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RECYCLED MATERIALS TO STRENGTHEN ENVIRONMENTAL AWARENESS IN PRESCHOOL CHILDREN AT A RURAL EDUCATIONAL INSTITUTION IN THE AMAZON REGION, 2025

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ABSTRACT:
The general objective of this research was to promote a positive and responsible environmental attitude in 5-year-old children through the use of recycled material, in 5-year-old children in a rural Initial Educational Institution in the Amazonas region, 2025. The study was developed using a quantitative approach, with a quasi-experimental design in a pre-experimental phase, using a single group with pretest and post-test. The sample consisted of 17 children of the initial level aged 5 years. An observation sheet was applied as the instrument, structured in 5 and 21 items. The results showed that 58.8% were at a deficient level, while the post-test results reached a good value of 70.6%. Therefore, it is concluded that the influence of recycled material- , strengthens the environmental attitude in children of a rural Initial Educational Institution in the Amazonas region, highlighting the effectiveness of the pedagogical strategies employed during its complementation.

KEYWORDS: recycled material, environmental attitude, strengthening, pedagogical strategies, responsibility.

INTRODUCTION:

Currently, humanity faces an unprecedented environmental crisis, marked by climate change, loss of biodiversity, and the uncontrolled increase of solid waste. In this context, educating preschoolers with a critical awareness, an environmental attitude, and, above all, a proactive approach to their surroundings has become a global educational priority. Early childhood education, as a sensitive and decisive formative stage, offers an invaluable opportunity to develop attitudes of care and respect for the natural environment (Van de Wetering et al., 2022). Some studies show that children can become agents of sustainable change when they are provided with meaningful educational experiences related to the environment (Liu & Green, 2024).

In Amazonian regions such as Puerto Pacuy, in the district of Imaza, these problems are even more acute: inadequate waste management affects not only the ecological balance but also the health of local communities. Although the Ministry of Education's National Curriculum promotes environmental education (MINEDU, 2017), its application in rural areas is limited, both due to logistical factors and the lack of integration of concrete practices in the classroom. In response to this, the pedagogical use of recycled materials represents an innovative, playful, and contextualized strategy with the potential to promote a positive environmental attitude in preschool-age children (Rojas Quinto, 2017).

This research took on the challenge of evaluating this proposal. Using a pre-experimental design and a quantitative approach, it was applied to a sample of 17 students enrolled according to the SIAGIE 2024 system report, aged five years old, from State Educational Institution No. 357 in Puerto Pacuy. Using a structured observation form validated by experts, each dimension evaluated—cognitive, behavioral, and affective—was measured in terms of environmental attitude before and after the intervention. Statistical verification of significant differences ($p < 0.05$) using Student's t-test between pretest and posttest scores showed the favorable impact of using recycled materials in strengthening responsible attitudes toward the environment. Within this framework, this thesis seeks to answer the following question: To what extent does recycled material strengthen the environmental attitude of 5-year-old children at the Initial Educational Institution No. 357, Puerto Pacuy, Imaza, 2025? The general objective was: To promote a positive and responsible environmental attitude in 5-year-old children through the use of recycled materials, in 5-year-old children at the Institución Educativa Inicial N.º 357, Puerto Pacuy-Imaza, 2025, and the specific objectives were: a) to identify the level of environmental attitude in the cognitive attitude dimension in the pretest and posttest through the use of recycled materials in 5-year-old children at the Initial Educational Institution No. 357, Puerto Pacuy-Imaza, 2025; b) To identify the level of environmental attitude in the dimension of affective attitude in the pretest and posttest through the use of recycled material in 5-year-old children at Early Education Institution No. 357, Puerto Pacuy-Imaza, 2025; c) Identify the level of environmental attitude in the behavioral attitude dimension in the pretest and posttest through the use of recycled material in 5-year-old children at the Initial Educational Institution No. 357, Puerto Pacuy-Imaza, 2025; d) Involve the children's families in recycling activities to reinforce learning and promote a change of attitude at home in 5-year-old children at Early Education Institution No. 357, Puerto Pacuy-Imaza, 2025.

