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Research paper

Environmental knowledge and perceptions of good environmental education practices for affirmative climate actions in rural schools of Manabí-Ecuador

Conocimiento ambiental y percepciones de buenas prácticas de educación ambiental para acciones climáticas afirmativas en unidades educativas rurales de Manabí-Ecuador

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ABSTRACT

Climate change is the greatest threat that humanity faces nowadays. Therefore, the present work had the purpose of determining the environmental knowledge and perceptions of good environmental education practices for affirmative climate actions in rural schools of Manabí-Ecuador, specifically in the school Manuel Daza Palacios. By applying the bibliographic and hypothetical deductive methods, the most appropriate affirmative climatic actions were determined. According to the results of the diagnosis, it was possible to show that, although environmental education is implicitly contained in the Plan Nacional Toda una Vida 2017-2021; in the students there is still a deficit in or referring to this matter; affirmative climate actions included limiting the amount of plastic waste and making compost to be applied in orchards, a practical guide was developed with the most relevant steps on how to carry out these processes. Finally, the results were shared through the Voces de la Naturaleza program broadcast by Radio Politécnica de Manabí 101.7 FM, as well as on social media. In a changing and uncertain environment, it is necessary to continue with the dissemination of mitigation measures against climate change according to the needs of each community.

Keywords: *climate change, practical guide, rural school.*

RESUMEN

El cambio climático es la mayor amenaza que enfrenta la humanidad en la actualidad. Por lo tanto, el presente trabajo tuvo como propósito determinar el conocimiento ambiental y las percepciones de buenas prácticas de educación ambiental para acciones climáticas afirmativas en unidades educativas rurales de Manabí-Ecuador, específicamente en la escuela Manuel Daza Palacios. Aplicando los métodos bibliográfico e hipotético deductivo se determinaron las acciones climáticas afirmativas más adecuadas. De acuerdo con los resultados del diagnóstico, se pudo evidenciar que, si bien la educación ambiental está implícitamente contenida en el Plan Nacional Toda una Vida 2017-2021; en los estudiantes aún existe un déficit o referente a esta materia; Las acciones climáticas afirmativas incluyeron limitar la cantidad de residuos plásticos y hacer compost para ser aplicado en huertos, se elaboró una guía práctica con los pasos más relevantes sobre cómo llevar a cabo estos procesos. Finalmente, los resultados se compartieron a través del programa Voces de la Naturaleza emitido por Radio Politécnica de Manabí 101.7 FM, así como en las redes sociales. En un entorno cambiante e incierto, es necesario continuar con la difusión de medidas de mitigación contra el cambio climático de acuerdo a las necesidades de cada comunidad.

Palabras clave: cambio climático, guía práctica, escuela rural

INTRODUCTION

Climate change has become an increasingly pressing problem in society (Carlson et al., 2020). Furthermore, the impacts and risks of local climate change can be transmitted to an entire region and economic sectors (Ruiz et al., 2020). Therefore, mitigating climate change requires rapid action at all levels, by people. Since it is a problem driven by anthropic activities, the solutions must, then, revolve around the actions and demands of individuals Goldberg et al., 2020).

In Ecuador, climate change is evident and manifests itself in phenomena such as: melting of mountain glaciers, changes in rainfall patterns, an increasing of the average temperature throughout the country, among others; that have aggravated the problems of poverty, causing effects on human health and the environment (Universidad San Francisco de Quito, 2014). Consequently, the Economic Commission for Latin America and the Caribbean (ECLAC, 2019) emphasizes that it is unfair that this phenomenon is going to have its greatest impact on the regions with the greatest poverty, since they are the ones that have contributed the least to its causes.

In this context, the United Nations Framework Convention on Climate Change (UNFCCC, 1992) ratifies the importance of good practices in environmental education and the determination of affirmative climate actions to respond to the great challenge that climate change represents and develop styles of sustainable life that take into account mitigation and adaptation actions (Departamento Administrativo de Ciencia Tecnología e Innovación de Colombia, 2017).

In the Agua Fría community (Manabí-Ecuador) there is insufficient knowledge about environmental education both in the students of the Manuel Daza Palacios Educational Unit and in the residents of the community, which causes the need for a change in attitude, responsibility and care for the environment ambient. Under this approach, the present research aimed to determine the environmental knowledge and perceptions of good environmental education practices for affirmative climate actions in rural schools of Manabí-Ecuador.

