

Original article

Environmental education strategy for local development

Estrategia de educación ambiental para el desarrollo local

Estratégia de educação ambiental para o desenvolvimento local



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ABSTRACT

The interrelation between community environmental education and local development prepares the individual to be able to improve his or her relationship with the natural environment, and thus the way of thinking and acting. The purpose of this work was to design strategic actions of environmental education for the local development of the "Alvarito Díaz" community, highlighting the links that make possible a socially responsible action in the natural environment, with a view to sustainable local development. A descriptive observational study was carried out with the application of theoretical and empirical methods, and the application of the SWOT matrix to obtain a general perspective of the local situation. As a result, an environmental strategy was designed with a series of elements based on the system approach, which proposes actions to develop strengths, reduce weaknesses, locate and take advantage of opportunities and reduce the threats encountered. Its design had a high level of satisfaction on the part of the users to provide new ways to generate

significant changes in behavior and development through training and education of the different social actors.

Keywords: community; local development; environmental education; strategy.

RESUMEN

La interrelación educación ambiental comunitaria y el desarrollo local prepara al individuo para que sea capaz de mejorar su relación con el entorno natural, y así la forma de pensar y actuar. El presente trabajo tuvo como propósito diseñar acciones estratégicas de educación ambiental para el desarrollo local de la comunidad "Alvarito Díaz", destacando los nexos que posibilitan una actuación socialmente responsable en el entorno natural, con una mirada al desarrollo local sostenible. Se realizó un estudio observacional descriptivo con la aplicación de métodos teóricos y empíricos, y la aplicación de la matriz DAFO para obtener una perspectiva general de la situación local. Como resultado se diseñó una estrategia ambiental que en su composición cuenta con una serie de elementos que se fundamentaron desde el enfoque de sistema, lo que propone acciones para desarrollar fortalezas, reducir las debilidades, localizar y aprovechar las oportunidades y disminuir las amenazas encontradas. Su diseño tuvo un elevado nivel de satisfacción por parte de los usuarios para proporcionar nuevas maneras de generar cambios significativos de comportamiento y de desarrollo mediante la capacitación y la formación de los diferentes actores sociales.

Palabras clave: comunidad; desarrollo local; educación ambiental; estrategia.

RESUMO

A inter-relação entre a educação ambiental comunitária e o desenvolvimento local prepara o indivíduo para ser capaz de melhorar sua relação com o ambiente natural e, portanto, sua forma de pensar e agir. O objetivo deste trabalho foi projetar ações estratégicas de educação ambiental para o desenvolvimento local na comunidade "Alvarito Díaz", destacando os vínculos que permitem uma ação socialmente responsável no ambiente natural, com vistas ao desenvolvimento local sustentável. Foi realizado um estudo observacional descritivo com a aplicação de métodos teóricos e empíricos e a aplicação da matriz SWOT para obter uma visão geral da situação local. Como resultado, foi elaborada uma estratégia ambiental com uma série de elementos baseados na abordagem sistêmica,

que propõe ações para desenvolver os pontos fortes, reduzir os pontos fracos, localizar e aproveitar as oportunidades e reduzir as ameaças encontradas. Sua concepção teve um alto nível de satisfação dos usuários por proporcionar novas maneiras de gerar mudanças significativas no comportamento e no desenvolvimento por meio da capacitação e do treinamento dos diferentes atores sociais.

Palavras-chave: comunidade; desenvolvimento local; educação ambiental; estratégia.

INTRODUCTION

The wide range of environmental problems affecting the planet has been influenced by a lack of environmental awareness and education in a considerable percentage of the population and has resulted, on many occasions, in their aggravation (Rodríguez García & Peña Fuentes, 2019), so it requires the mobilization of all actors to face the challenge and jointly formulate responses to the problems. All this requires developing in people's minds a new way of looking at the environment, by educating conceptually and attitudinally to contribute to the development of a positive environmental quality through the solution of environmental problems at the local level (Sánchez Santamaría et al., 2010).

An alternative to obtain the participation of the population in the solution of environmental problems in their own environments consists of environmental education, as it is key to understand the existing relationships between the contexts of nature, society and economy, as well as to achieve a more evident perception of the importance of socio-cultural factors in the genesis of environmental problems (Orihuela & Paredes, 2015).