From a theoretical perspective, this study is formalized in a three-dimensional theory of attitude proposed by Smith (1947), which includes cognitive components (knowledge of the environment), affective components (feelings of care), and behavioral components (specific actions). Ajzen (1991) explains how attitudes, subjective norms, and perceived control influence pro-environmental intentions, and approaches to school environmental psychology (Rahmania, 2024) recognize the formative role of schools in complex social contexts. The findings of this study coincide with recent international research, which shows the positive impact of environmental attitudes and educational proposals as part of the development of sustainable attitudes and behaviors in children (Wetering et al., 2022; Liu & Green, 2024). They are also in line with the results obtained by Rojas Quinto (2017), concluding that the 3Rs as a technique significantly improve conscious environmental actions in rural students. These contributions underscore the importance of continuing to research and apply teaching strategies that integrate recycling as a means of educating ecologically responsible citizens from childhood. This study therefore responds to an urgent educational need in Amazonian contexts and emphasizes locally, proposing an innovative practice, theoretically supported and empirically validated, which demonstrates how recycled material can become an effective teaching resource for promoting environmental sustainability from early education classrooms.

International background

A meta-analysis study conducted by Wetering et al. (2022), covering 169 studies carried out in 43 countries, summarized the impact of environmental education programs on children and adolescents. A total of 512 effect sizes were analyzed across 176,007 participants. The results showed a significant improvement in environmental knowledge ($g = 0.953$), environmental attitude (0.384), stated intentions ($g = 0.256$), and environmental behaviors ($g = 0.410$) following the interventions. Despite the heterogeneity of the effects, it was possible to demonstrate potentially educational results and part of their learning due to contact with nature and collaborative work. This finding underscores the importance of designing proposals contextualized in early childhood that not only inform but also transform students' perceptions and actions regarding the environment.

Consequently, in a recent systematic review, Liu et al. (2024) analyzed 76 studies focused on pro-environmental actions in schoolchildren aged six to twelve, identifying internal factors such as self-efficacy and personal norms, and external factors such as contact with nature and parental influence. It was found that educational programs that combine playful, immersive, and observation-based strategies generate sustained behavioral changes. The research also highlights that early emotional bonding with nature increases children's ecological empathy and promotes behavioral changes. These findings support the use of resources such as recycling in the classroom, as they encourage an active experience that internalizes values of environmental respect from an early age.

For their part, Gómez et al. (2025) conducted a documentary analysis that reviewed early childhood educational experiences focused on comprehensive environmental education. Their study, which took a qualitative approach and was supported by Atlas.ti software, identified environmental literacy, child participation, and the development of critical thinking as fundamental pillars. The article argues that schoolchildren should be given the same consideration as subjects of law capable of actively intervening in the resolution of ecological conflicts. These educational proposals recognize recycling as a powerful pedagogical tool that articulates cognitive, affective, and ethical dimensions from an early age, aligning with the conclusions of this thesis.

National background

In a study conducted by Tsejem (2023), evaluating the 3Rs technique, its applicability, and its effect on (reducing, reusing, and recycling) strengthening attitudes that safeguard our habitat with educational practices in primary school students in the bilingual native community of Pumpu, in Imaza. The research was conducted using a quantitative, applied approach, with a pre-experimental design and a purposive sample of 61 students. The questionnaire used and validated by experts with a Likert scale and the results between the pretest and posttest

were compared using the T-student test. Statistically significant improvements were evident in the affective, behavioral, and cognitive dimensions. The findings confirm that the implementation of contextualized ecological strategies can induce a change in environmental attitudes in bilingual school populations.

The research conducted by Goicochea et al. (2023) aimed to determine whether a recycling workshop significantly improves the environmental attitude of four-year-old preschool students at Educational Institution 81010, Virgen de la Puerta, Trujillo. The study was applied, with a pre-experimental design and a quantitative approach. The sample consisted of 19 students, who took a pretest and posttest before and after participating in 15 fun activities related to recycling, carried out over six weeks. The results showed a significant improvement in the children's environmental attitudes, confirming that the intervention was beneficial for developing ecological awareness from an early age.

Similarly, Tello (2022) conducted a descriptive study to analyze the level of environmental attitudes in 5-year-old children, whose sample represents a group considered and proposed according to the enrollment list belonging to the Educational Institution of the Province of Huancayo, based on the application of ecological activities. A checklist was used as part of the assessment tool, which was applied to 20 students as part of the study sample. The results indicated that, after the implementation of activities focused on the reuse of materials and care for the environment, the children showed a positive change in their environmental awareness. The author concludes that the design of experiential ecological experiences is an effective way to foster responsible attitudes towards the environment from childhood.