METHODOLOGY

The scientific methods that were used in the study were the theoretical methods: bibliographic and hypothetical deductive. In addition, virtual broadcast media such as Radio Politécnica de Manabí and the YouTube social network were used to socialize the results of this research with the community.

Diagnosis of environmental knowledge and perceptions of good-practices in environmental education

In the first instance, a survey was applied to the students of the school Manuel Daza Palacios at the beginning of 2020; These data represent the general diagnosis of the study topic in the community.

Determination of affirmative climate actions for good environmental education practices

Affirmative climate actions were determined taking the criteria established by the Food and Agriculture Organization of the United Nations (FAO, 2020), which include:

- Limit the use of plastic: Plastic that is disposed of irresponsibly contributes to severely damaging the marine habitat and kills large numbers of animals each year.
- Consciously Recycling and Disposing: Recycling paper, plastic, glass, and aluminum reduces the amount of garbage that goes to landfills.

In addition, the production of compost and its subsequent application in home gardens, through the methodology proposed by Vargas and Azofeifa (2006), was proposed as an extra affirmative climate action.

Virtual diffusion of determined affirmative climate actions

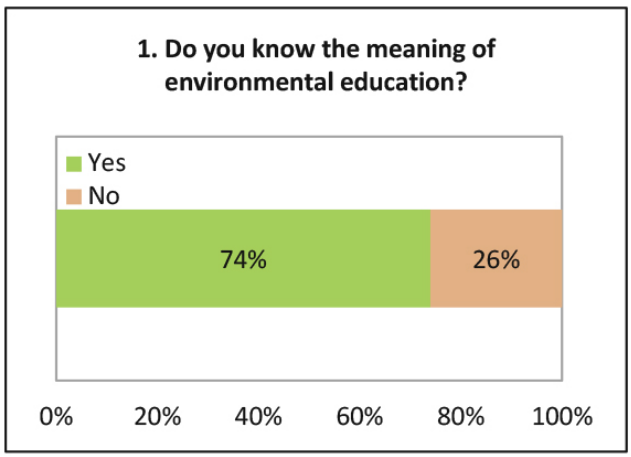
A video was edited with all the information produced, using PowerPoint 2016 software, that audiovisual material was transmitted through the Voces de la Naturaleza program on Radio Politécnica de Manabí, frequency 101.7. Considering that university radios, through participatory and collaborative horizontal communication, can generate processes to achieve the empowerment of science; in such a way that they are within everyone's reach, tend towards social, cultural and economic change through planned processes of dissemination of culture and knowledge (Álvarez et al., 2017).

RESULTS AND DISCUSION SECTION HEADING3

The reflective analysis, interpretation and discussion was carried out based on the results of the surveys, applied to 83 students of the school Manuel Daza Palacios.

In question number 1: Do you know the meaning of environmental education? It was found that 76% of the interviewees do know this definition (Figure 1).

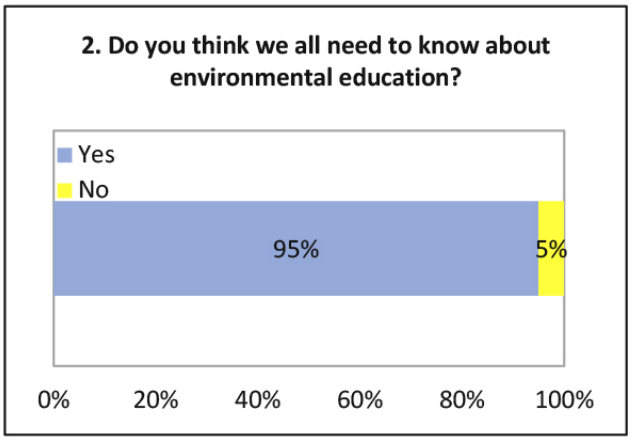
Figure 1. Knowledge of environmental education.



Environmental education is the training of the operation of natural environments, as long as people can adapt to them without damaging nature (Martínez, 2010). Furthermore, environmental education has been incorporated into all educational stages; in a transversal way (Universidad Internacional de La Rioja, 2016). In Ecuador, environmental education is implicitly contained in the Plan Nacional Toda una Vida 2017-2021 (Ministry of the Environment of Ecuador, 2018). So, it is clear that students are already familiar with this concept.

Question 2: Do you think we all need to know about environmental education? Projected favorable results since 95% of those surveyed recognize the importance of knowledge of environmental education (Figure 2).

