly valued at the occasional level. Likewise, a significant association was determined between pro-environmental behavior and students' sex ($p<0,05$).
Conclusions: the pro-environmental behavior of fifth-grade secondary education students was assessed as occasional. Therefore, it is recommended that educational authorities develop educational programs and awareness campaigns to promote the adoption of pro-environmental behaviors.

Keywords: Environmental Behavior; Recycling and Reuse; Resource Conservation; Environmental Purchasing; Sustainable Development.

RESUMEN

Introducción: el comportamiento proambiental constituye un tópico esencial dentro de la investigación ambiental contemporánea. En un contexto global donde la conciencia sobre los desafíos ambientales crece constantemente, entender cómo los estudiantes se relacionan con su entorno y adoptan prácticas que fomentan la sostenibilidad se vuelve imperativo.
Objetivo: evaluar el comportamiento proambiental de los estudiantes del quinto grado de educación secundaria.

Métodos: estudio cuantitativo, no experimental y descriptivo de corte transversal. La muestra estuvo conformada por 164 estudiantes de ambos sexos a quienes se les aplicó el Cuestionario de Conductas Ambientales, un instrumento con adecuadas propiedades métricas. Para el análisis se utilizó la estadística descriptiva y para determinar si el comportamiento proambiental se asociaba significativamente a las variables sociodemográficas propuestas, se recurrió a la prueba no paramétrica Chi-Cuadrado.
Resultados: se halló que el comportamiento proambiental del 28 % de estudiantes fue ocasional, del 23,7 % fue poco habitual, del 19,5 % fue habitual, del 18,8 % fue no habitual y del 10 % fue muy habitual. Al evaluar las dimensiones también se encontró que reciclaje y la reutilización, el ahorro de recursos y la compra ambiental también fueron valoradas predominantemente en el nivel ocasional. Del mismo modo, se determinó que existía una asociación significativa entre el comportamiento proambiental y el sexo de los estudiantes ($p<0,05$).
Conclusiones: el comportamiento proambiental de los estudiantes del quinto grado de educación secundaria fue valorado como ocasional. Por lo tanto, se recomienda a las autoridades educativas desarrollar programas educativos y campañas de sensibilización para promover la adopción de comportamientos proambientales.

Palabras clave: Comportamiento Ambiental; Reciclaje y Reutilización; Ahorro de Recursos; Compra Ambiental; Desarrollo Sostenible.

INTRODUCTION

In recent years, society has been experiencing disproportionate exploitation of existing natural resources.[1] This phenomenon has triggered severe environmental impacts, including pollution, biodiversity loss, climate change, deforestation, and the greenhouse effect.[2] These impacts not only affect the ecological balance but also threaten human health and the sustainability of ecosystems.

The case of Madre de Dios region (Peru), where this research was carried out, is known for its biological richness; however, it also faces significant challenges, such as illegal mining, deforestation, and inadequate waste management, which threaten its biodiversity and the quality of life of its inhabitants.[3] In the face of these problems, international initiatives have been promoted, such as the 1972 Earth Summit, which emphasized the importance of environmental education to address these problems.[4] In this context, the relevance of understanding and fostering pro-environmental behaviors among students is recognized as a fundamental approach to addressing current environmental challenges.

Pro-environmental behavior involves those deliberate actions that people take to protect, preserve, or reduce negative impacts on the natural environment.[5] This type of behavior encourages environmental conservation and involves concrete actions to reduce the impact that daily activities have on nature.[6] Essentially, it involves a series of actions aimed at sustainability and care for the planet, from daily decisions to lifestyle changes that contribute to the preservation of the natural environment.[7]

Environmental behavior consists of three dimensions, which are recycling and reuse, resource-saving, and environmental purchasing.[8] Recycling and reuse involve the process of valorization of solid waste, aimed at reintegrating it into the economic cycle as raw material for new products, which entails significant economic, ecological, and social benefits. On the other hand, resource-saving refers to the conscious use of available resources, such as electricity and water, avoiding their unnecessary use and striving for efficient management. Finally, environmental purchasing involves the acquisition of products or services whose production has followed processes that minimize pollution and energy consumption, using recycled elements and respecting sustainable practices.