Rodríguez (2021) also evaluated the impact of an educational strategy based on recycling as a tool for shaping environmental values among preschool students at a public institution in Lima. The methodological approach was quantitative and pre-experimental, with pre- and post-tests administered to a sample of 25 children. The study concluded that, following the educational intervention, there was a significant increase in children's commitment to recycling and their understanding of its importance. These results support the idea that the strategy not only raises awareness but also strengthens values linked to responsibility and care for the environment.

A significant benchmark in the local context, environmental citizenship and culture are part of the municipal education program implemented in the town of Imaza through Municipal Ordinance No. 010-2023-MDI. This initiative, developed by the District Municipality of Imaza, aims to strengthen environmental awareness through a participatory approach, including training activities aimed at educational institutions and social organizations. The program includes recycling campaigns, school workshops, reforestation days, and actions to promote care for the environment, prioritizing early education as a strategic axis for building environmental citizenship. This local policy explicitly recognizes the role of rural schools as vital spaces for instilling ecological values from childhood.

Theoretical foundations

There are issues that, because they are so commonplace, run the risk of going unnoticed in terms of their educational value. Proper solid waste management, for example, is often addressed as a functional or logistical component; however, it constitutes a unique opportunity to educate children about values, build citizenship, and forge a critical environmental awareness from an early age. This research is based on that conviction: exploring the link between the use of recycled materials and environmental attitudes in preschoolers is not a minor exercise, but rather an incursion into the very foundations of a pedagogy committed to the planet.

Variable 1: Recycled material

Far from being conceived as a simple teaching resource, recycled material is presented here as an epistemological tool, a vehicle for ecological thinking at an early age. From an environmental and critical perspective, as proposed by MINEDU (2021) in the PEAI–MARES guide, school recycling should be understood as part of a comprehensive strategy that combines scientific knowledge, social skills, and ethical values. The approach is not limited to teaching reuse, but proposes transforming school practices to build sustainable and reflective environments.

Classification of plastic material.

Plastic is one of the most prevalent and persistent types of waste in everyday life. Martínez et al. (2021) argue that teaching children to differentiate between types of plastics, their uses, and their ecological consequences allows them not only to develop classification skills but also to understand the life cycle stages of certain products and some of the implications of their consumption. This dimension is particularly relevant in contexts where the immediate environment is saturated with plastic waste, as it transforms observation into awareness.

Classification of glass material.

Although less common in school settings for safety reasons, glass offers a paradigmatic example of recyclability. Peña et al. (2022) highlight that introducing this material into controlled educational experiences through simulations, representations, or low-hazard waste facilitates the teaching of concepts such as infinite reuse and the circular economy. In this way, children learn that not all waste is rubbish and that some materials have a recoverable value that defies the logic of disposal.

Classification of cardboard or paper material

Cardboard and paper are among the most commonly used materials in school environments. According to Torres (2021), sorting them not only enables effective recycling practices but also provides an opportunity to reflect on consumption, the plant origin of these materials, and their relationship to deforestation. In preschool, reusing paper in art or writing activities is not a minor gesture: it is a way of connecting symbolic expression with respect for natural resources.

Thus, the recycled material variable is structured around three practical dimensions, each with different educational implications, but all interrelated in an educational vision that articulates action, reflection, and ecological responsibility.

Variable 2: Environmental attitudes

Now, what does it mean to form an environmental attitude in childhood? This notion refers to a complex psychosocial structure, made up of cognitive, affective, and behavioral components. Based on the classic model of Rosenberg and Hovland (1960), expanded and reinterpreted by recent research, it is recognized that attitudes are not taught as content, but rather develop at the intersection of knowledge, emotion, and practice.

Cognitive attitude.

This dimension refers to the knowledge that children construct about their environment and the effects of their actions on it. Jiménez (2017), in a study with higher education students, found that a greater understanding of environmental issues translates into a more consistent willingness to care for the environment. At the preschool level, this knowledge is constructed in a situated and experiential way: knowing what waste is, why it is classified, and how it affects the planet is the first step toward critical awareness.

Affective attitude.

Feeling respect, affection, or even sadness in the face of pollution is not an incidental emotional response, but a structural component of ecological attitude. Muñoz et al. (2020), in their study, have shown that positive emotions toward nature predispose children to act in its defense. Therefore, activities with recycled materials should be designed not only to inform, but also to provoke sensitive, aesthetic, and emotionally meaningful experiences.

Behavioral attitude.