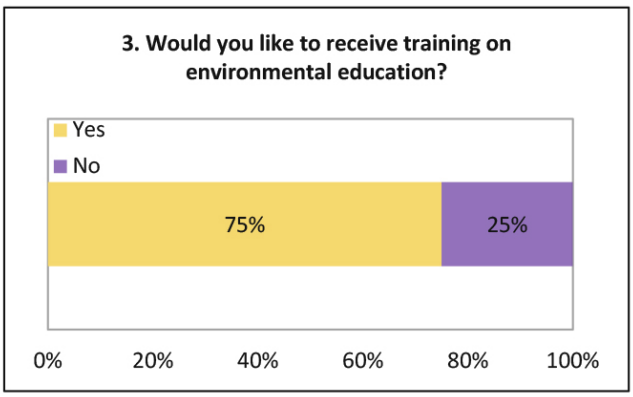
Figure 2. Importance of knowledge on environmental education.



Environmental education teaches people how to appreciate the different aspects of a problem through critical thinking and improve their own problem-solving and decision-making skills (United States Environmental Protection Agency [EPA], 2018). However, Martínez (2012) emphasizes that the environmental education is taught without a transdisciplinary or transversal relationship; which means that its objectives are not directed at the true root of the problem; that is, to question the current civilizational model.

In question 3: Would you like to receive training on environmental education? It was found that 75% of the interviewees are interested in receiving this type of training (Figure 3).

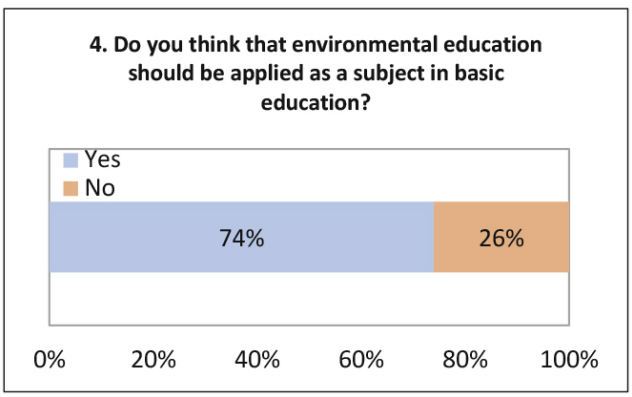
Figure 3. Availability to receive training on environmental education.



Research and environmental training aimed at all educational levels and social sectors are mostly centralized, that is, they focus on the center of cities, placing rural communities in last place, making their development even more difficult (López and Rodríguez, 2008). Therefore, the need to develop this type of program in rural communities is emphasized.

Regarding to question 4: Do you think that environmental education should be applied as a subject in basic education? The results show that 74% of the students consider that it should be applied (Figure 4).

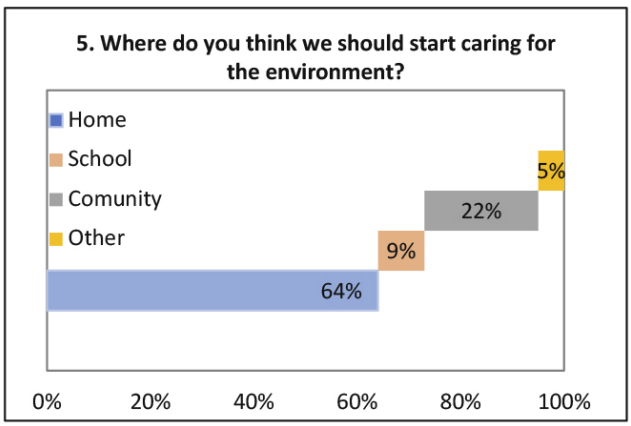
Figure 4. Application of environmental education as a subject in basic education.



The Estrategia Nacional de Educación Ambiental del Ecuador (ENEA) specifies that the curricular treatment of environmental education is carried out from two transversal axes: Protection of the environment and Interculturality. Therefore, to delve into environmental issues that the curriculum does not contemplate, it is necessary to establish educational projects that contextualize the environmental reality and its needs (MAE, 2018).

Question 5: Where do you think we should start caring for the environment? It reflected that 64% think that this process should be started at home; 22% in the community; 9% at school and 5% at external entities (Figure 5).

