CHAPTER 122

Environmental concern and environmental training in university students

10.56238/pacfdnsv1-122

Edith Meryluz Claros Guerrero
https://orcid.org/0000-0002-2765-953X
E-mail: meryluzclaros@gmail.com

ABSTRACT
The research is based on the environmentalization doctoral thesis of the José Faustino Sánchez Carrión National University, which evaluates the environmental dimension from a comprehensive point of view, addressing the problem of the perception that university students have of their professional training in environmental matters (plan curriculum, teaching methodology, content) regardless of their professional training in relation to the self-assessment of their pro-environmentalist attitudes (environmental concern). Through stratified probabilistic sampling, the size of the sample of each professional career intentionally selected to meet the objective of the investigation was determined. A questionnaire based on Melania Coya's proposal was applied to students from III to V Semester, from 10 professional schools, who valued their training in environmental matters, and the scale of environmental concern. The students surveyed obtained an environmental concern score of 44.02 points out of 65, qualifying in the medium grade, with a regular level of training in environmental matters. There is no significant correlation between environmental training and environmental concern, except for professional careers with a professional profile related to environmental issues, concluding that the environmental concern of students is influenced by the cultural and social environment.

Keywords: Environmental training, environmental concern, methodology, professional profile.

1 INTRODUCTION

The environmental problem, in itself , is a very complex issue to address, and it has become even more accentuated in recent decades, showing a considerable increase in consequences in different factors, such as the physical, biotic and social factors, which are affecting the activities and that despite the actions carried out at a global level to raise awareness of care and respect for the environment, through the issuance of pro-environmental regulations that seek environmental sustainability, it still seems that the model of social development and economic, apparently it is not managing to fully achieve the natural balance and the well-being of the ecosystems, therefore, it is necessary that the idea of sustainability is immersed and forms part of the culture of the human being, an alternative is to encourage environmental education , formal and informal, through the interaction of the various actors that make up society, including citizens, organizational groups zed by society, government, business and above all educational institutions, especially higher education institutions, to correct and mitigate the effects of the environmental crisis. Another concept immersed in environmental problems is sustainability, and as mentioned, (García, D & Priotto, 2009)this implies assuming the responsibility of improving the current living conditions of all people, other forms of life and natural systems.

The higher university institution, an area in which professionals with diverse occupational profiles are trained, who must be aware of the social and environmental reality and be active participants in the

transformation of society with environmental responsibility, as mentioned by Mora (2012)who considers that Including the environmental dimension in Higher Education is imperative, and this must be done through the application of models focused on sustainable development. For its part, (Silva, 2007)it considers that by including the environmental dimension in the educational system, it should lead to new forms of relationship between human beings and nature, between them and with the rest of society, this will lead to the formation of environmental awareness as an immediate need in the preparation of future university graduates . Noguera(2007).

According to Cárdenas (2013a), university environmental responsibility is the action of the university put into practice in principles and values that contributes to the training of professionals and citizens with awareness, commitment and proactive participation in solving environmental problems, through the exercise of its substantive functions of training, research, extension and management, the author also considers that this institution must incorporate the environmental dimension into its institutional, educational and labor project

If we analyze the national regulations, in art. 127° of the national environmental education policy of our country, mentions that: "environmental education becomes an integral educational process that occurs throughout the life of the individual, which seeks to generate in him the knowledge, attitudes, values and practices , necessary to develop their activities in an environmentally appropriate manner, with a view to contributing to the sustainable development of the country", in this sense, Peru through the Ministry of the Environment (MINAM) through the Interuniversity Environmental Network – Interuniversia Peru (RAI Peru), has a process started in 2012 (Cárdenas, 2018c) ; and is consistent with the provisions of the Bicentennial Plan – Peru by 2021

An optimal environmental education with environmentally responsible values and attitudes would be to consider the environmental dimension as part of professional training, adapting the university curriculum that influences a change in behavior of the entire university community, internalizing respect for the environment and natural resources. .