In general, four categories of environmental values are fundamental to understanding pro-environmental behavior: biospheric, altruistic, selfish, and hedonic values.[9] Biospheric values denote a direct concern for the environment and its preservation. Altruistic values, on the other hand, emphasize the importance of the well-being of others and future generations in relation to the natural environment. Selfish values, on the other hand, focus on concern for personal resources and individual benefit. Finally, hedonic values address the pursuit of pleasure and comfort in relation to the environment. These values do not act independently but interact in a complex way, influencing people's decisions and actions in their relationship with the environment.[10]

However, educational institutions are fundamental pillars for fostering the development of pro-environmental behaviors among students.[11] By providing an environment conducive to environmental education, they can positively influence adolescents' perceptions, attitudes, and behaviors toward the environment.[12] Through curriculum-integrated educational programs, conservation projects, and awareness campaigns, students have the opportunity to directly experience environmental concepts and develop practical life skills.[13] Furthermore, by implementing sustainable practices and fostering community collaboration, educational institutions can serve as models of environmentally responsible behavior and motivate students to become agents of change in their environment.[14]

https://doi.org/10.56294/sctconf2024678

The present research is relevant in the current context of the climate crisis. First, students represent a crucial population for understanding and fostering sustainable attitudes and actions that can have a significant impact on the environment in the long term. By understanding current behavior and the influences that shape them, effective educational interventions can be designed to promote environmental responsibility from an early age. Second, Peru, like many other countries, faces significant environmental challenges, from deforestation to water and air pollution. These problems have direct consequences on the health and well-being of the population, as well as on biodiversity and ecosystems. By investigating the pro-environmental behavior of Peruvian students, it will be possible to identify aspects that could be improved and develop strategies to address these problems effectively and sustainably.

Therefore, the objective of this research was to evaluate the pro-environmental behavior of students in the fifth grade of secondary education.

METHODS

The research used a quantitative approach to collect data and detect behavioral patterns in the sample studied. The design was non-experimental since it did not involve the manipulation of the environmental behavior variable; it was only observed in its natural environment. Likewise, it was classified as descriptive and cross-sectional since it explored the characteristics of the study variable at a single time point.[15]

The population consisted of 285 students of both sexes in the fifth grade of secondary education in three educational institutions located in the city of Puerto Maldonado (Peru). The sample consisted of 164 students. It should be noted that this sample size was determined using a probability sampling method, which ensured a confidence level of 95 % and a significance of 5 %, which guarantees the representativeness of the sample and the validity of the results obtained in the study.

Pro-environmental behavior was considered as the study variable, which was categorized into 5 levels: not habitual, not very habitual, occasional, habitual, and very habitual. In addition, the sociodemographic variables included were sex (male and female), age (between 15 and 16 years and between 17 and 18 years), and socioeconomic level (low, medium, and high).

The data collection technique was the survey, while the instrument was the Environmental Behavior Questionnaire.[16] This questionnaire evaluates a series of behaviors and attitudes related to environmental protection and preservation. It is made up of 11 items with 5 response alternatives ranging from 1 (never) to 5 (always) and presents three dimensions: recycling and reuse (4 items), resource-saving (4 items), and environmental purchasing (3 items). Previous research conducted in the Peruvian context[17] determined that the questionnaire had adequate metric properties (Aiken's V= 0,829; α= 0,816).

Data collection was carried out once the pertinent authorizations were obtained from the educational authorities. To ensure the active participation of the students, it was decided to conduct the survey in person at the educational institution. The students were kindly invited to participate and were provided with detailed instructions for completing both instruments. This process lasted approximately 15 minutes.

For the development of the data analysis, SPSS version 25 software was used. In the first phase, the percentage distributions of the variable, dimensions, and study items were calculated. Subsequently, inferential analysis was performed using the nonparametric Chi-Square test (X2). The objective of this analysis was to determine whether there was a significant association between pro-environmental behavior and the proposed sociodemographic variables.

The research was conducted in strict adherence to ethical standards. Informed consent was obtained from the student's parents, who were duly informed about the purpose and procedures of the study, as well as about their children's rights of participation and confidentiality. In addition, the confidentiality of the data was protected by using identification codes instead of personal information. Finally, the principles of the Declaration of Helsinki were respected to ensure the well-being and integrity of the participants.

RESULTS

Table 1 presents the distribution of participants according to some sociodemographic variables. According to the data, 54,3 % were women and 45,7 % were men. Regarding age, 57,3 % were between 15 and 16 years old, while 42,7 % were between 17 and 18 years old. As for socioeconomic level, 56,1 % belonged to the low level, 28,7 % to the medium level, and 15,2 % to the high level.

