

La educación ambiental en el nivel educativo primario bajo condiciones de ecosistemas frágiles montañosos

Environmental education at the primary school level under conditions of fragile mountain ecosystem

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Resumen

Este trabajo tiene como propósito el desarrollo de la educación ambiental desde la asignatura Ciencias Naturales en los educadores desde los objetivos 4, 5, 11 y 13 de la Agenda 2020-2030, con acciones que tienen un carácter integrador y por su conformación, debe responder al insuficiente desarrollo de la educación ambiental desde la asignatura Ciencias Naturales en los educadores de la zona escolar Aguacatal en el municipio Maisí, esta situación actual fue confirmada mediante métodos teóricos como histórico-lógico, inducción-deducción y métodos empíricos como las observaciones, encuestas y el pre-experimento. Para ello, se propone una estrategia metodológica la cual puede contribuir al desarrollo de los conocimientos, las habilidades, los valores ambientales, y el uso de las potencialidades que brindan los contenidos de la asignatura Ciencias Naturales en función de la protección, cuidado y conservación del medio ambiente condicionado a los contextos de convivencia y profesional en los ecosistemas frágiles montañosos.

Palabras clave: Desarrollo; Educación ambiental; Ecosistema frágiles montañosos; Educadores primarios.

Summary

The purpose of this work is the development of environmental education from the subject Natural Sciences in educators from objectives 4, 5, 11 and 13 of the 2020-2030 Agenda, with actions that have an integrating character and by its conformation, it should respond to the insufficient development of environmental education from the subject Natural Sciences in educators of the Aguacatal school zone in the municipality of Maisí, this current situation was confirmed by means of theoretical methods such as historical-logical, induction-deduction and empirical methods such as observations, surveys and pre-experiment. To this end, a methodological strategy is proposed which can contribute to the development of knowledge, skills, environmental values, and the use of the potentialities offered by the contents of the subject Natural Sciences in terms of the protection, care and conservation of the environment conditioned to the contexts of coexistence and professionalism in fragile mountain ecosystems.

Keywords: Development; Environmental education; fragile mountain ecosystem; Primary educators.

Introduction

The irrational use of science, technology and natural resources has created ecological and environmental problems worldwide, which are reflected in Cuba, Guantánamo and Maisí, being underestimated and generally very little attended. It is for this reason that the existence of life on Earth in the not too distant future depends on its compensation and prevention.

Consequently, it is essential, both from the instructional and educational point of view, to satisfy the thirst for environmental knowledge, in order to form in them, conscious attitudes about the surrounding reality, because the faster they become familiar with nature, the more positive the influence of this has to be on their intellectual development and their education according to Zilberstein (2018).

Taking into account the objectives and principles of environmental education, defined in the meetings convened by the United Nations Organization in Stockholm in 1972 and Belgrade in 1975, and the Earth Summit held in Rio de Janeiro in 1992, it is clear the need to incorporate with precision and greater scope the environmental dimension. For this reason, Cuba is no stranger to this problem and has included this subject in its study plans and programs, as well as in the legal documents that regulate the activity.

Related to this, Castro (1992), expressed:

(...) use all the science necessary for a sustained development without pollution... They have poisoned the seas and rivers, they have polluted the air, they have weakened and perforated the ozone layer, they have saturated the atmosphere with gases that alter the climatic conditions

with catastrophic effects that we are already beginning to suffer.

Forests are disappearing, deserts are spreading, billions of tons of fertile land are ending up in the sea every year. Numerous species are becoming extinct. Population pressure and poverty lead to desperate efforts to survive even at the cost of nature (p. 4).

The Cuban environmental strategy for sustainable development is in essence a continuity, since the idea of sustainability is intrinsic to the socialist principles that serve as the basis of our revolutionary model; however, it is necessary to intensify actions to raise the awareness of our entire population in order to achieve greater effectiveness in the application of this environmental policy, and in this, educators at the primary education level play a determining role towards the fulfillment of this purpose, according to Herrera (1995).

The integral formation of the new generation foresees the development of their thinking and language; for this, sensitive experience is required, which is assimilated by the students in the process of perception of different objects, phenomena and processes of the nature that surrounds them and of the social life in which they develop, all this should be seen as a process and result of the strategic actions and tasks set forth in the state plan for the confrontation of Climate Change (Task Life).