According to the University Law (Ley N°30220, 2014): "The university is an academic community oriented towards research and teaching, which provides humanistic, scientific and technological training with a clear awareness of our country as a multicultural reality." And among its purposes, among others, is to "promote human and sustainable development, serve the community and seek comprehensive development",

This document is based on the Environmentalization doctoral thesis of the José Faustino Sánchez Carrión National University (Claros, 2020)where a diagnosis of the environmentalization conditions in which the educational institution is located was made, being the reason for analysis the degree of environmental concern of the University student that allows to know the student's perception of environmental problems, and the level of training in environmental matters that, according to the student's

perception, they have been receiving as part of their professional training, regardless of their professional profile.

2 METHODOLOGICAL STRATEGIES OR MATERIALS AND METHODS

The research design had a quantitative, correlational cross-sectional approach, the population was composed of students enrolled in Semester 2019 - I, distributed in 13 Faculties with 34 Professional Careers, some related to environmental issues, and others that "are not related", to make a difference, the curricular plan of professional careers is analyzed, which according to regulations of the institution, is divided into three curricular areas: Area of general studies or basic training, area of specific studies or basic professional training and the area of specialty or specialized professional training, being the basic training, where competence in science is identified, technology and relationship with the physical environment, being studied in the first four cycles.

Based on the recommendations of Fox (1987, 2nd: 373) cited by (Coya, 2001)mentioning that in order to deliberately achieve representativeness of the sample, three conditions must be met: a) knowing the characteristics (variables) that are related to the problem being studied; b) have the ability to measure those characteristics; c) have population data on the characteristics to use as a basis for comparison and non-compliance with one of these conditions should justify the use of another type of method, the university population is restricted to cycles from III to VI Cycle, discarding the first cycles assuming that they do not have enough information to judge professional training and higher cycle students, to achieve homogeneity, since not all study in a competency-based plan, only one professional career is chosen from those that have related curricular plans. The population remains at 3183 students, distributed in 10 professional careers. Through non-probabilistic sampling, with conditioned criteria, the exclusions required by the research were made, surveying 278 students.

A questionnaire adapted to the reality and characteristics of the region was applied to the students surveyed, in order to know the environmental training, and for the degree of environmental concern, the Scale of Environmental Concern was used, proposed by Coya (2001), taking as base the Environmental concern Scale (Environmental Concern Scale, EPA) designed by Weigel and Weigel (1978), adapted by Holahan (1991) or Amerigo and Gonzales (1996). Four dimensions were identified for the evaluation of environmental concern: Non-personal control over the environment, which evaluates whether the student assumes control of pollution and presents the solution, Personal effort for the conservation of the environment, if the student is willing to assume some personal cost, pollution prevention and control, the student expects the authorities to provide solutions or propose alternative solutions, and irresponsible attitude towards pollution is evaluated if the student values the real importance of pollution and takes responsibility of their actions. In the documentary analysis, the review of the curricular plans was made, observing the number of courses by thematic areas, registered on the institution's website.

3 RESULTS AND DISCUSSION

For a sample of 278 students, with an average age of 20 years, made up of students from careers not related to the environmental area: Statistics and Computer Science (4%), Economics and Finance (15.1%), Chemical Engineering (10.1%) , Electronic Engineering (10.8%), Sociology (9%), Nursing (10.1%), while the Schools related to environmental matters are Zootechnical Engineering (7.9%), Biology with a mention in Biotechnology (6.1%), Engineering Environmental (14.4%), Agricultural Engineering (12.6%).

Descriptive Analysis: Environmental Concern: Of the 5 items with negative attitudes, 8 with positive attitudes, of the Environmental Concern Scale, distributed in four dimensions that evaluate the attitudes of the students, obtaining a range of 13 - 65 and a potential average of 44 .02, is located in the medium degree of environmental concern.

Table 1: Dimensions of the Environmental Concern Scale

EPA Dimensions	potential range	potential average	conclusion
Non-personal control over the environment	03-15	8,953	Medium (-)
Personal effort for the conservation of the environment	04-20	14,809	High (+)
Pollution prevention and control	04-20	15,845	High (+)
irresponsible attitude towards pollution	02-10	4,414	Bass (-)

Note: (-) Unfavorable attitude (+) Favorable attitude

If we analyze the results by Career or Professional School, it is obtained that Environmental Engineering has positive results and is explained by its professional profile, according to the dimensions considered in the research , while Schools with little or no training in environmental matters have low potential averages. .