Figure 1 shows the distribution of percentages of the variable pro-environmental behavior and the dimensions of recycling, saving resources, and environmental purchasing. The pro-environmental behavior of 28 % of students was occasional, 23,7 % was unusual, 19,5 % was usual, 18,8 % was unusual, and 10 % was very usual. Regarding recycling and reuse, 30,9 % of the students rated it as occasional, 22,3 % at an unusual level, 18,4 % at a usual level, 16,8 % at an unusual level, and 11,6 % at a very usual level. Regarding resource-saving, 25 % of students rated it as occasional, 23,5 % at an unusual level, 22,4 % at a usual level, 18,8 % at an unusual level, and 10,4 % at a very usual level. With regard to environmental purchasing, 28,3 % of the students engaged in this practice occasionally, 26 % rarely, 21,5 % not usually, 16,9 % usually, and 7,3 % very often.

https://doi.org/10.56294/sctconf2024678

Table 1. Sociodemographic characteristics of the sample			
Variables	**Sociodemographic characteristics**	**n= 164**	**%**
Sex	Male	75	45,7
	Female	89	54,3
Age	Between 15 and 16 years old	94	57,3
	Between 17 and 18 years old	70	42,7
Socioeconomic level	Low	92	56,1
	Medium	47	28,7
	High	25	15,2

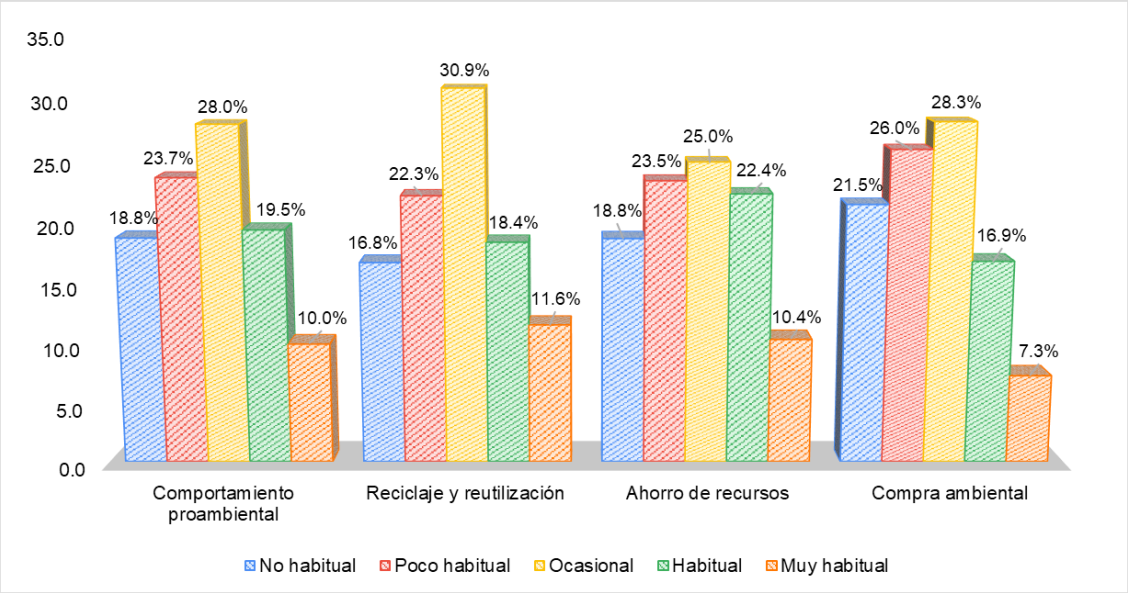

Figure 1. Distribution of percentages of the pro-environmental behavior variable and its dimensions
Source: Surveys.

According to the results in table 2, a significant association was found between pro-environmental behavior and students' sex (p<0,05). The data revealed that females showed a greater tendency towards habitual pro-environmental behaviors compared to males.

Table 2. Association between depression and sociodemographic and academic variables.							
Variables		**Pro-environmental performance**					**P-value**
		NH	**PH**	**O**	**H**	**MH**	
Sex	Male	15 (20,0 %)	22 (29,3 %)	22 (29,3 %)	11 (14,7 %)	5 (6,7 %)	p<0,05
	Female	16 (18,0 %)	17 (19,1 %)	24 (27,0 %)	21 (23,6 %)	11 (12,4 %)	
Age	Between 15 and 16 years old	14 (14,9 %)	24 (25,5 %)	27 (28,7 %)	20 (21,3 %)	9 (9,6 %)	p>0,05
	Between 17 and 18 years old	17 (24,3 %)	15 (21,4 %)	19 (27,1 %)	12 (17,1 %)	7 (10,0 %)	
Socioeconomic level	Low	17 (18,5 %)	21 (22,8 %)	27 (29,3 %)	18 (19,6 %)	9 (9,8 %)	p>0,05
	Medium	10 (21,3 %)	12 (25,5 %)	11 (23,4 %)	9 (19,1 %)	5 (10,6 %)	
	High	4 (16,0 %)	6 (24,0 %)	8 (32,0 %)	5 (20,0 %)	2 (8,0 %)	

Note: NH=Not usual; PH=Hardly usual; O=Occasional; H=Habitual; MH=Most usual.
Source: Surveys.