In the search for tools aimed at curbing or, at least, mitigating the deterioration of the environment, is that environmental education arises, in order to achieve the participation of social actors, united with organizations and institutions in pursuit of a new conservationist ethic from the development of a comprehensive educational process (Acevedo Rodríguez et al., 2019).

Environmental education is important in promoting sustainable development and increasing the capacity of populations to address environmental development issues, using academic and non-academic methods and effective means of communication. The environmental issue is currently a challenge of global commitment to the protection of natural resources (Martínez Castillo, 2012). In this way, environmental education is valued as a process and a factor of social change, which

coincides with the aim of achieving sustainable development (De la Peña Consuegra & Vences Centeno, 2020).

Environmental education and local development are two important and topical terms in the framework of sustainable development. Environmental education is a strategic factor that affects the established forms of development in order to reorient them towards sustainability and equity, thus building a new lifestyle (Pérez Díaz et al., 2019). Community work constitutes the scenario where the protagonism of local actors in the search for solutions to their own problems must be achieved (Bustio Ramos, 2023).

The study of local development should not be separated from environmental education since human beings develop their lives in a complex social reality and, from this, it follows that an educational process is necessary to address all aspects of environmental problems (Hernández Martín et al., 2021).

This is an important element to take into account for local development; each of the dimensions mentioned above contributes in an integral way to the improvement of the living conditions of the inhabitants and favors the promotion of this, in a more favorable environment, with the use of endogenous resources (Sosa González et al., 2020).

This research focuses on one of the aspects of local development, the environmental component, and its objective is to design strategic environmental education actions for the local development of the "Alvarito Díaz" community in the municipality of Consolación del Sur, Pinar del Río province.

MATERIALS AND METHODS

A technological development research was carried out in the "Alvarito Díaz" community of the "Puerta de Golpe" popular council in the municipality of Consolación del Sur (Figure 1).



Figure 1. Satellite location of the community "Alvarito Díaz"

Source: Physical Planning Pinar del Río

To determine the environmental problem in the community, the environmental diagnosis methodology proposed by Linares Guerra et al. (2021) was applied, which has six stages:

1. Identification of information needs
2. Definition of the sources of information, methods, procedures and techniques to be used
3. Design of the formats for the collection of information according to the techniques defined above
4. Sample size determination
5. Data collection, processing and analysis
6. Conclusion of the environmental diagnosis

The following methods were used to design the strategy:

- The modeling method that allowed us to build the strategy of the environmental education process in the studied community.
- The structural systemic method, which made possible the general orientation for the design and substantiation of the proposal, by facilitating the determination of the components of the strategy through the relationships that make it up, as well as its structure.
- The ethnographic method that allowed the capture of the community's way of life, its social structure and the process of development of environmental education in the inhabitants.
- The participatory action research method allowed the understanding and interpretation of the environment in the community under study and the development in its inhabitants of a critical awareness of their own needs, problems and ways to solve them.
- The Iadov Method was used as a scientific methodological procedure for processing the results. This technique constitutes an indirect way for the study of customer satisfaction (Mirabal Sarria & Torres Paez, 2021) to estimate the level of satisfaction of the inhabitants of the "Alvarito Díaz" community with the proposed environmental education strategy. The technique was applied to 10 inhabitants of the locality that are part of the universe, four formal leaders, three informal leaders and three members of the locality, of which 60% belong to the female gender and 40% to the male gender.

RESULTS AND DISCUSSION

The "Alvarito Díaz" community is a hamlet in the municipality of Consolación del Sur, with a predominance of agricultural production and, irregularly, fishing. It has an extension of 2 km², it is located at kilometer 3½ of the Central Highway that leads to the Popular Council Puerta de Golpe, 11.5 km west southwest of the municipal capital and linked to it by road, at 22° 28' 15" N latitude and 84° 35' 12" West longitude, in the southern plains of Pinar del Río (Cabeza Defaus & Jaula Botet, 2022).

