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Trends and Effectiveness of a Pedagogical Strategy for the Promotion of Environmental Care in 7th grade students

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Tendencias y Efectividad de una Estrategia Pedagógica para la Promoción del Cuidado del Medio ambiente en Estudiantes de grado 7°

Tendências e Eficácia de uma Estratégia Pedagógica para a Promoção do Cuidado Ambiental em Alunos do 7º ano

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Abstract

This article examines the implementation of a pedagogical strategy focused on the care and protection of the environment in the Zenú educational community. The proposed pedagogical strategy was developed using a qualitative methodology of action-research type, with a sample of 30 7th grade students, the activities were developed in 3 phases, an observation phase, a thinking phase and an action phase. In terms of results, through the initial socialization of the project, it was possible to actively involve students, parents and teachers, generating a solid collective commitment from the beginning. Active collaboration and belief in the community's capacity to address environmental challenges were fundamental to motivate students to behave in an environmentally responsible manner. In conclusion, the inclusion of the ancestral culture of the Zenú people, with a focus on sacred sites, added a valuable dimension to the pedagogical strategy, promoting the preservation of both nature and cultural traditions. Likewise, the comprehensive evaluation of the strategy proved to be essential to measure student learning and the effectiveness of the strategy in generating sustainable environmental awareness in the community.

Key words: Pedagogical Strategy, Environment, Educational Inclusion.

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Resumen
Este artículo examina la implementación de una estrategia pedagógica centrada en el cuidado y la protección del medio ambiente en la comunidad educativa Zenú. La estrategia pedagógica planteada se desarrolló empleando una metodología cualitativa de tipo investigación-acción, contando con una muestra de 30 estudiantes de grado 7°, las actividades se desarrollaron en 3 fases, una fase de observación, una fase de pensamiento y una fase de actuación. A nivel de resultados, a través de la socialización inicial del proyecto, se logró involucrar activamente a estudiantes, padres de familia y docentes, generando un compromiso colectivo sólido desde sus inicios. La colaboración activa y la creencia en la capacidad de la comunidad para abordar los desafíos ambientales fueron fundamentales para impulsar la motivación de los estudiantes hacia comportamientos responsables ambientalmente. Como conclusión se establece que la inclusión de la cultura ancestral del pueblo Zenú, con un enfoque en los sitios sagrados, añadió una dimensión valiosa a la estrategia pedagógica, promoviendo la preservación tanto de la naturaleza como de las tradiciones culturales. Así mismo, la evaluación integral de la estrategia demostró ser esencial para medir el aprendizaje de los estudiantes y la efectividad de la estrategia en la generación de una conciencia ambiental sostenible en la comunidad.
Palabras clave: Estrategia Pedagógica, Medio Ambiente, Inclusión Educativa.

Resumo
Este artigo analisa a implementação de uma estratégia pedagógica voltada para o cuidado e proteção do meio ambiente na comunidade educativa Zenú. A estratégia pedagógica proposta foi desenvolvida utilizando uma metodologia qualitativa do tipo investigação-ação, com uma amostra de 30 alunos do 7º ano, as actividades foram desenvolvidas em 3 fases, uma fase de observação, uma fase de reflexão e uma fase de ação. Em termos de resultados, através da socialização inicial do projeto, foi possível envolver ativamente alunos, pais e professores, gerando um sólido compromisso coletivo desde o início. A colaboração ativa e a crença na capacidade da comunidade para enfrentar os desafios ambientais foram fundamentais para impulsionar a motivação dos alunos para um comportamento ambientalmente responsável. Em conclusão, a inclusão da cultura ancestral do povo Zenú, com destaque para os locais sagrados, acrescentou uma dimensão valiosa à estratégia pedagógica, promovendo a preservação da natureza e das tradições

culturais. A avaliação exaustiva da estratégia revelou-se essencial para medir a aprendizagem dos alunos e a eficácia da estratégia na criação de uma consciência ambiental sustentável na comunidade.
Palavras-chave: Estratégia Pedagógica, Ambiente, Inclusão Educativa.

INTRODUCTION

In recent decades, environmental care has become a global concern due to the increasing negative impact that humans have inflicted on the natural environment (Salisbury, 2021). The relentless pursuit of economic power by nations has led to the degradation of ecosystems, habitat pollution, and indiscriminate exploitation of natural resources. Among the most pressing environmental problems is the inadequate management of solid waste, whose disconnection with environmental education has further exacerbated the crisis (Salisbury, 2021).