Finally, the behavioral component involves acting in accordance with what one knows and feels. López (2021) argues that this consistency is the strongest indicator of a consolidated attitude. In the classroom, this translates into small actions: disposing of waste correctly, motivating other classmates, and caring for the environment without the need for orders. Considering this research as a guide, it refers to the hypothesis that these behaviors may arise more frequently when systematic recycling practices are incorporated as part of everyday school life.

Thus, the variable of environmental attitudes unfolds as a constellation of knowledge, emotions, and practices that, when addressed in a coordinated manner, allow us to glimpse the birth of an authentic ecological consciousness from the earliest years of life.

Research hypothesis.

H1: There is a direct relationship between recycled material and environmental attitudes among five-year-old students in early childhood education at Educational Institution 357, Puerto Pacuy, Imaza.

Ho: There is an inverse relationship between recycled materials and environmental attitudes among five-year-old preschool students at Educational Institution 357, Puerto Pacuy.

METHODS AND METHODOLOGY

2.1. Type of research.

This study was applied in nature and used a quantitative approach with a pre-experimental design, seeking to determine the effect of using recycled materials as part of an educational strategy to strengthen environmental attitudes in five-year-old preschool students. The study was structured with an observation sheet designed in a pretest and posttest, establishing its application to a single group, without a control group, due to the actual conditions of the school context **(**Hernández, Fernández & Baptista, 2014; Mejía, 2008).

2.2. Research Design.

A pre-experimental design with a single group was adopted, which allowed the impact of the pedagogical intervention based on recycled materials on children's environmental attitudes to be measured (Mejía, 2008).

Ge: O_1 X O_2 ⟶ ⟶

Where:

Ge : Experimental group

$O_{(1)}$: Pre-test

X : Stimulus (learning activities)

$O_{(2)}$:Post-test

Population

For this study, we have a total population of five-year-old children enrolled in a rural educational institution in the Amazonas Region during the year 2025 (Minedu. 2017).

Sample

We worked with a non-probabilistic convenience sample, consisting of 17 five-year-old boys and girls, all of whom participated with the prior formal authorization of their parents or guardians and with the authorization of the school administration (Rengifo, 2023).

Table 1 Distribution of students at a rural educational institution in the Amazonas región

Gender	Number
M	9
F	8
Total	17

Note: Taken from the 2025 enrollment lists

Sampling
Sampling was convenience-based and non-probabilistic, in accordance with its convenience characteristics and due to direct access to the study population and the operational feasibility of the intervention process (Hernández et al., 2014).

2.3. Methods, techniques, and instruments for data collection and procedure

METHODS

The hypothetical-deductive method was used, allowing us to propose a hypothesis of a direct relationship between the use of recycled material and the strengthening of environmental attitudes, to be empirically tested through the application of measurement instruments before and after the intervention (Ajzen, 1991; Smith, 1947).

Techniques
Systematic observation was used as the main technique to assess the environmental attitudes of the participating children. This was structured into dimensions and applied at the pretest and posttest stages (Rosenberg & Hovland, 1960; Ruiz & Castillo, 2021).

Instruments
The instrument used to collect data, which was then processed in the pretest and posttest, consisted of observation sheets structured based on Smith's three-dimensional model or guide (1947), validated by expert judgment. It contemplated three specific dimensions related to environmental attitude: cognitive (5 items), affective (12 items), and behavioral (12 items), respectively. A three-level Likert scale (poor, fair, and good) was used, and its reliability was verified with a Cronbach's alpha coefficient (> α 0.70) (Taciano, 2007; Ruiz & Castillo, 2021).

2.4. Procedure and presentation of data.

This study was able to develop the learning activities programmed in 16 activities or learning sessions, proposed through a learning project called " " (I take care of my health and garden using the three Rs), using recycled materials as a resource to promote experiential and meaningful learning in students and managing to develop each of the competencies related to the area of science and technology. Each scheduled activity included recreational, exploratory, and dramatization activities. Consequently, when analyzing the data, it was convenient to use descriptive statistics referring to percentages and frequencies. The Kolmogorov-Smirnov and Shapiro-Wilk normality tests were used. Finally, to counteract the results obtained through the application of the pretest and posttest, the Student's t-test and Pearson's correlation coefficient were applied. All the analysis was processed with the support of SPSS version 27 software (Mejía, 2008; Liu & Green, 2024). The result was statistically significant t (16) = -30.24, p = .000), showing a positive effect of the use of recycled material on environmental attitudes.