Table 3 shows that checking food to prevent it from spoiling without being consumed and carrying reusable bags when shopping were the two most recurrent activities associated with recycling and reuse among students.

https://doi.org/10.56294/sctconf2024678

Table 3. Distribution of percentages of activities associated with recycling and reuse

Items	Never	Almost never	Sometimes	Almost always	Always
1. I recycle newspapers.	26,8 %	27,4 %	23,8 %	13,4 %	8,5 %
2. I carry my own bags when I go shopping.	12,8 %	22,0 %	32,3 %	21,3 %	11,6 %
3. I check the food to avoid expiring without consuming it.	11,6 %	17,1 %	26,8 %	27,4 %	17,1 %
4. I sort the garbage before disposal.	15,9 %	22,6 %	40,9 %	11,6 %	9,1 %

Source: Surveys.

According to the data in table 4, turning off equipment and lights when leaving home and avoiding unnecessarily charging cell phones were two actions associated with saving resources that students carried out most frequently.

Table 4. Percentage distribution of activities associated with resource savings

Items	Never	Almost never	Sometimes	Almost always	Always
5. I use a glass when I brush my teeth to save water.	32,9 %	37,2 %	16,5 %	7,3 %	6,1 %
6. I avoid unnecessarily charging my cell phone.	10,4 %	17,7 %	31,1 %	22,6 %	18,3 %
7. I print on the other side of already used sheets.	20,1 %	24,4 %	28,7 %	23,8 %	3,0 %
8. I turn off equipment and lights when I leave the house.	11,6 %	14,6 %	23,8 %	36,0 %	14,0 %

Source: Surveys.

Table 5 shows that the most recurrent activities associated with environmental purchasing among students were buying products with reusable packaging and acquiring products made or packaged with recycled materials.

Table 5. Percentage distribution of activities associated with environmental purchasing

Items	Never	Almost never	Sometimes	Almost always	Always
9. I read labels to verify that the contents are environmentally safe.	29,9	33,5	22,6	9,1	4,9
10. I buy products made or packaged with recycled materials.	23,2	27,4	29,9	17,7	1,8
11. I buy products with packaging that can be reused.	11,6	17,1	32,3	23,8	15,2

Source: Surveys.

DISCUSSION

Environmental behavior is a fundamental part of contemporary education, which seeks to instill in students an active awareness of the importance of preserving and protecting the environment. In a global context where environmental challenges are increasingly evident, educational institutions play a crucial role in promoting sustainable practices and in the formation of responsible citizens. Therefore, the present research focused on evaluating the pro-environmental behavior of students in the fifth grade of secondary education.

A relevant finding shows that the pro-environmental behavior of 28 % of students was occasional, 23,7 % was unusual, 19,5 % was usual, 18,8 % was unusual, and 10 % was very usual. As can be seen, approximately a quarter of the students showed occasional pro-environmental behavior, suggesting that they perform pro-environmental actions from time to time. On the other hand, slightly less than a quarter showed unusual behaviors, which could indicate a lack of environmental commitment or awareness. Those with habitual behaviors accounted for almost one-fifth, suggesting a steady trend toward pro-environmental practices. The smallest group consists of those whose pro-environmental behavior is very habitual, which could indicate a strong commitment and high environmental awareness.

Similar results were obtained in research conducted by Nanos et al.[18], who reported that most students were affective towards the environment. However, there is a need for more solidified environmental education and motivation from social opportunities outside school, such as in family socialization contexts. Similarly, it is related to the results of research conducted by Estrada et al.[19], who found that the pro-environmental behavior of 42 % of the students was unusual, 34,5 % was usual, and 23,5 % was unusual. When analyzing the dimensions of recycling and reuse, resource-saving, and environmental purchasing, it was observed that all of them were also rated as unusual.

Pro-environmental behavior is a complex phenomenon that is influenced by a variety of factors. In this

regard, several theories have been proposed to understand and predict this type of behavior. The theory of planned behavior and the value-belief-norm theory are two essential approaches in this field.[20] According to the theory of planned behavior, intention plays a crucial role in determining pro-environmental behavior.[21] This intention can be predicted from attitudes toward the behavior, subjective norms, and perceived behavioral control. On the other hand, the value-belief-norm theory postulates that values influence pro-environmental behavior through pro-environmental beliefs and personal norms.[22] In short, people adopt pro-environmental behaviors because they believe in the implications of environmental problems for themselves, for other people, and for nature.