In this context, environmental care emerges as a fundamental problem that affects humanity as a whole, with devastating consequences such as pollution, logging of native forests, deforestation, burning of waste and contamination of water sources (Basani, 2017). This challenge is not foreign to the community of the Zenú reservation, specifically in the Agricultural Technical Educational Institution of Cerro Vidales, where a contamination problem has arisen due to inadequate solid waste management and the lack of an ingrained ecological culture (Basani, 2017).

Although the institution promotes environmental conservation and the formation of individuals responsible for natural resources, traditional pedagogies have limited the effectiveness of this vision. Pre-established curricula have hindered the formation of individuals truly committed to their social, natural and environmental surroundings (Salisbury, 2021).

This problem is compounded by a lack of awareness and understanding among students with learning barriers. These students often do not understand the importance of environmental issues or the relationship between their actions and environmental impacts, which can be attributed to cognitive limitations, lack of access to relevant information, or lack of adapted learning opportunities (Basani, 2017). In addition, these students are often excluded from environmental care and protection initiatives due to their difficulty in understanding complex environmental concepts and fully participating in hands-on activities (Salisbury, 2021).

In view of this situation, the central research question arises: How to strengthen environmental care in seventh grade students, including those with learning barriers, through a pedagogical strategy in the IE Técnica Agropecuaria Cerro Vidales de Tuchín, Córdoba?

With the general objective of strengthening environmental care in this educational context, specific objectives have been established, ranging from the identification of factors related to environmental care to the evaluation of a pedagogical strategy designed to achieve this purpose.

This project, in line with the worldview and spirituality of the Zenú people, seeks to address this issue through inclusive education that mitigates barriers to learning and promotes equal opportunities. Inclusive education will not only contribute to the integral formation of students, but will also foster a sound environmental awareness and a respectful attitude towards natural resources (Basani, 2017).

In summary, this article addresses a pressing problem: the effective integration of environmental care in the education of seventh grade students, including those with learning barriers. Through a pedagogical strategy, we seek to strengthen environmental awareness and the active participation of students, thus contributing to the care and protection of the environment and the development of a citizenship more committed to sustainability.

The concept of educational inclusion has been fundamental throughout human history. In different times and contexts, various reasons, such as cognitive, physical, religious, economic or thinking limitations, have led to the social exclusion of individuals. This exclusion has prevented the integral development of these people and has resulted in the creation of deep gaps that divide society into two groups: those who are included and those who are excluded (Ramírez, 2017).

UNESCO (2005, cited in Moliner, 2013) defines inclusion as a dynamic and transformative process that addresses and responds to the diversity of needs of all learners through inclusive practices in learning, cultures and communities. This process seeks to reduce exclusion within education through changes and modifications in educational content, approaches, structures and strategies. The vision behind inclusion is that all children, regardless of their differences, should be educated in a common education system and that it is the responsibility of the regular system to educate all children (UNESCO, 2005).

Throughout history, education has played a crucial role in society, but unfortunately, it has also been a means of exclusion for those who

did not meet certain criteria of equality. People have been excluded by gender, age, race, socioeconomic status, religion and disability, assigning them specific labels and roles at different times (Vargas et al., 2012).

Educational inclusion seeks to remove these barriers and ensure that all students have equal access to education, regardless of their individual differences (Porter, 2008). From this perspective, inclusion implies that all children, including those with disabilities or special needs, attend their neighborhood or local school and share regular classrooms with their peers of the same age in their community (Porter, 2001). In other words, inclusion encourages students with disabilities to attend the school they would attend if they did not have a disability.

However, it is important to note that inclusion is not considered a static state, but a continuous and constantly evolving process (Sebba and Sachdev, 1997). School inclusion as a state does not imply simply placing students with disabilities in regular classrooms, but requires constant efforts to ensure that all students have equal opportunities and access to quality education (Ainscow, 2005; UNESCO, 2005).