In relation to Environmental Training; In the opinion of the students surveyed at the José Faustino Sánchez Carrión National University, for 65.47% it is Regular, 19.06% consider it Good and 15.47% have not had any training in environmental matters, specifically environmental training is being valued in The theoretical content, the highest percentage consider that in the courses they have taken, they partially encourage the rescue of values, national identity, and content with environmental themes.

Regarding the Curriculum Plan, based on the documentary information, the schools have courses with content on environmental issues as part of their curricular plan from more to less: Environmental Engineering, Agronomic Engineering, Biology with a mention in Biotechnology, and Zootechnical Engineering; and the schools that do not have courses with environmental themes are: Electronic Engineering, Chemical Engineering, Statistics and Computer Science, Economics and Finance; Coinciding with what is obtained by (Venegas & Quijano, 2017)those who conclude Administration and accounting, they do not contain subjects related to the environment, meanwhile in the Nursing school their thematic contents are related to the humanistic aspect.

Regarding the Quality of Environmental Training received, the students who have a favorable Opinion are those from the School of Environmental Engineering; for those of Zootechnical Engineering, Nursing, Biology with a mention in Biotechnology, Statistics and Computer Science, they consider that the training will allow them to know, understand, face and act on environmental issues in more than 50% of the cases. Where there is some negativity in this aspect, it is in the students of Sociology, Economics and Finance (larger number) and Chemical Engineering in a lower percentage.

In relation to the teaching methodology referring to environmental issues: The students of Environmental Engineering, Agronomic Engineering, Zootechnical Engineering and Biology with a mention in Biotechnology, consider that teachers have developed environmental issues in greater proportion within the contents and methodology; in Economics and Finance, consider that teachers do not develop anything related to environmental issues as part of the methodology of the courses, a result that coincides with what was obtained by (Padilla, 2016), who in his research found that the training of teachers is still incipient, which that contrasts with the student attitude that is positive.

Correlational analysis: To determine if the degree of environmental concern is related to the environmental training of the students of the Institution, in the exploratory data analysis, to determine if the sample fits a normal distribution, we use Kolgomorov - Smirnov (lilliefors significance correction), is obtained for environmental formation with a value of 0.070 and $p=0.002<0.05$, rejecting the null hypothesis, concluding that there is no normality in the data; and for the environmental concern variable with a value of 0.062 and $p=0.011<0.05$, it is concluded that the data are not normal. Considering that they are ordinal and non-parametric data in both variables, we use the Spearman's rho correlation coefficient, and for $r = 0.081$ with $p=0.179>0.05$, it is concluded that there is no significant correlation between the variables.

When asked: If the level of environmental training that you are receiving from the University correlates with the extent that students consider the importance of the environment, $r=0.109$ and $p=0.071>0.05$ are obtained, which indicates that despite the fact that if it is necessary to have professional training in environmental issues as a basis, to know, interpret, and promote actions in favor of the environment, this does not imply that the importance of the environment is not considered and valued (62.59%) , and similarly for each school.

- In relation to the correlation of the dimensions of environmental concern:

Non-personal control over the environment is significantly correlated with the personal effort that the student is willing to make for the conservation of the environment ($r=0.135^*$, $p=0.025<0.05$); At the same time, it correlates significantly with the irresponsible attitude towards pollution, directly ($r=.435^{**}$ $p=.000<0.01$) (both negative attitudes).

It is also observed that the student is aware that he has to be an active part to stop pollution and seek environmental protection, which is statistically demonstrated ($r=.571^{**}$; $p=.0000<0.01$) that there is a high

correlation of the personal effort for the conservation of the environment and to achieve the prevention and control of contamination, with a direct and positive relationship.

It is obtained that there is a significant correlation between the prevention and control of pollution with an irresponsible attitude towards pollution (r=-.350; p=.000<0.01), whose relationship is indirect, that is to say that while the irresponsible attitude decreases , the search for pollution prevention and control will increase.

- In relation to the correlation of the dimensions of Environmental Training:

Regarding the humanistic and pro-environmentalist training in the contents of the courses, it correlates directly and positively with the number of courses in the curricular plan (r=, 415, p=.000<.01), which implies that the greater the number of courses with environmental themes, the greater the humanistic training; and at the same time, it correlates significantly with the quality of environmental training (r=.302; p=.000<.01), and with the methodology used by the teacher in the development of content (r=.411**; p=.000<.01).