Environmental education, from the Natural Sciences subject, focuses on man, evident in the achievements in education, health, science, technology and social security; a fact that, for many Third World countries, is a utopia in the framework of unequal relations. The educational institutions are responsible for the integral formation of the personality of the students, aspects that come as an indication in the new curriculum of primary education.

The authors agree with the contributions made by researchers on the subject, which reflects that the Cuban school faces an important challenge towards environmental education in students, from the Natural Sciences subject in the context of the current Cuban educational improvement, since, in order to achieve this goal, educators need to be sufficiently prepared.

The works of (Márquez, 2016; Mc Pherson, 2008; Ministry of Science, Technology and Environment [CITMA], 2007; United Nations Educational, Scientific and Cultural Organization [UNESCO], 2006; Relaño, 2010; Ugarte, 2014; Valdés, 2021), among others, in which environmental education, from Natural Sciences occupies a space of constant reflection in the experiences and research developed by them, have contributed to this.

The above, has a true formation in favor of environmental protection, the Cuban school must become the essential center for its promotion, through a continuous and permanent process of instruction and education, so that it constitutes a true component of the integral education of all citizens in terms of the

acquisition of knowledge, skills and attitudes, as well as in the formation of values aimed at such direction, according to Mc Pherson (2008).

This should be a basic premise to update the knowledge of students from the work of many researchers and defenders of life on our planet, where the aggressiveness of man towards nature has become the cause of the disappearance of life, all of which can be seen in the data provided by the state plan to address Climate Change (Task Life).

Thus, it is assumed as an objective to contribute to the development of environmental education from the subject Natural Sciences in the educators of the Aguacatal school zone in the municipality of Maisí under the conditions of fragile mountainous ecosystems.

Development

In history, the first works on environmental education are known since the first years of the 17th century, in the United States, with the movements for the protection of nature, which arose as a consequence of the indiscriminate felling and sale of trees in the lands of the Plymouth colony. Subsequently, environmental manuals were introduced in religious schools for educational purposes.

However, efforts to develop a more effective environmental education became more evident in the 20th century, especially in the second half of the century. Thus, on December 10, 1948, in Paris, when the United Nations Organization (UNO) was created, the Universal Declaration of Human Rights was signed, which, in its article 12, refers to the economic, social and cultural rights of man.

In this same order of criteria, it is not until the 1970's that the international community really projects itself, deeply in relation to the protection of the environment and the awareness of the environmental problems existing on the planet. In this sense, on June 5, 1972, the United Nations International Conference on the Environment was held in Stockholm, Sweden.

Following this meeting, in October 1972, and under the organization of the French State, the Aix-en-Provence International Colloquium on "Environmental Education" was held. At this event, the elements already enunciated in previous meetings of experts, such as the one promoted by UNESCO (1970), were developed and a definition of the Environment was proposed.

Already in 1974, the United Nations International Program for the Environment was elaborated, which has among its objectives environmental training in both formal and informal education.

Later, from October 13 to 22, 1975, an International Seminar on Environmental Education was held in the city of Belgrade. The United Nations International Program for the Environment was presented at this seminar, which was attended by most of the UNESCO Member States. The meeting also advocated the need to think and act in a new spirit in order to find a solution to environmental problems. In this regard, it was agreed to:

To make the population aware and concerned about the environment and the problems inherent to it, and to have the knowledge, capacity, mentality, motivation and sense of responsibility that will enable them to work individually and collectively to solve current problems and prevent the emergence of new ones. (UNESCO, 1975, p. 24)

Later, in 1976, in Nairobi, UNESCO organizes an International Conference aimed at emphasizing the importance and role of education in the dissemination of information and training, because this increases the understanding inspired by the sense of responsibility regarding the protection and improvement of the environment.

In 1976, specifically on July 4, in Algiers, the Universal Declaration of the Rights of Peoples was signed. This declaration, in its article 16, section V, establishes the right to the environment and common resources.

As early as 1977, the Declaration of the Intergovernmental Conference on Environmental Education was signed in Tbilisi, the former Union of Soviet Socialist Republics (USSR). This conference, also organized by UNESCO, in cooperation with the United Nations Environment Program (UNEP), established the objectives of environmental education.