In addition, inclusion is not limited to disability alone. It must encompass all forms of diversity present in the school, including cultural, linguistic, socioeconomic, gender and other forms of diversity (UNESCO, 2001). Inclusion implies creating a welcoming educational environment that is respectful of all differences, where inclusive pedagogical practices are adopted, the necessary resources and supports are adapted, and a school culture that celebrates diversity and promotes mutual respect is fostered.

Bandura's Social Learning Theory, developed by Albert Bandura in 1977, is a fundamental perspective in psychology that addresses how people acquire new knowledge, skills and attitudes through observation and interaction with their social environment.

Bandura emphasizes that learning is not limited to direct experience, but that people can learn by observing others. This process implies that people can acquire new behaviors, knowledge and attitudes by observing the actions and outcomes of others.

Social learning involves modeling, where an individual adopts behaviors, attitudes or skills after having seen them in another person. It is not simply mechanical imitation; it involves cognitive processes such as attention, retention, reproduction and motivation. Individuals select, process and evaluate observed information before deciding whether to incorporate it into their own behavioral repertoire.

Bandura emphasizes the constant interaction between the social environment and internal cognitive processes. A person's thoughts, beliefs and attitudes can influence his or her ability to learn from social experiences.

In addition, Bandura's Social Learning Theory highlights the importance of attention, retention, reproduction and motivation in the learning process. These elements interact with each other and contribute to the development of learned skills and behaviors.

Similarly, Bandura's Social Learning Theory can play a fundamental role in the development of environmental awareness in seventh grade students. According to this theory, students can acquire environmental knowledge and attitudes by observing and modeling the behavior of others, including their teachers, peers, and public figures committed to environmental protection. Attention and retention are key aspects, which means that students should be exposed to environmentally conscious role models and remember actions and attitudes related to environmental awareness.

Replication and motivation are also crucial elements. Students need opportunities to put into practice what they have observed in the classroom and in their community. This may include participating in environmental activities, such as conserving resources, recycling, or participating in school projects related to the environment. In addition, motivation plays a vital role; students must understand the positive consequences of behaving in an environmentally conscious manner and be motivated to do so.

Therefore, applying Bandura's Social Learning Theory in the seventh grade context could involve exposing students to environmentally conscious role models, providing opportunities to practice these behaviors in real-world situations, and motivating them by highlighting the benefits of environmental awareness. Doing so would foster the development of a strong and enduring environmental consciousness in students, which would contribute to a greater commitment to environmental protection and sustainability as they progress through their education and lives.

Universal Design for Learning (UDL) has become a fundamental pedagogical strategy for addressing the diversity of student needs and learning styles. This methodology, originally developed by the Center for Applied Special Technology (CAST) in 1990, has gained recognition and acceptance in the field of education due to its focus on equity and inclusion.

The 1991 Political Constitution of Colombia recognizes the right of all people, including those with special educational needs, to have

access to quality education throughout their lives. This legal framework supports the implementation of the SAD in the Colombian educational context, as it seeks to ensure that all students have equal opportunities to develop academically and personally, regardless of their characteristics or particular conditions.

To better understand SAD and its application in education, it is important to consider the contributions of several authors and experts in the field of inclusive pedagogy. Izzo (2012) highlights that SAD is based on an inclusive approach that focuses on creating learning environments that are flexible, accessible, adaptive and centered on the individual needs of each student. This perspective is essential in competency-based training in modern society, where the diversity of students and their learning styles must be effectively addressed.

Sánchez and Díez (2016) emphasize that SAD involves a redesign of the traditional curriculum to consider the characteristics, needs and interests of all students, promoting diversity and educational inclusion. This approach requires educators to adapt and remain in constant training to meet the changing needs of students, as interests and needs may vary according to factors such as socioeconomic status and family support. Blanco (2008) adds that the inclusion of diversity in education implies a cultural change, not only a political one, and emphasizes the importance of creating spaces that promote an egalitarian and equitable education.

The Universal Design for Learning model proposes three key principles for instructional planning. The first, providing multiple means of representation, refers to the need to present information in a variety of ways to accommodate differences in student perception and understanding. The second principle, provide multiple means of action and expression, recognizes that there is no single optimal way for students to interact with information or demonstrate understanding. The third principle focuses on providing multiple forms of engagement, recognizing variability in student motivation and engagement. Together, these principles promote more inclusive and meaningful learning by ensuring that all students have equal opportunities to develop academically and personally, regardless of their individual characteristics.