RESULTS

This section presents the empirical findings obtained after applying the structured observation instrument to 17 five-year-old children at a rural educational institution in the Amazonas Region, 2025. The data are presented according to the general objective and specific objectives, following a logical order and supported by tables and figures.

General objective: To promote a positive and responsible attitude towards the environment in five-year-old children through the use of recycled materials.

Table 2 Level of development in the pretest and posttest on the variable "environmental attitudes" in five-year-old children

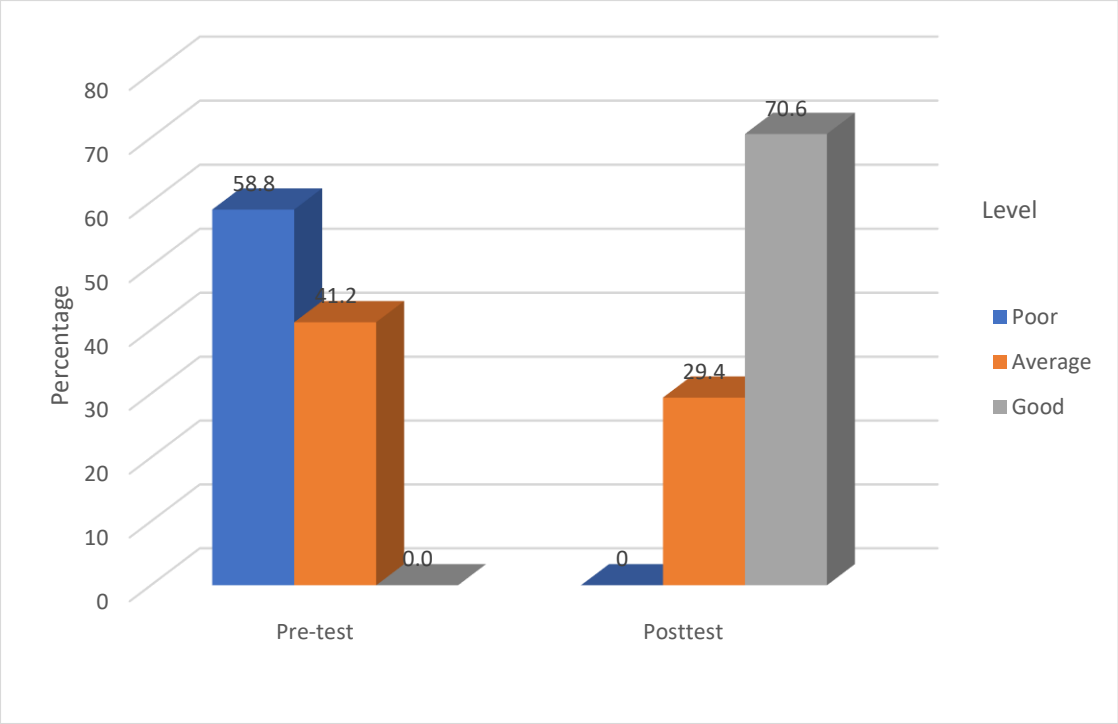
Level	**Variable: Environmental Attitudes**			
	Pretest		**Post-test**	
	Frequency	%	Frequency	%
Poor	10	58.8	0	0

Fair	7	41.2	5	29.4
Good	0	0.0	12	70.6
Total	17	100.0	17	100.0

Note: Data obtained from the structured observation form.

Table 2 shows the levels achieved in the "environmental attitudes" variable before and after the intervention. In the pretest, 58.8% of participants were at the deficient level and none were at the good level. After the intervention, 70.6% were at the good level, and no children remained at the deficient level.

Figure 1 Percentage distribution of environmental attitude levels in the pretest and posttest



Source: Prepared by the author based on empirical data

Figure 1 visually represents the percentage changes recorded.