Based on the analysis of the instruments (Observation Guide) used for the environmental diagnosis, the following environmental problems are regularly identified:

- Deforestation
- Disappearance of plants and animals that once existed in the community
- Inefficient solid waste management
- The deplorable sanitization of backyards in homes
- Soil degradation due to agricultural activity
- Family conflicts
- Violent behaviors
- Excessive consumption of alcoholic beverages
- Poor housing conditions
- Lack of drinking water
- Overcrowded housing

These identified environmental problems are recognized by several actors who have studied rural communities, such is the case of Pérez Rodríguez et al. (2018). These problems are caused by humans to the environment, through the irrational use of natural resources and the emergence of conflicts that exacerbate social problems.

Based on the diagnosis of the main environmental problems, insufficient environmental education is recognized as the main problem, making it necessary to implement an environmental education instrument to help mitigate or solve these problems.

In the elaboration of the strategy, the structure and characteristics of the community were taken into account in order to carry out, in a comprehensive and flexible manner, a set of systematic and coherent actions in its development.

The environmental education strategy proposed for the "Alvarito Díaz" community in the municipality of Consolación del Sur, in Pinar del Río, was structured in five stages, the same as the one designed by Pérez Díaz et al. (2019), as shown in the following scheme:

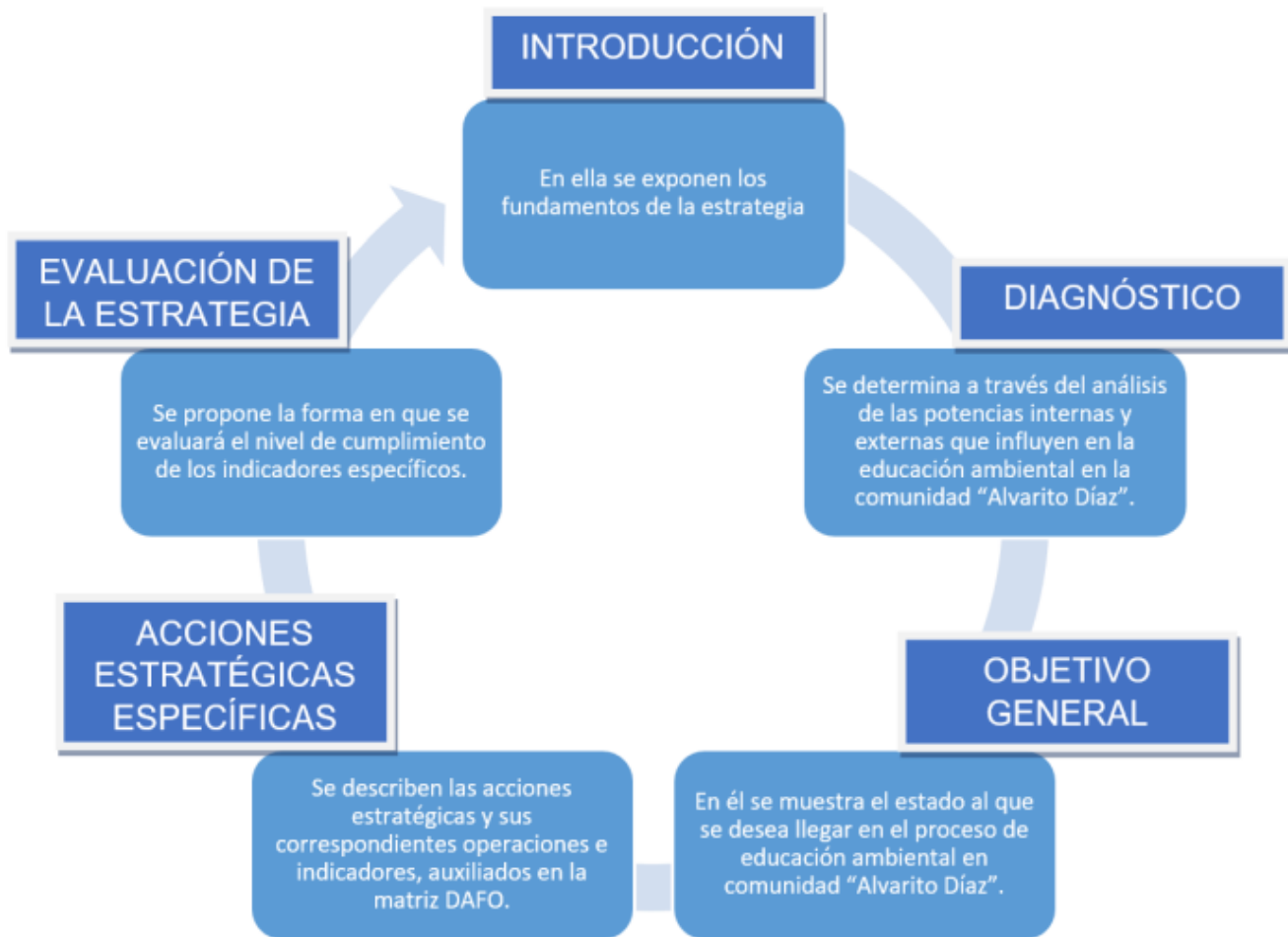


Figure 2. Structure of the environmental education strategy in the community "Alvarito Díaz"

Source: Own elaboration

Strategy structure

Introduction

The strategy was designed to mitigate environmental deterioration and strengthen the environmental education process, with the participation of social actors, together with organizations and institutions in order to achieve local community development. It consists of a set of elements based on the system approach, where the inhabitants of the community will be the protagonists of the actions that are developed in it, from the incorporation of the actors in the decision making to carry out the process of environmental education from the community sociocultural work.

Diagnosis to implement the environmental education strategy in the community

The preparation of the SWOT matrix (a technique used to identify weaknesses, threats, strengths and opportunities) contains a series of internal and external forces that have a direct impact on the development of actions to develop strengths, reduce weaknesses, locate and take advantage of opportunities and reduce or avoid the threats encountered. It is a tool that allows obtaining a clear diagnosis to make strategic decisions in a timely manner and improve in the future (Peñafiel Nivelá et al., 2020).