From August 17 to 21, 1987, an International Congress on Environmental Education was held in Moscow, with the participation of 110 countries.

Finally, in 1992, in Rio de Janeiro, Brazil, the International Conference on Environment and Development, known as the Earth Summit, was held. At this international meeting, global environmental problems and the plans, projects and strategies to address them were discussed. Among these plans, environmental education was considered the pillar without which it is not possible to expect any solution.

The attention to the environment at the curricular level has been present during these years, but very much directed to Natural Sciences and with the tendency to incorporate concepts on environmental aspects to the new improvement programs, since the Curricular Adjustments 2022, in addition to the law 150/23 Law of the system of natural resources and the environment, the above should contribute to the acquisition of knowledge on environment, sustainable development and environmental education but it is still insufficient, hence the need for a methodological strategy.

The first to use the term strategy were the Greeks. According to history, and from the etymological point of view, its name comes from the word ΣΤΡΑΤΗΓΙΚΗΣ (stratégós: general) "stratēgeia" which means "the art or science of being general".

The Larousse dictionary of the Spanish language conceives strategy as the art of directing military operations and considers tactics as a synonym of this, the ability to direct a matter or project. While in the DRAE dictionary, Microsoft, Encarta (2009), it is defined as the "(...) ability, skill, expertise to direct a matter (...) adjustable process, set of rules that ensure an optimal decision at all times".

In 1962, it was introduced in the field of theory and defined as the joint determination of the company's objectives and the lines of action to achieve them.

From epistemology, according to Valle (2019), the strategy concept is introduced in the economic and academic field with game theory, in both cases the basic idea is competition.

So the concept of strategy has been widely used in military, business and service sciences, many authors have enriched the concept, for example, Valle (2019), and others, have strengthened its conceptual basis, thanks to that, in pedagogical sciences they find a high field of employment.

The use of strategy in educational activity in general, has in recent times a good level of use as a scientific result in educational research, according to the conceptions of Valle (2019), an important reflection that points out that the Cuban school has assumed as premises the strategy to meet and strengthen the needs of the context.

Many authors have used the base term (strategy) and have added the denomination they consider for their purposes, for example: interventional strategy (Añorga, 1996); theoretical-methodological, pedagogical (Ortíz and Mariño, 2020); for Márquez (2021), interdisciplinary and for (Valcárcel, 2020), didactic, methodological, socio-educational, among others.

Roca (2021, p. 27), points out that "The concept of strategy has been widely used and its use has been extended to the most diverse activities where a management task is developed", this author emphasizes that it, as part of the stage of looking at the longer term in planning, is complemented by its concretion in the daily work of the teacher. These ideas for the teaching-educational process and the environmental training of teachers through methodological work are accepted.

It is valid to recognize is that the strategies:

- They imply important changes in the direction of any process, such as the teaching-learning process.
- It is a broad and globalized process that takes into account decision-making, the strategy formulation process, human resources, technology, information, culture and control, among other aspects.
- Strategies emphasize not only results, but also process development.
- They seek the transformation of an initial state into a desired state, which is why they are systemic, dynamic, flexible, contextualized and executed gradually and in stages.

Although Sierra (2020) considers that -the pedagogical strategy is distinguished by three dimensions: Procedural (delimitation of components and approaches to adapt to educational change), Methodological (conception, planning and control of components) and Contextual (adjustment of actions to objectives and needs), to this is added that its limits go beyond the school institution and encompass other contexts of action such as the community.

Based on the above analysis and as a result of the theoretical systematization carried out, for the interests of this research, and considering that it is fully in line with it, we assume the conceptions of Lima (2010, p. 188) who points out: "(...) strategy is a set of sequential and interrelated actions that starting from an initial state (given by the diagnosis) allow directing the passage to an ideal state as a result of planning".

It was necessary to inquire into the definitions of methodological strategy, and there appears that of González (2021), who states:

"(...) methodological strategy is the anticipated integral projection of the didactic components to achieve changes in the training of the subjects, taking as a starting point the real state in the development of the subjects, to take them to the desired state, which conditions the whole system of actions to achieve the objective." (p. 45)

It is decided to assume this definition because important elements appear that fit the research interests and are those referred to: the formation of the subjects, starting point the real state in the development of the subjects, to take them to the desired state and system of actions to achieve the objective, which is congruent with the scientific problem related to environmental formation, because it completes what Valle (2014) assumed, referred to: sequential and interrelated actions, starting from the diagnosis and directing the passage to an ideal state consequence of the planning.