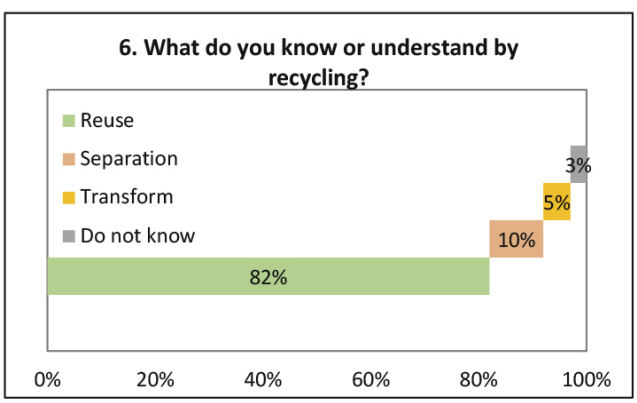
Figure 5. Where should start the caring of the environment.



The deterioration of the environment is influenced by a high rate of ignorance. Therefore, through an educational process, society transmits certain values which shape the behavior of students (Martínez, 2012). According to this assessment, it is emphasized that, although the environment must be cared for at all times and places, educational institutions are in charge of transmitting knowledge that generates changes in the perceptions and actions of students.

The findings of question 6: What do you know or understand by recycling? They showed that 82% of the respondents associate this concept with reuse; 10% believe that it is about separating; 5% think it is converting and 3% don't know (Figure 6).

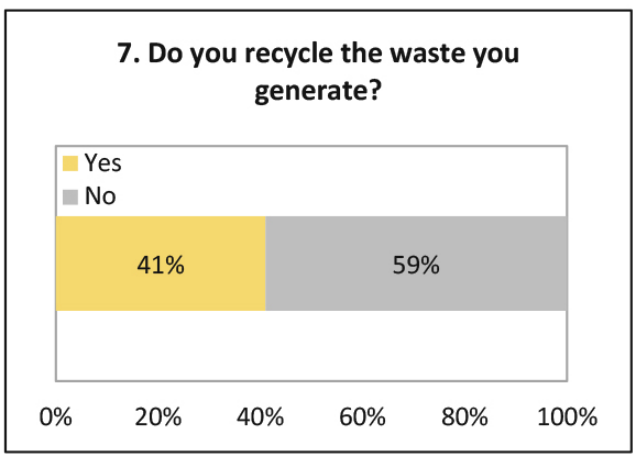
Figure 6. Conceptions about recycling



In the ENEA, it is pointed out that recycling is one of the themes that must be studied in depth through educational projects, since it is not contemplated in the curriculum (MAE, 2018). On the other hand, Martínez (2010) points out that recycling is an environmental measure for the management of solid waste. In the Código Orgánico del Ambiente de Ecuador (COA), recycling is conceptualized as the process by which, after selective separation and classification of waste or its components, they are used as energy or raw material in the manufacture of new products (MAE, 2017). Emphasizing that it is necessary for the students of the school Manuel Daza Palacios to deepen their knowledge about recycling.

When asking question 7: Do you recycle the waste you generate? It was found that 59% of those surveyed, claim to carry out this practice; however, the remaining 41% do not recycle (Figure 7).

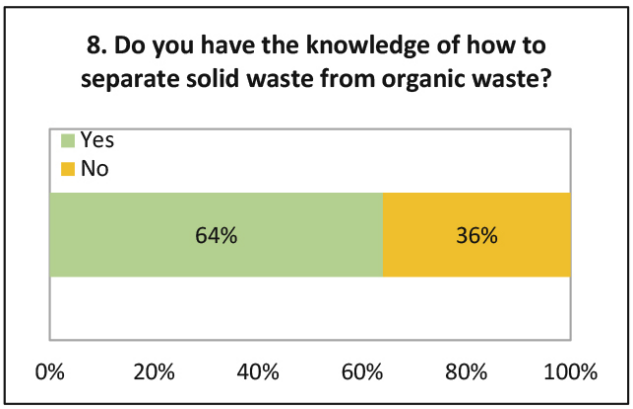
Figure 7. Recycling practice.



According to data from the Regional Initiative for Inclusive Recycling in 2014, 4'100,000 tons of solid waste were generated in Ecuador, of which 1'025,000 are potentially recyclable waste and only 24% of that potential was recovered and recycled (Cajamarca et al., 2019). The limited knowledge of the benefits of proper waste management affects human and environmental health, and exacerbates problems such as poverty (Delgado, 2015). With the aforementioned, the need to improve the recycling practice in the community under study is supported.