In order to obtain internal and external forces, group interviews were carried out, which led to the identification of positive and negative elements, both inside and outside the community. These elements are closely linked to environmental problems and the process of environmental education in the locality.

- **Internal forces**

- Strengths

1. The People's Council is structured and organized in a way that favors the introduction and development of the environmental education strategy in the "Alvarito Díaz" community.
2. The community is willing to work on the solution of environmental problems that have been identified from the genesis, formulation, evaluation and follow-up of the actions to be developed.
3. Existence of the community project "El Patio de Pelegrín" in the popular council to which the community belongs.

- Weaknesses

1. Lack of an environmental education strategy for the community that would lead to the improvement of the current environmental situation.
2. There is a partial and asystemic treatment of the elements linked to the knowledge, perception and sensitivity of the population to environmental problems in the locality without projecting solutions towards know-how.
3. There are insufficiencies in the joint coordination of environmental education actions that contribute to responsible environmental behavior.
4. Unstable and insufficient levels of communication, commitment and integration (mass and interpersonal) on environmental problems and their solutions.

- **External forces**

- Opportunities

1. Support from political and mass organizations.
2. Existence of a Municipal Government identified with the environmental problems of the community.
3. Creation of a promoter or facilitator group in the community itself to carry out and sustain the training processes, strategies and projects in the environmental transformation of the community.
4. Participation of the provincial and municipal mass media.

- Threats

1. Difficult economic conditions in the country.
2. Lack of material resources for community development.
3. Insufficient environmental education actions from the institutional level to strengthen knowledge, skills and attitudes of the subjects regarding the care and protection of the environment.
4. Impacts caused by the COVID 19 pandemic.

Objective of the strategy: To manage environmental education from a systemic and integral approach to local development that contributes to the improvement of the environmental situation in the "Alvarito Díaz" community.