Likewise, it is important to highlight that the Universal Design for Learning (UDL) is significantly related to the proposal of the pedagogical strategy for the care and protection of the environment in seventh grade students, since both share the fundamental objective of promoting inclusion and equity in the educational process.

The SAD, by offering multiple means of representation, allows content related to environmental care to be presented in a variety of ways, catering to students' different forms of perception and understanding. This is essential when addressing complex topics such as environmental protection, as some students may have difficulty understanding abstract concepts or technical information, while others may benefit from visual, auditory, or interactive approaches. By using a variety of representational strategies, educators can ensure that all students have access to information effectively.

The second SAD principle, which focuses on providing multiple means of action and expression, is equally relevant to the pedagogical strategy for environmental care. Environmental protection involves the active participation of students in concrete actions, such as reducing waste, conserving natural resources and promoting sustainable practices.

However, each student may have different abilities and preferences in terms of how to participate and express their commitment to the environmental cause. By offering choices in terms of actions and forms of expression, educators can enable students to contribute to environmental stewardship according to their individual strengths. Some students may choose to lead environmental projects, while others may prefer to express their commitment through artistic, written, or other forms of expression that are more effective for them.

Finally, the third SAD principle, which focuses on providing multiple forms of involvement, is also closely related to the pedagogical strategy for environmental stewardship. Student motivation and engagement are crucial aspects when it comes to instilling sustainable practices and fostering environmental awareness.

Educators must recognize that different students may find motivation in a variety of ways, whether through group work, choosing environmental projects that interest them, or applying pedagogical approaches that suit their learning styles. By providing multiple forms of engagement, the pedagogical strategy can ensure that all students feel motivated and committed to the cause of environmental stewardship, facilitating more effective and sustainable learning on this important topic.

MATERIALS AND METHODS

The study is qualitative, as it seeks to explore, identify and know the perceptions of teachers regarding educational diversity; thus approaching the broad interpretation of the dynamics emerged in the

reality of the phenomenon studied (Buena-Paz, 2017; Sanchez, 2019).

Likewise, the qualitative approach allows researchers to have direct contact with the object of study and provides the opportunity to directly evidence the change generated in relation to the problem. Considering that the research is carried out in the educational context, the implementation of a didactic strategy and the analysis of the results obtained after the implementation of this strategy are established.

Regarding qualitative research, Hernández et al. (2014) state that this research approach "provides depth to the data, dispersion, interpretative richness, contextualization of the environment or setting, details and unique experiences. It also provides a "fresh, natural and holistic" point of view of the phenomena, as well as flexibility" (p. 16).

Regarding the type of research, Action Research allows the implementation of an idea oriented towards improvement or change, trying to establish a real effect on the problem situation being studied (Kemmis, 1988). In this sense, the implementation of action research favors active participation by students in the development of the activities, which are developed in 3 phases, an observation phase (identification of the problem and data collection), a thinking phase (analyze and interpret) and an action phase (solve the problem and implement improvements) (Hernández et al., 2014).

According to Hopkins (1989) "Action Research combines a major act with a procedure of inquiry; it is a disciplined action by seeking, a personal attempt to understand, while engaged in a process of improvement and reform."

For the development of the research process reflected in this article, the participating population was established, first of all, the students of grade 7-4 of the Agricultural Technical Educational Institution of Cerro Vidales and the teachers who guide classes in this group, who, through their voices, contributed to the identification of the factors related to the care of the environment in this group of students.

Likewise, a practical work is established with a population made up of 30 students who are part of the 7th-4th grade of the Agricultural Technical Educational Institution of Cerro Vidales, all between the ages of 12 and 14, belonging to socioeconomic stratum 1, and to the communities of the Zenú indigenous reservation to which the Educational Institution is linked.

These two population groups comprise the sample selected for the development of the activities proposed within the framework of the research conducted.