Another interesting finding reveals that women tend to adopt pro-environmental behavior more regularly than men. Similar results were obtained in some research.[19,23,24] This gender discrepancy in pro-environmental behaviors has been the subject of debate and study. On the one hand, some men may have ingrained biases that link environmental concerns and care exclusively to women.[25] On the other hand, it is pointed out that cultural differences in socialization, roles, and personality traits between men and women may influence these disparities. In that sense, it is stated that women, due to their socialization, tend to develop greater emotional empathy, care for others, social and environmental responsibility, as well as a more ingrained sense of altruism compared to men.[26]

Students represent not only the present but also the future of our planet, and their current behaviors have a significant impact on the long-term health of the environment.[27] It is essential that both at home and in the educational environment, a culture of respect and responsibility towards the environment is promoted, where the importance of recycling, conservation of resources, and reduction of consumption is taught.[28] In addition, it is crucial to provide them with the necessary tools so that they can make informed decisions and act as agents of change in protecting the natural environment.[29] By cultivating environmental awareness from a young age, we can work towards a more sustainable and equitable future for generations to come.[30]

It is important to note that the present study has certain limitations that should be considered when interpreting its results. The sample used was homogeneous, which could affect the representativeness of the findings. In addition, the use of a self-administered instrument to collect data could lead to social desirability biases. For future research, multicenter studies covering educational institutions of different types (public and private) and contexts (urban and rural) should be conducted to ensure a more diverse and representative sample. Likewise, it would be beneficial to complement quantitative data collection with qualitative methods to obtain a more complete and in-depth understanding of the study variable.

CONCLUSIONS

Based on the results, the pro-environmental behavior of students in the fifth grade of secondary education was valued as occasional. This indicates that actions and practices related to environmental protection and preservation were performed sporadically by these students. The actions that students performed most frequently were checking food to prevent it from spoiling without consuming it, turning off equipment and lights when leaving home, and buying products with reusable containers. On the other hand, it was determined that women showed a greater tendency towards habitual pro-environmental behaviors than men.

In view of the above, it is suggested that educational authorities implement educational strategies aimed at promoting greater environmental awareness and sustainable commitment. These strategies could include awareness programs on the importance of consistent pro-environmental practices on a daily basis, as well as practical activities that encourage the active participation of students in the protection and preservation of the environment. In addition, consideration could be given to integrating environmental issues into the school curriculum in a cross-cutting manner so that students acquire knowledge and skills related to sustainability from an early age.

REFERENCES

1. Richardson M, Hamlin I, Elliott L, White M. Country-level factors in a failing relationship with nature: Nature connectedness as a key metric for a sustainable future. Ambio. 2022;51(11):2201–2213. https://doi.org/10.1007/s13280-022-01744-w

2. Shivanna K. Climate change and its impact on biodiversity and human welfare. Proc Indian Natn Sci Acad Part A Phys Sci. 2022;88(2):160-171. https://doi.org/10.1007/s43538-022-00073-6

3. Brack A, Ipenza C, Álvarez J, Sotero V. Minería Aurífera en Madre de Dios y Contaminación con Mercurio – Una Bomba de Tiempo. Lima: Ministerio del Ambiente; 2011.

4. Márquez D, Hernández A, Márquez L, Casas M. La educación ambiental: evolución conceptual y metodológica hacia los objetivos del desarrollo sostenible. Rev. Univ. Soc. 2021;13(2):301-310.

5. Cortes F, Cabana R, Vega D, Aguirre H, Muñoz R. Variables influyentes en la conducta ambiental en alumnos de unidades educativas, región de Coquimbo-Chile. Estud. Pedagog. (Valdivia). 2017;43(2):27-46. https://doi.org/10.4067/S0718-07052017000200002

6. Rincón F. Análisis de la aplicación de la teoría cognitiva de Jerome Bruner como mecanismo para fortalecer la conducta ambiental en los estudiantes del grado segundo de la institución educativa Chuniza. Rev. Tecnol. Educ. Docentes 2.0. 2020;9(1):132-141. https://doi.org/10.37843/rted.v9i1.110

7. Yusliza M, Amirudin A, Rahadi R, Nik N, Ramayah T, Muhammad Z, et al. an investigation of pro-environmental behaviour and sustainable development in Malaysia. Sustainability. 2020;12:7083. https://doi.org/10.3390/su12177083

8. Amérigo M, Aragonés J, García J. Explorando las dimensiones de la preocupación ambiental. Una propuesta integradora. PsyEcology. 2012;3(3):299-311. https://doi.org/10.1174/217119712802845705