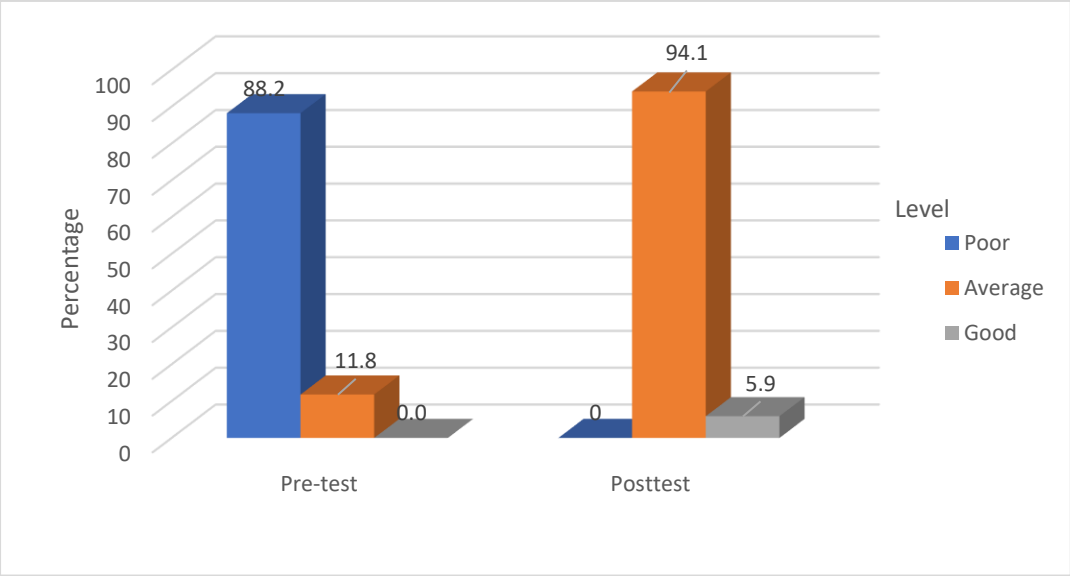
- Specific objective 1: Evaluate cognitive attitude before and after the implementation of recycled material.

Table 3 Level of development in the "cognitive attitude" dimension in the pretest and posttest

Level	**Dimension: Cognitive Attitude**			
	Pre-test		**Post-test**	
	Frequency	%	Frequency	%
Poor	15	88.2	0	0
Fair	2	11.8	16	94.1
Good	0	0.0	1	5.9
Total	17	100.0	17	100.0

As shown in Table 3, 88.2% of the children started at a deficient level and none reached a good level. After the intervention, 94.1% reached a fair level and 5.9% reached a good level.

Figure 2 Percentage changes in the cognitive dimension after the intervention.



Source: Own elaboration.
Figure 2 shows this evolution.

Specific objective 2: Determine changes in the affective dimension.

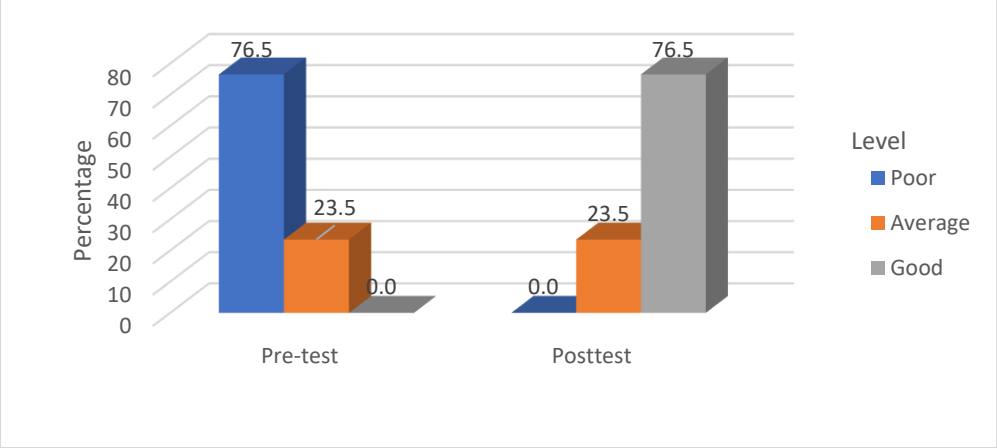
Table 4 Level of development in the "affective attitude" dimension in the pretest and posttest

Level	Dimension: Affective Attitude			
	Pre-test		Post-test	
	Frequency	%	Frequency	%
Poor	13	76.5	0	0.0
Fair	4	23.5	4	23.5
Good	0	0.0	13	76.5
Total	17	100.0	17	100.0

Note. Measurement with items 6 to 9.

According to Table 4, initially 76.5% were at a deficient level and none were at a good level. After the intervention, 76.5% reached the good level, while no participants remained at the deficient level.

Figure 3 Percentage distribution of affective attitude before and after the intervention.



Source: Own elaboration
Figure 3 illustrates these results.

Specific objective 3: Analyze behavioral attitudes before and after the intervention.