The number of courses that are part of the environmental curriculum is significantly correlated (r=.547**, p=.000<.01) with the quality of training in environmental issues, and with the teaching methodology (with a curricular plan with more courses related to environmental issues (r=, 632**, p=.000<.01), and for its part, the quality of university education is significantly correlated with the methodology used by the teacher in the matter. environmental (r=, 507**, p=.000<.01).

- Correlation between the dimensions of environmental concern and dimensions of environmental training:

A high significant correlation is observed between humanistic and pro-environmental training in the contents of the courses, with non-personal control over the environment, directly and positively (r=.192, p=.001<0.01), and with the methodology that the teacher uses in the classroom in environmental matters (r=.150; p=.012<.05); which implies that while training in ethical values, critical analysis of reality is encouraged, and methodologies that include the environmental dimension in their teaching with practical examples are used by the teacher, students will have a greater incentive to actively participate with sense of responsibility and adopt positions that lead to pollution control and environmental conservation.

The quality of university education on environmental issues is correlated with the personal effort that the student manifests, is willing to make for the conservation of the environment (r=.131; p=.030<0.05), with adopting actions and actively participate in the prevention and control of pollution (r=.231; p=.000<.01).

In relation to the correlation of the level of environmental training, with the degree of environmental concern of the students by professional school, there is a significant correlation at a significance level of 0.05 in the School of Environmental Engineering (r=.375*; p =.017<0.05), between the level of Environmental Concern and their training in environmental matters, with a positive relationship and there is a correlation at a significance level of 0.01 in the School of Sociology for (r=.549* *; p=.005<0.01)

between both variables, while in the remaining schools, there is no statistically significant correlation between both variables ($p>0.05$).

Berenguer and Corraliza (2000) mention that "when concern for the environment is evaluated at a general level, high levels of environmental concern are recorded, however, this evaluation is not sufficient to predict other pro- environmental beliefs and values", in this investigation asked the students to self-assess and respond to the importance they give to the environment, and it was obtained that for 62.59% the environment is very important to them, and through the evaluation of the scale of environmental concern (EPA) has a potential average score of 44.02 points out of a maximum of 65, which corresponds to a medium degree of environmental concern (61.5%) with students who have a high degree of concern (35.97%).

" Environmental concern has been considered a descriptive parameter of the level of environmental awareness, and a predictive variable of environmental behavior" (Berenguer & Corraliza, 2000), under this premise it was observed that the highest percentage of students know the existence of pollution in lakes, rivers, air, but they consider that nature through the purification processes will return it to normality (non-personal control over the environment), however they are willing to make personal sacrifices, whether economic, time, or other activities to prevent the extinction of animals and reduce the rate of pollution (personal effort for the conservation of the environment); as part of the pollution prevention and control actions, as well as requiring government agencies to participate directly in pollution control, but they also consider that secondary schools should be the first to provide education on the conservation of natural resources, this statement is related to what Amérigo and García, (2014) express: "people value their concern for environmental problems depending on whether these have harmful consequences for oneself, other human beings or the biosphere " .

The highest percentage of students surveyed considered that the training in environmental matters received is Regular and agrees with the analysis of the indicators proposed by Cárdenas (2014); who considers that the incorporation of the environmental perspective in the training function of universities is moderate to low.

The pro-environmentalist attitudes on the part of the students are influenced by their professional profile, such as the School of Environmental Engineering, whose training is correlated with the degree of environmental concern, unlike the other schools analyzed in this research, which agrees with (Casas & Jaula, 2004)that considers that the university, from its traditional treatment, is responsible for the fragmentation of the fields of knowledge and for a large part of the negative effects that this has caused on the natural and social environment; but it is also noteworthy that the School of Sociology despite not having an " environmentalized " professional profile, there is a correlation in both variables, which explains that positive attitudes in relation to the environment, is not only conditioned to the academic training or formal education, if not based on the environment, culture and customs that are innate in the human being, as mentioned (Delgado, 2012)that informal education refers to the various learning achieved through daily

experiences at home, work, street, trips, etc , when talking, reading or using mass media and the author considers that the baggage of information, skills and attitudes that people possess is due to it.