9. Steg L, Perlaviciute G, Van der Werff E, Lurvink J. The significance of hedonic values for environmentally relevant attitudes, preferences, and actions. Environ. Behav. 2014;46(2):163-192. https://doi.org/10.1177/0013916512454730

10. Lönnqvist J, Leikas S, Paunonen S, Nissinen V, Verkasalo M. Conformism moderates the relations between values, anticipated regret, and behavior. Pers Soc Psychol Bull. 2006;32(11):1469-81. https://doi.org/10.1177/0146167206291672

11. Torres B, Amérigo M, García JA. Evaluación de una intervención proambiental en escolares de educación primaria (10-13 años) de Castilla-La Mancha (España). Rev. Electr. Educare. 2021;25(3):186-201. https://dx.doi.org/10.15359/ree.25-3.11

12. Ardoin N, Bowers A, Gaillard E. Environmental education outcomes for conservation: A systematic review. Biol Conserv. 2020;241:108224. https://doi.org/10.1016/j.biocon.2019.108224

13. Estrada E, Mamani H, Huaypar K. Eficacia del programa Cuidemos el ambiente en el desarrollo de la conciencia ambiental de estudiantes de educación primaria en Madre de Dios, Perú. CA. 2020;8(1):85-98. https://doi.org/10.22386/ca.v8i1.282

14. Holst J. Towards coherence on sustainability in education: a systematic review of Whole Institution Approaches. Sustain Sci. 2023;18:1015-1030. https://doi.org/10.1007/s11625-022-01226-8

15. Hernández R, Mendoza C. Metodología de la investigación: las rutas cuantitativa, cualitativa y mixta. México: McGraw-Hill; 2018.

16. Álvarez A, López D, Chafloque R. Conducta ambiental en estudiantes universitarios de Perú. Lima: Universidad de San Martín de Porres; 2018.

17. Estrada E, Huaypar K, Gallegos N. Conductas ambientales en estudiantes de la Universidad Nacional Amazónica de Madre de Dios, Perú. CA. 2020;8(2):253-264. https://doi.org/10.22386/ca.v8i2.301

18. Ntanos S, Kyriakopoulos G, Arabatzis G, Palios V, Chalikias M. Environmental behavior of secondary education students: A case study at central Greece. Sustainability. 2018;10:1663. https://doi.org/10.3390/su10051663

19. Estrada E, Gallegos N, Paredes Y, Quispe R, Mori J. Examining the relationship between environmental education and pro-environmental behavior in regular basic education students: A cross-sectional study. Soc Sci. 2023;12:307. https://doi.org/10.3390/socsci12050307

20. Ahmat N, Abd-Rahman N, Halim L, Chan M, Mohd N. Measuring pro-environmental behavior triggered by environmental values. Int J Environ Res Public Health. 2022;19(23):16013. https://doi.org/10.3390/ijerph192316013

21. Ajzen I. Attitudes, personality and behavior. Mapping social psychology. New York: Open University Press;

2005.

22. Auza-Santivañez JC, Lopez-Quispe AG, Carías A, Huanca BA, Remón AS, Condo-Gutierrez AR, et al. Work of the emergency system in polytraumatized patients transferred to the hospital. AG Multidisciplinar 2023;1:9-9. https://doi.org/10.62486/agmu20239.

23. Cabrera-Aguilar E, Zevallos-Francia M, Morales-García M, Ramírez-Coronel AA, Morales-García SB, Sairitupa-Sanchez LZ, et al. Resilience and stress as predictors of work engagement: the mediating role of self-efficacy in nurses. Frontiers in Psychiatry 2023;14. https://doi.org/10.3389/fpsyt.2023.1202048.

24. Cayupe JC, Bernedo-Moreira DH, Morales-García WC, Alcaraz FL, Peña KBC, Saintila J, et al. Self-efficacy, organizational commitment, workload as predictors of life satisfaction in elementary school teachers: the mediating role of job satisfaction. Frontiers in Psychology 2023;14. https://doi.org/10.3389/fpsyg.2023.1066321.

25. Chura S, Saintila J, Mamani R, Ruiz Mamani PG, Morales-García WC. Predictors of Depression in Nurses During COVID-19 Health Emergency; the Mediating Role of Resilience: A Cross-Sectional Study. Journal of Primary Care and Community Health 2022;13. https://doi.org/10.1177/21501319221097075.

26. Cuervo MED. Exclusive breastfeeding. Factors that influence its abandonment. AG Multidisciplinar 2023;1:6-6. https://doi.org/10.62486/agmu20236.