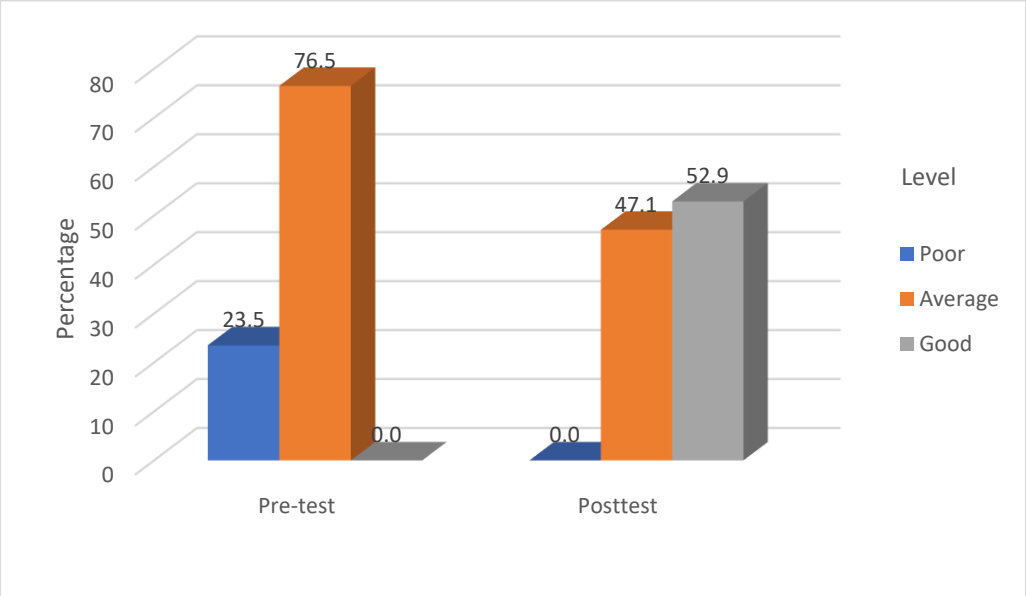
Table 5 Level of development in the "behavioral attitude" dimension in the pretest and posttest.

Level	Dimension: Behavioral Attitude			
	Pretest		Post-test	
	Frequency	%	Frequency	%
Poor	4	23.5	0	0
Fair	13	76.5	8	47.1
Good	0	0.0	9	52.9
Total	17	100.0	17	100.0

Note: Measurement with items 10 to 21.

Table 5 shows that none of the children were at a good level in the pretest. Subsequently, 52.9% reached that level. There was a complete decrease in the deficient level.

Figure 4 Percentage of development in the behavioral dimension.



Source: Own elaboration

General statistical analysis:
Normality test
The normality of the data was verified using the Kolmogorov-Smirnov and Shapiro-Wilk tests. Both tests indicated normal distribution ($p > .05$), as shown in Table 6.

Table 6 Normality test for the environmental attitudes variable in the pretest and posttest

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	gl	Sig.	Statistic	gl	Next
PRETEST	0.166	17	.200*	0.972	17	0.845
POSTEST	0.119	17	.200*	0.969	17	0.792

*. This is a lower limit of true significance.

a. Lilliefors significance correction

To compare the means, the t-test for related samples was used. The result was statistically significant ($t(16) = -30.24$, $p = .000$), showing a positive effect of the use of recycled material on environmental attitudes.

Table 7 Paired samples t-test

Paired samples test

		Paired differences					t	gl	Sig. (two-tailed)
					95% confidence interval of the difference				
		Mean	Standard deviation	Standard error mean	Lower	Upper			
Pair 1	PRETEST - POSTEST	-24.294	3,312	0.803	-25,997	-22,591	-30,242	16	0

Finally, Pearson's correlation test indicated a direct and strong relationship between pretest and posttest scores (r = .796, p = .000).

Table 8 Correlation between pretest and posttest scores for the environmental attitudes variable

Correlations of paired samples

		N	Correlation	Sig.
Par 1	PRETEST & POSTEST	17	0.796	0.000

DISCUSSION

The results obtained in this research show that the use of recycled materials as a teaching strategy had a positive effect on strengthening the environmental attitude of five-year-old children at a rural educational institution in the Amazonas region. The improvements observed in the cognitive, affective, and behavioral dimensions allow us to affirm that the students not only increased their knowledge about responsible practices with the environment, but also developed a favorable emotional disposition toward caring for the environment and a greater predisposition to act in accordance with these values.