Question 8: Do you have the knowledge of how to separate solid waste from organic waste? It showed that 64% of the interviewees do have knowledge; however, there is 36% who do not know how to carry out this process (Figure 8).

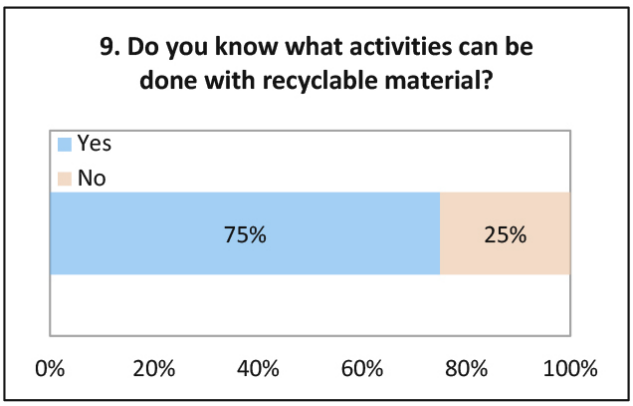
Figure 8. Knowledge about waste separation.



The conviction of those involved is necessary for a correct separation of waste to be carried out (Cajamarca et al., 2019). On the other hand, the separation of waste is carried out after collection and is understood as a generally manual waste operation that allows different uses to the groups according to the composition of the waste: organic (food waste, paper, cardboard) or inorganic (glass, plastic, cans) (Reyes et al., 2015).

Through question 9: Do you know what activities can be done with recyclable material? It was evidenced that 75% of those surveyed do know about the activities that can be carried out, while the remaining 25% do not know them (Figure 9).

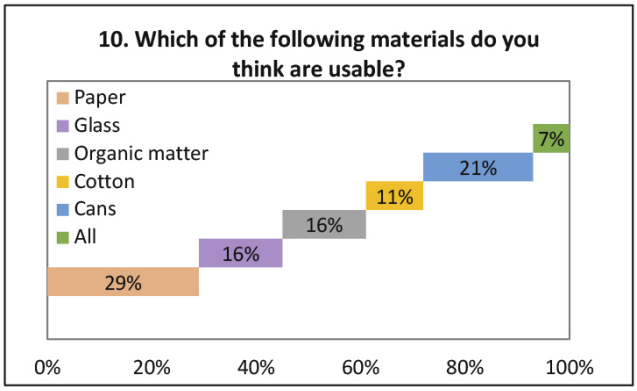
Figure 9. Knowledge of the activities that can be carried out with recyclable material.



Although there are many ways to recycle, worldwide, resources continue to be wasted in a large percentage due to lack of adherence to proposals as simple as the separation of waste or the realization of crafts giving a double use to certain materials; being reuse a simple way to extend the useful life of certain products (Gutiérrez, 2016). In addition, it is emphasized that mass consumption would be avoided by reducing the acquisition of products through the reuse of waste.

Finally, in question 10: Which of the following materials do you think are usable? It was found that 29% of those surveyed consider that paper is the main usable material; followed cans with 21%; glass and organic matter with 16% each; and 7% consider that all are likely to be used (Figure 10).

Figure 10. Conception on usable materials in recycling.



Usable solid waste is any material, object, substance or solid element that has no use value for whoever generates it, but that is capable of being used for its reincorporation into a production process, they can be: cardboard and archival paper, plastic, PET bottles, aluminum and glass (Gutiérrez, 2016). Agreeing with the perceptions found in this research.

Taking into account the findings of the diagnosis, two guidelines were developed in Spanish, depending on the age of the beneficiaries: children (Figure 11) and adults (Figure 12).

Figure 11. Guide of good practices of environmental education for children.

Figure 12. Guide of good practices of environmental education for adults

The transmission of audiovisual material was carried out on Wednesday, September 9, 2020 at 1:00 p.m. (GMT-5 time zone) on frequency 101.7 of Radio Politécnica de Manabí. The video is available at https://www.youtube.com/watch?v=X9WcEVMiPb8

CONCLUSIONS

According to the diagnosis made, in the studied area there is a gap in the basic knowledge of environmental education strategies. The established climate actions included recycling, the preparation of compost and family gardens, taking into account that the area to be trained is totally rural and is based on food production, so it is advisable to instill teachings of this type to promote sustainable planting practices. Regarding the dissemination of results, given the current situation, a virtual socialization was carried out that is expected to have reached all the residents of Agua Fría, and to any community that is interested in the application of affirmative climate actions.

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