The methodological strategy presented is characterized by its:

- Intentionality: it is directed to an explicitly defined purpose, that is to say, to the development of the methodological environmental training of the teacher in the Bachelor's Degree in Primary Education.

- Degree of completion: it defines the criteria that determine the necessary components for the development of the teacher's environmental education in the Bachelor's Degree in Elementary Education.
- Degree of comprehensiveness: it explicitly establishes the limits that define it as a methodological strategy, hence its procedural, open, systemic, flexible and contextualized nature (addressing international, national, territorial and local environmental problems).

The structural components of the methodological strategy to be developed are taken with the peculiarity that the authors decide to incorporate, first of all, one component (foundations and the principles of operation), as the first structural component, so that it is implied in the theoretical-methodological corpus of the strategy, a point of view assumed from Valle (2014)

It is valid to point out that these actions are logically from the stages, that is why they are enunciated as stages and the other elements raised by Valle (2014) are maintained, so the structure of the methodological strategy will be:

I-Mission II-Objectives III-Stages (Diagnosis-Planning-Implementation-Evaluation IV-Resulting Quality

I-Mission To contribute to the environmental education of primary school teachers from the subject Natural Sciences in the Aguacatal school zone in the municipality of Maisí.

General Objective: To contribute to the environmental education of primary school teachers from the subject Natural Sciences in the school zone Aguacatal in the municipality of Maisí.

Specific Objectives:

- To diagnose the environmental education process of primary teachers.
- To characterize primary teachers in the process of environmental education.
- To propitiate the differentiated improvement of primary teachers in the environmental education process.
- To carry out actions in the methodological work for primary teachers in the environmental education process.

Stage 1 Diagnosis: The diagnosis allows to scientifically know the real (current) state, to determine its contradictions, insufficiencies, weaknesses, strengths and potentialities and the achievements, consequently, to trace the objectives that will lead to the desired state (the environmental education of

the teacher). This means that this stage is very important because it is the one that allows the actions of the other stages that follow it to be traced.

Stage 2 Planning: This stage is directly related to planning, which comprises the actions that, as a system, allow the achievement of the objectives outlined in close connection with the diagnosis stage in the transformation of the actual state to reach the desired state.

Stage 3 Implementation: It is developed according to the planning carried out to allow the achievement of the objectives in a gradual way, which makes it possible to move from the real state to the desired state.