These findings coincide with those reported by Tsejem (2023), who demonstrated that the application of the 3Rs technique significantly strengthened environmental attitudes in primary school students in the bilingual Pumpu community of Imaza. Similarly, Goicochea et al. (2023) verified the effectiveness of a recycling workshop in shaping the environmental attitudes of four-year-old children, highlighting the impact of direct manipulation of recyclable materials on the development of ecological awareness. The present research reaffirms these conclusions in a similar rural educational context, suggesting the validity of the intervention for populations with analogous cultural and socioeconomic characteristics.

Internationally, the findings are consistent with the meta-analysis by van de Wetering et al. (2022), who concluded that educational interventions focused on active learning and contact with ecological materials have a significant impact on the development of pro-environmental attitudes and behaviors in childhood. Similarly, the review by Liu et al. (2024) highlights that early emotional bonding with nature and the practice of recycling contribute to the consolidation of lasting environmental awareness. This theoretical and empirical convergence reinforces the hypothesis that an educational intervention based on recycled materials is effective in stimulating profound and sustainable attitudinal changes from early childhood onwards.

However, this research also raises questions that open up new lines of inquiry. While evidence shows a significant improvement in environmental attitudes after the intervention, it is still necessary to explore the permanence of these changes over time and their impact in family contexts. It would also be relevant to analyze whether teacher mediation and parental involvement have a decisive influence on the consolidation of these attitudes.

From a theoretical perspective, this work confirms that teaching strategies focused on concrete manipulation and experiential learning are not only effective for cognitive development, but also for the ethical and emotional education of students. In practical terms, the proposal is projected as a viable and replicable alternative in rural institutions with limited resources, where recycling can become an accessible, meaningful, and culturally relevant pedagogical tool.

Finally, considering that this research was conducted in a district with active local policies on environmental education (as stipulated in Municipal Ordinance No. 010-2023-MDI), the social relevance of the study is reaffirmed, suggesting its application on a larger scale. The convergence between empirical results, regulatory

support, and theoretical consistency allows us to infer that the observed effects could be replicated in other rural schools with similar sociocultural and environmental characteristics.

CONCLUSION

The findings of this research allow us to affirm that the pedagogical use of recycled materials has a positive impact on the development of environmental attitudes in five-year-old children at a rural educational institution in the Amazonas region. This statement is supported by empirical evidence obtained throughout the process, which shows substantial improvements in cognitive, affective, and behavioral dimensions after the educational intervention in the application of learning activities or workshops.

With regard to the general objective (to promote a positive and responsible environmental attitude in children), the results reflect notable progress in performance levels. While deficient levels predominated in the diagnostic stage, in the post-test most participants achieved good levels, confirming that the objective was met to a highly significant degree.

In relation to the specific objectives, it was evident that the cognitive dimension, initially dominated by fragmentary or absent responses, was strengthened through active interaction with recycled material, which led to an increase in understanding and appreciation of the natural environment. On an emotional level, at the end of the experience, the children showed a greater sensitivity towards caring for the environment, expressed in attitudes of respect, empathy, and appreciation of resources. Finally, on the behavioral level, a tangible transformation in ecological behaviors was observed: a greater willingness to sort waste, reuse materials, and actively participate in cleaning and conservation tasks. Taken together, these results corroborate the hypothesis: the systematic use of recycled materials as a teaching tool significantly improves environmental attitudes at the early childhood level.

From a theoretical perspective, the study reaffirms the postulates of meaningful learning and the ecological approach in early childhood education, showing that concrete and situated experience favors the construction of environmental values from an early age. It also contributes to the pedagogical discussion surrounding the role of the environment and teaching resources in the formation of environmental citizenship.

On a practical level, the research shows that it is possible (and necessary) to integrate environmental education into everyday classroom activities using accessible resources, such as waste materials, which are given new meaning for educational purposes. This strategy not only makes teaching more dynamic, but also strengthens children's ecological awareness in an experiential and sustained way.

However, it is essential to recognize the limitations of the study. As this is a pre-experimental design without a control group, the results should be interpreted with caution in terms of their generalizability. In addition, the small sample size and specific location restrict the extrapolation of the findings to broader contexts. Nevertheless, the evidence is sufficiently robust to support the conclusions reached in this study.

In short, this research not only validates the effectiveness of using recycled materials as a pedagogical strategy in shaping environmental attitudes, but also calls for a reconfiguration of teaching practices toward early childhood education that is more committed to sustainability. The impact observed in the participating children suggests that ecological transformation in education is not only desirable, but possible and urgent.

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