Specific strategic actions (Table 1)

Table 1. Summary of the environmental education strategy in the community "Alvarito Díaz"

Strategic actions	Activities	Indicators
To identify the needs of the community environmental education process in the "Alvarito Díaz" community with a holistic, multidisciplinary and intersectorial approach.	<ol style="list-style-type: none"> 1. Survey to determine the main environmental problems and the effects they cause in the "Avarito Díaz" community, by formal and non-formal leaders. 2. Development of workshops to socialize the results 	<ul style="list-style-type: none"> • Level of awareness of the need for change in the environmental education process to which the inhabitants of the community have been led on the priority of generating new attitudes for the

	found in the identification of the main problems.	resolution of the environmental problems to be identified.
To train through community participatory activities that promote the successful solution of environmental problems in the "Alvarito Díaz" community.	<ol style="list-style-type: none"> 1. Training of the facilitator group and formal and non-formal community leaders on environmental education. 2. Lectures given by specialists of the Territorial Delegation of the Ministry of Science, Technology and Environment in the territory on environmental education and the methods to be used to solve the problems that were detected. 3. Workshops with the community to analyze possible solutions to their main environmental problems. 	<ul style="list-style-type: none"> • Level of assistance and empathy of the inhabitants of the "Alvarito Díaz" community in the development of the planned training activities. • Proposals for solutions to mitigate the environmental problems detected.
To develop voluntary and participative actions for the transformation of environmental problems in the "Alvarito Díaz" community.	<ol style="list-style-type: none"> 1. Reforestation actions with endemic species. 2. Elimination of micro dumps. 3. Selection of Sustainable Courtyards. 4. Creation of a rural and sustainable vegetable garden for local supply. 	<ul style="list-style-type: none"> • Attitude of the villagers towards the operations to be carried out in favor of community environmental management. • Amount of reforested area. • Community integration) in the activities developed

	<p>5. Reflect on the changes that occur in the community once the environmental problems have been solved.</p>	<p>(90% of the inhabitants of the locality.</p> <ul style="list-style-type: none"> • Increase in the quality of life of the community.
<p>Promote environmental education activities aimed at solving environmental problems in the "Alvarito Díaz" community.</p>	<ol style="list-style-type: none"> 1. Creation of scenarios where the different environmental problems are disseminated in the community. 2. Dissemination of solutions to environmental problems. 3. Exhibition of different artistic manifestations linked to the El Patio de Pelegrín Project on the theme of the environment. 4. Organization of a gallery of images of the community related to the environmental education activities they carry out. 	<ul style="list-style-type: none"> • Increased community motivation towards environmental education activities and mitigation of environmental problems.

Source: Own elaboration

Strategy evaluation

In this evaluation stage of the environmental education strategy in the community under study, it will be developed in a pleasant and flexible way, visualized as a phase that occurs naturally during the process. In it, the analysis of the objectives of the proposed indicators, which have a direct impact on the efficiency, effectiveness, preservation and relevance of the strategy, should be deepened.

The evaluation process will give the strategy a greater validity, from its revision, updating and readjustment, with the purpose of making it a useful product for the improvement of the environmental education process in the "Alvarito Díaz" community, as an instrument of transformation.

Results obtained in the validation of the environmental strategy

In the present research, the Iadov technique was applied as an indirect way to study satisfaction, since the criteria used are based on the relationships established between three closed questions that are inserted in a questionnaire and whose relationship is unknown to the subject. These three questions are related through what is called Iadov's Logical Table (Table 2).

Table 2. Iadov's logic table

Question 3. Do you like the way the environmental education strategy was designed and structured for the community?	Question 2. Do you feel satisfied with the environmental education strategy designed for the "Alvarito Díaz" community?								
	Yes			No			I do not know		
	Question 6. Do you consider that the environmental strategy designed for the "Alvarito Díaz" community responds to the mitigation of the environmental problems existing in the community?								
	Yes	No	I do not know	Yes	No	I do not know	Yes	No	I do not know
a) I like it very much	1	2	6	2	2	6	6	6	6
b) I like it more than I dislike it	2	2	3	2	3	3	6	3	6
c) I am indifferent	3	3	3	3	3	3	3	3	3
d) I dislike it more than I like it	6	3	6	3	4	4	3	4	4
e) I do not like	6	6	6	6	4	4	6	4	5
f) I cannot say	2	3	6	3	3	3	6	3	4

Source: Own elaboration

By applying the method and performing the corresponding analysis between the questions contained in the table, it was possible to obtain the individual satisfaction level of each community member surveyed, as shown in figure 3.