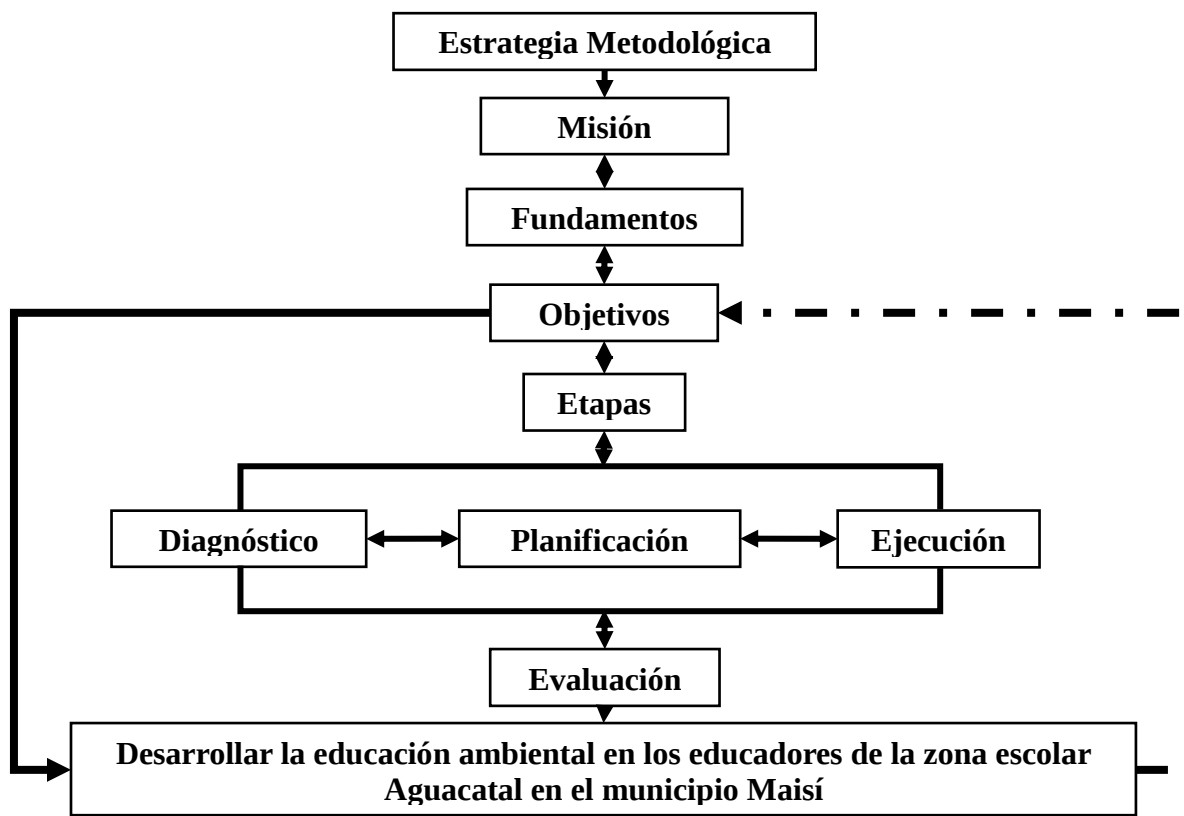
Stage 4 Evaluation: It allows determining how the transformation of the initial state of the object was influenced, whether or not progress was made in achieving the proposed objectives through the methodological strategy to reach the desired state.

Resulting Quality: Contribute to environmental education in primary level educators from the Natural Sciences subject in the Aguacatal school zone in the municipality of Maisí in fragile mountain ecosystems.

The ways to be used to guarantee the success of the proposal go through the social functions, their abilities, capacities, in the school zone exercising the dynamic role with the unity of the affective and the cognitive and the self-regulation of the behavior.

The methodological strategy proposed has followed a logical order with elements conceived in it, so as to achieve its mission and objectives; its modeling from the systemic approach facilitates the understanding of why it can be one of the answers to the scientific problem posed. Hence the following graph of the methodological strategy.

Graph 1 Structure of the methodological strategy



Elaboración propia, adaptado de Valle (2012)

Methodology used

The logic of this article is based on the dialectical-materialistic approach, which allowed the application of various theoretical and empirical research methods, which made possible the study of environmental education in the context of fragile mountain ecosystems, with the methodology applied, as part of the conformation of the methodological strategy mentioned above, the initial diagnosis recognized the following results:

Limited knowledge on the part of the students about the main environmental problems of the locality

Little linkage of the local environmental problems dealt with in the Natural Sciences classes.

Insufficient actions for the development of environmental education by educators from the Natural Sciences subject in fragile mountain ecosystems.

From the quantitative point of view is reflected in the following way:

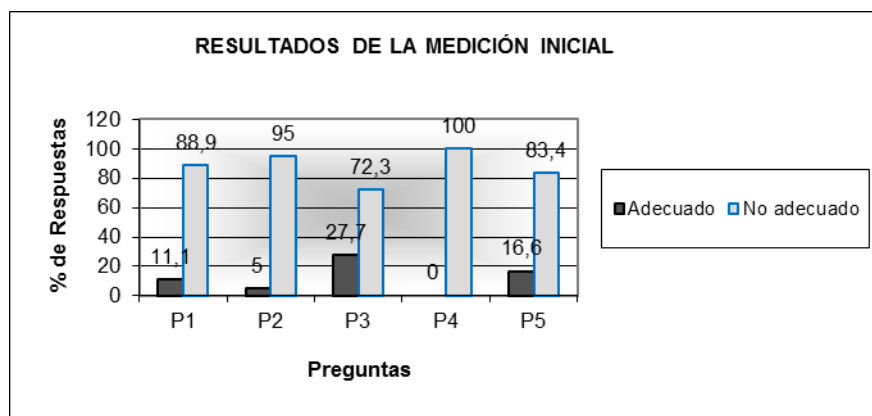
Table 1 Initial measurement of the pre-experiment

Results

RESULTADOS DE LA MEDICIÓN INICIAL					
	P1	P2	P3	P4	P5
Adecuado	88,9	5	27,7	0	83,4
No adecuado	11,1	95	72,3	100	16,6

Own elaboration, adapted from Márquez (2012).