The main instrument selected was the semi-structured interview, which was applied to the population of teachers and students in order to establish some fundamental aspects that lead to the design and subsequent implementation of the pedagogical strategy. The questions of this interview were categorized and validated by experts before being implemented. The interview format and the validation process are presented below:

Table 1. *Interview Format*

Teacher Interviews	
Project title	Pedagogical strategy for the care of the environment in the 7th grade
Context of application	The interview will be conducted at the Cerro Vidales Agricultural and Livestock Technical Educational Institution in the municipality of Tuchín, Córdoba.
Method	**Semi-structured:** the questions are formulated by the interviewer and are open-ended and informative.
Research objective(s) with which it is associated	Identify factors related to environmental care in 7th grade students.
To whom it is addressed	Sample of teachers from the Cerro Vidales Agricultural and Livestock Technical School in the municipality of Tuchín, Córdoba.
Purpose of the interview	Determine from a teacher's point of view the way in which environmental care is promoted and stimulated in 7th grade students.
Category(ies) in relation to which to investigate	
Category: Pedagogical Strategy	How do you integrate environmental stewardship into your lesson planning and development?
	What educational resources or materials do you use to teach your students about the importance of caring for the environment?

	What challenges have you faced in implementing pedagogical strategies for environmental stewardship and how have you overcome them?
Category: Inclusion	What strategies do you use to foster collaboration and mutual respect among your students, thus promoting inclusion in environmental projects and activities?
	How do you adapt your pedagogical strategies to ensure the participation of all students, regardless of whether or not they have learning barriers?
	What steps do you take to ensure that all your students feel included in the development of activities related to environmental stewardship?
Category: Environment	How do you approach your teaching strategies to help students understand the importance of caring for and protecting the environment?
	What steps do you take to raise awareness about conserving natural resources and reducing environmental impacts in your school environment?
Associated questions Inter categories	How do you promote collaboration and mutual respect among your students when working on environmental projects, and how do you use those opportunities to reinforce environmental stewardship values?

Source: Own elaboration

RESULTS

The process of applying the instruments was carried out directly in the facilities of the educational institution, in some cases in open spaces such as the courtyard and in others in closed spaces such as the teachers' lounge. On average, the application of each interview took approximately 25 to 30 minutes. These in turn were recorded for the subsequent transcription of the answers by the researchers and their analysis, which served as the basis for the design of the didactic

strategy and the establishment of the different activities to be developed with the participating students.

For the systematization of the results, a triangulation process was carried out in which the answers given by the teachers were summarized as shown below:

The interview results reveal a number of significant findings in relation to the emerging categories: Pedagogical Strategy, Inclusion and Environment. Regarding Pedagogical Strategy, an approach focused on action and student participation stands out, using strategies that involve students in practical activities related to the environment. This reflects a pedagogical perspective aligned with constructivism and experiential learning, as proposed by authors such as Kolb and Dewey. In addition, teachers strive to raise awareness and sensitize students to the importance of environmental care, which is in line with Stapp and Cohen's principles of environmental education.

In the Inclusion category, teachers adopt pedagogical strategies that promote collaboration and mutual respect among students, with an emphasis on the active participation of all. This approach is based on Johnson and Johnson's collaborative learning theory and Baglieri and Sapon-Shevin's inclusive pedagogy. In addition, pedagogical strategies are adapted to ensure the inclusion of students with disabilities or special educational needs, reflecting a commitment to equality and diversity in the classroom.

In the Environment category, teachers seek to raise awareness of the importance of environmental stewardship through direct dialogue with students and hands-on activities focused on local and global issues. This aligns with Scott and Vare's theory of environmental education, which advocates a holistic and participatory approach to environmental education. In addition, concrete measures to conserve natural resources and reduce environmental impacts are promoted, in line with Huckle's theory of sustainability. Teachers also relate environmental care to different areas of study, following the critical environmental education proposed by Bonnett.

Following Baglieri and Sapon-Shevin's (2011) perspectives on the importance of initial socialization, it was emphasized that this step was fundamental to involve students, parents and teachers in the understanding of environmental issues. This awareness-raising stage generated a strong collective commitment from the beginning, reflecting the positive influence of the strategy from its inception.

Active collaboration, inspired by Bandura's (1977) idea of self-efficacy, was highlighted as a key element. This collaboration

strengthened the belief in the educational community's ability to address environmental challenges, which in turn boosted students' motivation to adopt environmentally responsible behaviors.

In addition, the initial socialization not only provided information about the environmental issue, but also generated a sense of community and shared purpose. This was essential for establishing a solid foundation for continued work on the pedagogical strategy, as participants felt part of a collective effort to address a vitally important issue.