27. Dilas D, Flores R, Morales-García WC, Calizaya-Milla YE, Morales-García M, Sairitupa-Sanchez L, et al. Social Support, Quality of Care, and Patient Adherence to Tuberculosis Treatment in Peru: The Mediating Role of Nurse Health Education. Patient Preference and Adherence 2023;17:175-86. https://doi.org/10.2147/PPA.S391930.

28. Figueredo-Rigores A, Blanco-Romero L, Llevat-Romero D. Systemic view of periodontal diseases. AG Odontologia 2023;1:14-14. https://doi.org/10.62486/agodonto202314.

29. Gonzalez-Argote J, Castillo-González W. Update on the use of gamified educational resources in the development of cognitive skills. AG Salud 2024;2:41-41. https://doi.org/10.62486/agsalud202441.

30. Huaman N, Morales-García WC, Castillo-Blanco R, Saintila J, Huancahuire-Vega S, Morales-García SB, et al. An Explanatory Model of Work-family Conflict and Resilience as Predictors of Job Satisfaction in Nurses: The Mediating Role of Work Engagement and Communication Skills. Journal of Primary Care and Community Health 2023;14. https://doi.org/10.1177/21501319231151380.

31. Huancahuire-Vega S, Newball-Noriega EE, Rojas-Humpire R, Saintila J, Rodriguez-Vásquez M, Ruiz-Mamani PG, et al. Changes in Eating Habits and Lifestyles in a Peruvian Population during Social Isolation for the COVID-19 Pandemic. Journal of Nutrition and Metabolism 2021;2021. https://doi.org/10.1155/2021/4119620.

32. Huirse SAH, Panique JCA. Relationship Marketing and customer loyalty in the company Saga Falabella S.A. Cusco. SCT Proceedings in Interdisciplinary Insights and Innovations 2024;2:206-206. https://doi.org/10.56294/piii2024206.

33. Ledesma-Céspedes N, Leyva-Samue L, Barrios-Ledesma L. Use of radiographs in endodontic treatments in pregnant women. AG Odontologia 2023;1:3-3. https://doi.org/10.62486/agodonto20233.

34. Marquez NM, Saintila J, Castellanos-Vazquez AJ, Dávila-Villavicencio R, Turpo-Chaparro J, Sánchez-Tarrillo JA, et al. Telehealth-based interventions on lifestyle, body mass index, and glucose concentration in university staff during the coronavirus disease 2019 pandemic: A pre-experimental study. Digital Health 2022;8. https://doi.org/10.1177/20552076221129719.

35. Millán YA, Montano-Silva RM, Ruiz-Salazar R. Epidemiology of oral cancer. AG Odontologia 2023;1:17-17. https://doi.org/10.62486/agodonto202317.

36. Morales-García WC, Huancahuire-Vega S, Saintila J, Morales-García M, Fernández-Molocho L, Ruiz Mamani PG. Predictors of Intention to Vaccinate Against COVID-19 in a Peruvian Sample. Journal of Primary Care and

Community Health 2022;13. https://doi.org/10.1177/21501319221092254.

37. Olguín-Martínez CM, Rivera RIB, Perez RLR, Guzmán JRV, Romero-Carazas R, Suárez NR, et al. Rescue of the historical-cultural heritage of the Yanesha: interculturality and inclusive education of the oral traditions. AG Multidisciplinar 2023;1:5-5. https://doi.org/10.62486/agmu20235.

38. Otero DL, Licourt MT. Clinical and genetic characterization of Duchenne Muscular Dystrophy. SCT Proceedings in Interdisciplinary Insights and Innovations 2024;2:221-221. https://doi.org/10.56294/piii2024221.

39. Plaza-Ccuno JNR, Puri CV, Calizaya-Milla YE, Morales-García WC, Huancahuire-Vega S, Soriano-Moreno AN, et al. Physical Inactivity is Associated with Job Burnout in Health Professionals During the COVID-19 Pandemic. Risk Management and Healthcare Policy 2023;16:725-33. https://doi.org/10.2147/RMHP.S393311.

40. Quiroz FJR, Gamarra NH. Psychometric evidence of the mobile dependence test in the young population of Lima in the context of the pandemic. AG Salud 2024;2:40-40. https://doi.org/10.62486/agsalud202440.

41. Ríos-Quispe CF. Analysis of ABC Cost Systems. AG Managment 2023;1:12-12. https://doi.org/10.62486/agma202312.

42. Saavedra MOR. Revaluation of Property, Plant and Equipment under the criteria of IAS 16: Property, Plant and Equipment. AG Managment 2023;1:11-11. https://doi.org/10.62486/agma202311.