4 CONCLUSION OR FINAL CONSIDERATIONS

Pro-environmentalist attitudes such as environmental concern in university students are not only influenced by their formal education or professional training, but also depend on the various learning they acquire from their daily life activities and the cultural and social environment.

Assume the environmental policy as an institutional policy in an integral manner, which will allow students and future professionals to identify environmental problems that cause a decrease in the quality of life, will have an interdisciplinary approach and will be active actors in the performance of their work and professional activities in for sustainability.

It is important to generate a teacher training and updating plan as an academic policy, with an interdisciplinary approach, with collaborative work that allows adopting and internalizing the environmental culture, improving collective and environmentally responsible performance at the University.

This research was carried out with the participation of Dr. Cristian Iván Escurra Estrada, who departed to infinity, a tribute to his memory.

REFERENCES

Amerigo, M., & Garcia, J. (2014). Multidimensional Perspective of Concern for the Environment. Relationship between Attitudinal Dimensions and behaviors. Psycho, *406-414* .

Berenguer, J., & Corraliza, J.A. (2000). Environmental concern and ecological behaviors. Psychotheme, *325-329* .

Cardenas, J. (2013). Guide for Environmentally Responsible Universities. University Environmental Responsibility: Commitment and opportunity. *Interuniversity Environmental Network - Interuniversia Peru.* .
Cardenas, J. (2014). Incorporation of the Environmental Perspective in Peruvian Universities- Report on the Environmental Commitment of Universities. *INTERUNIVERSITY ENVIRONMENTAL NETWORK. INTERUNIVERSIA PERU* , 1-34.

Cardenas, J. (2018). *Matrix of Indicators of Incorporation of the environmental dimension in Universities (Updated version).* Lima: Interuniversity Environmental Network – Peru Interuniversity (RAI).

Houses, M., & Cage, A. (2004). Environmental interventions at the University of Pinar del Rio, Cuba. *ACEs Network* , 173-186.

Claros, E. (2020). *Environmentalization of the José Faustino Sánchez Carrión National University.* Doctoral thesis, José Faustino Sánchez Carrión National University, Huacho. Peru.

Coya, M. (2001). *The environmentalization of the Santiago de Compostela University.* Doctoral thesis, University of Santiago de Compostela, Spain.

Supreme Decree No. 054-2011-PCM. (June 23, 2011). *Bicentennial Plan: Peru towards 2021* . Official Gazette El Peruano, Peru.

Delgado, K. (2012). *Environmental education. Experiences and proposals.* Lima: San Marcos.

Garcia, D, & Priotto, G. (2009). *Environmental education. Political and pedagogical contributions in the construction of the field of Environmental Education.* Buenos Aires: Secretary of Environment and Sustainable Development of the Nation.

Hernandez, R., Fernandez, C., & Baptista, M. (2014). *Investigation methodology.* Mexico: McGraw Hill /Interamerica Editores SA de CV

Law No. 30220. (July 09, 2014). *University Law* . Peru: Official Gazette El Peruano.

Macedo, L. (2014). Environmental Policy of the Faculty of Educational Sciences and Humanities - UNAP (Master's Thesis). Peru: National University of the Altiplano.

Mora, W. M. (2012). CURRICULAR ENVIRONMENTALIZATION IN HIGHER EDUCATION: A QUALITATIVE STUDY OF THE IDEAS OF TEACHERS. *Journal of Curriculum and Teacher Training [online] 2012,* , 75-105. Recovered in 2019

Noguera, A. (2007). *Emergencies of an alternative environmental thought in Latin America.* Colombia: National University - IDEA.

Padilla, R. (2016). Curricular environmentalization, attitudes towards environmental education and its relationship with the quality of life of the students of the Faculty of Education of the UNMSM. Lima, Peru: National University of San Marcos.

Silva, J. (2007). Introduction of the environmental dimension in the curriculum in university education. *Sol sheets in the Victoria Regia* , 149-179. Colombia.

Venegas, L., & Quijano, Y. (2017). *Curriculum Environmentalization: Improvement in Training of future graduates of professional careers from San Pedro University.* Master's thesis, San Pedro University, Chimbote-Peru.

José Faustino Sánchez Carrión National University (2019), Transparency Portal. Retrieved from http://app.unjfsc.edu.pe/transparencia/ZonaUsuarioResoluciones/Resoluciones.aspx