The inclusion of the ancestral culture of the Zenú people, with attention to sacred sites, aligned with Bonnett's (2004) perspective on the need to integrate cultural and spiritual dimensions in environmental education. This inclusion not only promoted the preservation of nature but also of the traditions and cultural identity of the Zenú people, which motivated students to protect their environment.

The comprehensive evaluation, following the recommendations of Bustamante, Cruz and Vergara (2017), addressed multiple dimensions, including the measurement of knowledge acquired, active student participation and impact on the community. This allowed for the evaluation of both student learning and the effectiveness of the strategy in generating sustainable environmental awareness in the community.

The project's outreach to the communities of the resguardo, in line with Porter's (2008) ideas, emphasized the commitment to environmental education as a process that involves the entire community. This recognized the interconnection between people and their natural environment, promoting a deeper understanding of how individual and collective actions can have a significant impact on the local and global environment.

Finally, the pedagogical strategy implemented was aligned with contemporary visions of environmental education, highlighting the importance of inspiring action and active participation of students in environmental problem solving, according to authors such as Castrillón and Velásquez (2022), Díaz and Cuervo (2021), and Morales, Cantillo and Elles (2023). Overall, this strategy represented a sound and effective approach to address environmental challenges and promote sustainable environmental awareness in the educational community and beyond.

CONCLUSIONS

The article has explored in depth the implementation of a pedagogical strategy focused on the care and protection of the environment in the Zenú educational community. Through the analysis of the results and the review of the perspectives of various authors, several general conclusions can be drawn that highlight the effectiveness and relevance of this strategy.

First, it has been shown that the initial socialization of the strategy to the educational community is a crucial step to actively involve students, parents and teachers in the understanding of environmental issues. Following the perspective of Baglieri and Sapon-Shevin (2011), this awareness-raising stage generated a strong collective commitment from its inception, indicating that the pedagogical strategy was generating a positive impact from the outset. This finding highlights the importance of building a foundation of support and environmental awareness from the beginning of any environment-related educational program.

Second, active collaboration among all key players in the educational community, inspired by Bandura's (1977) idea of self-efficacy, played a key role in the success of the strategy. Collaboration not only strengthened the belief in the community's ability to address environmental challenges, but also boosted students' motivation to adopt environmentally responsible behaviors. This finding underscores that working together and active participation are essential to fostering sustainable awareness and commitment to the environmental cause.

Third, it has been highlighted that the inclusion of the ancestral culture of the Zenú people, with a focus on sacred sites, adds a valuable dimension to the pedagogical strategy. This inclusion, in line with Bonnett's (2004) perspective on the integration of cultural and spiritual dimensions in environmental education, not only promoted the preservation of nature but also of the traditions and cultural identity of the Zenú people. This conclusion highlights the importance of linking environmental education with local cultural heritage, which can strengthen students' connection with the natural environment.

Fourth, the comprehensive evaluation of the strategy, following the recommendations of Bustamante, Cruz and Vergara (2017), was revealed as an essential element to assess both student learning and the effectiveness of the strategy in generating sustainable environmental awareness in the community. This finding highlights the importance of measuring not only the knowledge acquired by

students, but also their active participation and impact on the community. Ongoing and comprehensive evaluation is critical to assessing the long-term success of any environmental education program.

Fifth, the projection of the project to the communities of the resguardo, in line with Porter's (2008) ideas, underscores a strong commitment to environmental education as a process that transcends the boundaries of the educational institution. This perspective recognizes that environmental protection is a collective enterprise that requires the active participation of the entire community. By bringing environmental education to these communities, it broadens the influence and fosters greater environmental awareness not only among students, but also among families and the community at large. This conclusion highlights the importance of involving the entire community in environmental education and in promoting a comprehensive approach to environmental stewardship.

Finally, it has been evidenced that the pedagogical strategy implemented is in line with contemporary visions of environmental education, according to authors such as Castrillón and Velásquez (2022), Díaz and Cuervo (2021), and Morales, Cantillo and Elles (2023). This strategy goes beyond the mere transmission of knowledge and seeks to inspire action and active participation of students in solving environmental problems. Taken together, these findings underscore the effectiveness and relevance of the pedagogical strategy implemented in promoting sustainable environmental awareness in the Zenú educational community and the community at large.

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