Graph 1 represents the results of the initial measurement



Own elaboration, adapted from Márquez (2012)

With the actions of the methodological strategy, the results reflected in Table 2 were achieved.

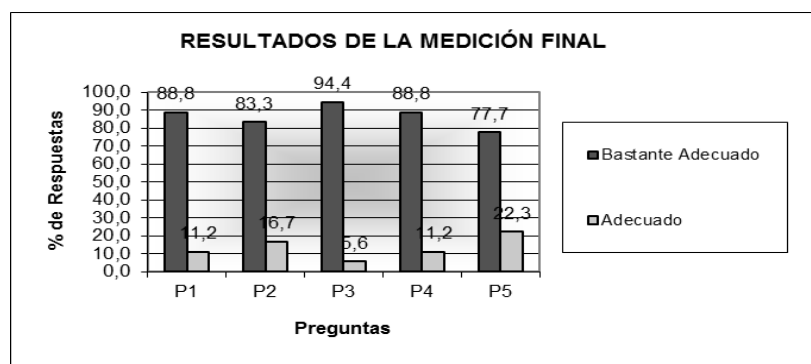
Table 2 Final measurement of the pre-experiment

Results

RESULTADOS DE LA MEDICIÓN FINAL					
	P1	P2	P3	P4	P5
Bastante Adecuado	88,8	83,3	94,4	88,8	77,7
Adecuado	11,2	16,7	5,6	11,2	22,3

Tomado de Márquez (2012).

Gráfico 2. Representa los resultados de la medición final.



Results

After the quantitative results obtained, these were reflected qualitatively as follows:

It helps to solve a problem of pedagogical practice in the teaching-learning process in the context of the Aguacatal de Maisí school zone.

It contributes to raise the level of scientific-methodological preparation of the educators of the primary level in the school zone of Aguacatal de Maisí, in function of the development of environmental education.

It helps to solve other socio-community problems in order to improve the quality of the teaching-learning process of the subject Natural Sciences in fragile mountain ecosystems.

The methodological strategy designed, with the stages and their actions, and methodological instrumentations, makes up for the lack of materials for the development of environmental education in the teaching-learning process of the Natural Sciences subject.

It offers concrete suggestions on how to act in order to contribute to the development of environmental education from the potentialities offered by the contents of the subject Natural Sciences in the educators of the primary level in the school zone of Aguacatal de Maisí.

It makes it possible to guide the work of environmental education, in order to improve the preparation of educators when conceiving their classes, and the educational work with their students, in conditions of fragile mountainous ecosystems.

Discussion

The results obtained confirm that the methodological strategy for the development of environmental education from the subject Natural Sciences in the educators of the primary level in the Aguacatal school zone in the municipality of Maisí is effective for the compensation of the scientific problem posed. It constitutes a working tool for the directors and educators in the fragile mountain ecosystem and, consequently, the integral formation of the personality of the students.

Conclusions

The systematization made to the assumed referents and that sustains environmental education in the Natural Sciences subject, allows determining that the behavior of the research object in this periodization has been characterized by a different way, evidencing remarkable changes from the improvement occurred in the primary educational level. The contribution to the integral formation of the students from the subject Natural Sciences implies the work of the educators from the potentialities of the contents to awaken feelings of love towards nature, as a concrete result of the methodological

strategy presented in function of the development of environmental education in the educators of the primary level in the Aguacatal school zone in Maisí. Through activity and communication, primary level educators in the Aguacatal school zone in Maisí acquire contents that contribute to the development of environmental education with a global thinking that is reflected in local action with solutions that help protect and transform their natural environment to the extent that they know and relate to it and are able to value the importance of environmental action based on their needs, motivations and values towards the environment that surrounds them.

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