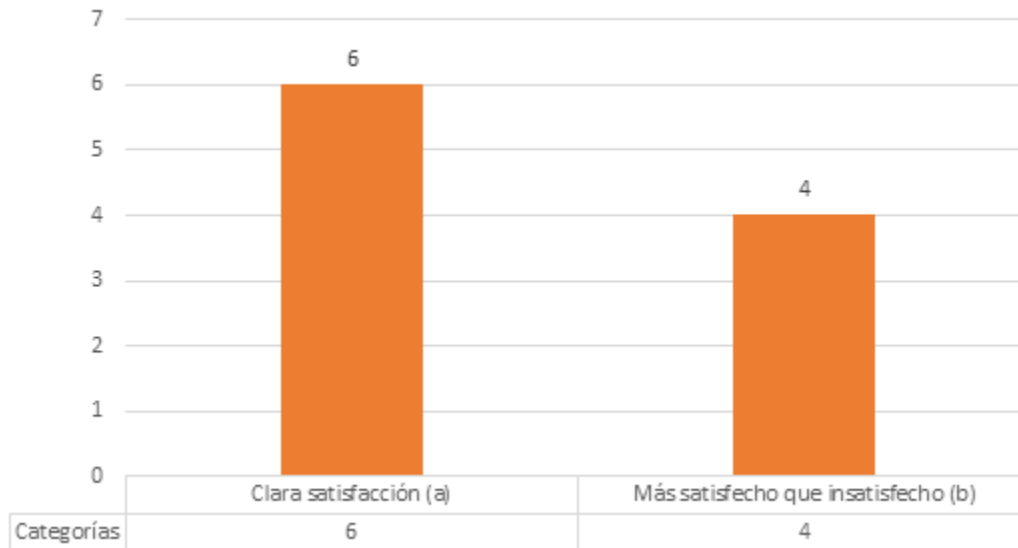


Figure 3. Level of satisfaction of the inhabitants of the "Alvarito Díaz" community with the environmental education strategy

Source: Own elaboration

In calculating the Global Satisfaction Index (ISG), the formula was used:

$$ISG = \frac{A * (+1) + B * (+0,5) + C * (0) + D * (-0,5) + E * (-1)}{N}$$

Where N = total number of respondents.

For this purpose, the values obtained in the categories of A = 6; B = 4; C = 0; D = 0 and E = 0 were substituted, obtaining an ISG = 0.8. According to the scale, the result is satisfactory as it is within the value range of 0.5 -+ 1 (Figure 4).

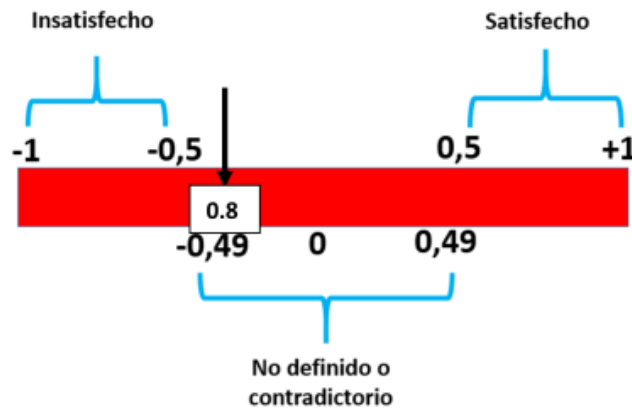


Figure 4. Interpretation of the ISG according to the scale

Source: Own elaboration

The design of strategic environmental education actions in the "Alvarito Díaz" community, as well as their implementation with community participation constituted a dynamic, conscious and reflexive process, in response to local development and the promotion of favorable changes in the lifestyle of its inhabitants.

The satisfactory validation obtained by user criteria reinforces the theoretical and practical value of the strategy whose implementation provides the management of the environmental education process in the community.

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Conflict of interest

Authors declare that they have no conflicts of interest.

Authors' contribution

Evelyn Pérez Rodríguez and Raymundo Vento Tielve participated in the conception, design and writing of the draft of the study.

Elisa Maritza Linares Guerra and Dora Lilia Márquez Delgado participated in data collection, analysis and interpretation.

All the authors reviewed the writing of the manuscript and approve the version finally submitted.



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