43. Solano AVC, Arboleda LDC, García CCC, Dominguez CDC. Benefits of artificial intelligence in companies. AG Managment 2023;1:17-17. https://doi.org/10.62486/agma202317.

44. Soto CEH, Lizarme EAV. Administrative management and user satisfaction of tele-consultation in a FEBAN polyclinic in Lima. SCT Proceedings in Interdisciplinary Insights and Innovations 2024;2:217-217. https://doi.org/10.56294/piii2024217.

45. Trovat V, Ochoa M, Hernández-Runque E, Gómez R, Jiménez M, Correia P. Quality of work life in workers with disabilities in manufacturing and service companies. AG Salud 2024;2:43-43. https://doi.org/10.62486/agsalud202443.

46. Stern P. New environmental theories: toward a coherent theory of environmentally significant behavior. J Soc Issues. 2000;56(3):407-424. https://doi.org/10.1111/0022-4537.00175

47. Manjunatha B. A study on environmental behaviour of adolescent students. IJRTI. 2022;7(12):938-942.

48. Hidalgo J, Benítez F, Amaya J, Soto M, Terán-Alvarado F, Hidalgo A. Does gender influence a person´s environmental concern and pro-environmental behaviours? In: 20th LACCEI International Multi-Conference for Engineering, Education and Technology: "Education, Research and Leadership in Post-pandemic Engineering: Resilient, Inclusive and Sustainable Actions". Latin American and Caribbean Consortium of Engineering Institutions; July 2022. http://dx.doi.org/10.18687/LACCEI2022.1.1.673

49. Mamani H, Estrada E, Gallegos N, Huaypar K. Actitudes hacia la conservación ambiental en adolescentes de educación secundaria en Madre de Dios, Perú. CA. 2020;8(1):99-110. https://doi.org/10.22386/ca.v8i1.283

50. Casaló L, Escario J. Heterogeneity in the association between environmental attitudes and pro-environmental behavior: A multilevel regression approach. J Clean Prod. 2018;175:155–163. https://doi.org/10.1016/j.jclepro.2017.11.237

51. Gu Z, Li P, Zhang A, Xu X, Gu F. The role of mental health and sustainable learning behavior of students in education sector influences sustainable environment. Front Psychol. 2022;13:822751. https://doi.org/10.3389%2Ffpsyg.2022.822751

52. Yli E, Jeronen E, Mäki S. School culture promoting sustainability in student teachers' views. Sustainability. 2022;14:7440. https://doi.org/10.3390/su14127440

53. Estrada E, Quispe J, Ttito S, Salas E, Cahuascanco E, Rivera F. From theory to practice: A study on

sustainable consumption practices among university students in a region of Peru. J. of Law and Sust. Develop. 2023;11(4):e561. https://doi.org/10.55908/sdgs.v11i4.561

54. Chang E, Sjöberg S, Turunen P, Rambaree K. Youth empowerment for sustainable development: Exploring ecosocial work discourses. Sustainability. 2022;14:3426. https://doi.org/10.3390/su14063426

FINANCING

The authors did not receive funding for the development of this research.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

Conceptualization: Edwin Gustavo Estrada-Araoz, Néstor Antonio Gallegos-Ramos.
Data curation: Yesenia Veronica Veronica Manrique-Jaramillo, Néstor Antonio Gallegos-Ramos.
Formal analysis: Edwin Gustavo Estrada-Araoz, Víctor Hugo Díaz-Pereira.
Acquisition of funds: Yesenia Veronica Manrique-Jaramillo.
Research: Edwin Gustavo Estrada-Araoz, Jenny Marleny Rucoba-Frisancho.
Methodology: Edwin Gustavo Estrada-Araoz, Jenny Marleny Rucoba-Frisancho.
Project administration: Víctor Hugo Díaz-Pereira, Néstor Antonio Gallegos-Ramos.
Resources: Yesenia Veronica Manrique-Jaramillo, Jenny Marleny Rucoba-Frisancho.
Software: Yesenia Veronica Manrique-Jaramillo, Jenny Marleny Rucoba-Frisancho.
Supervision: Edwin Gustavo Estrada-Araoz, Víctor Hugo Díaz-Pereira.
Validation: Edwin Gustavo Estrada-Araoz, Víctor Hugo Díaz-Pereira.
Visualization: Yesenia Veronica Manrique-Jaramillo, Néstor Antonio Gallegos-Ramos.
Editing - original draft: Edwin Gustavo Estrada-Araoz.
Writing - proofreading and editing: Edwin Gustavo Estrada-Araoz.