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Participatory Action Research as a Method That Enhances Education in the Basic and Secondary School of the Alfonso López Pumarejo Educational Institution. Valledupar. Colombia

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Abstract

The objective of this work was to analyze participatory action research as a method that enhances education in elementary and middle school students of the Alfonso López Pumarejo Educational Institution, under a positivist epistemic approach, of a descriptive projective theoretical cut with a cross-sectional field design, not experimental. For its analysis, a population of thirty-four (34) teachers is considered, two (administrative staff officials and 1147 students, with an intentional sampling of sixteen (16) teachers, two (2) administrative staff and two hundred and sixty (260) students in 9th, 10th and 11th grade of elementary and middle school, with similar characteristics. The survey was used as a technique and a questionnaire with a Likert scale with 48 items was used as an instrument, validated by three experts, yielding a reliability in pilot test of 0.972 for teachers and 0.923 for students, both with very high reliability. Descriptive statistics and the correlation coefficient of 0.949 teachers and 0.986 students were used as an analysis technique. The results showed that the variable action research and participation for teachers yielded an average of 3.32 and 2.91 for students; While environmental education was presented in teachers 3.32 and in the case of students an average of 2.91, both neutral results, these averages, close to the midpoint of the scale used (which usually ranges from 1 to 5), suggest a 'neutral' perception or implementation of both areas in the institution, according to the respondents. that is, they are not perceived in a very positive or very negative way; they could indicate indifference, lack of in-depth knowledge, or limited or unimpactful application of PAR and environmental education strategies in the school's daily practice at the time. Hence, the need to establish pedagogical guidelines as a transversal axis in the curricula that reinforce competencies in both, transform the environmental culture of the institution and impact the ecosystem in general spreads.

Keywords: *Action Research, Education, Method, Educational Improvement.*

Introduction

Environmental deterioration is a problem that affects any geographical area worldwide, becoming a crisis with signs and symptoms of instability whose main culprit is human beings (Aldana et al., 2021, p.8); therefore, the research processes throughout the training of students on environmental education remain misaligned with the demands of the context that demands

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the care of the system for the benefit of all the inhabitants of the planet.

However, the acceleration of changes at the political, economic, social, and technological levels disrupt the consolidation of learning communities that protect the environment; becoming a challenge at the educational level the implementation of research exercises, which promote the participation of the community within the classrooms with harmonious actions, aimed at a culture of care for nature.

At the same time, with participatory action research as a method that enhances environmental education, international research such as that presented by Vallejo and Callao (2022) and Capurro & Carhuaz (2018), affirms that the environmental crisis, rather than being caused by eventualities of nature, underlies processes whose cause lies in inadequate social practices produced by the behavior of human beings, resulting in natural disasters that in the opportunities become irreversible.

In this regard, Poma (2021) indicates that the evaluation carried out by the United Nations Environment Program in 2019 in Nairobi, Kenya together with the World Health Organization (WHO), corroborates that there is a global environmental crisis, highlighting aspects such as climate change, decrease in fresh water, loss of biodiversity; among others, as the main causes of ecosystem problems, whose responsibility is human beings.

This problem expanded to the Latin American level; makes countries such as Argentina, Chile, Panama, Mexico, Peru and Colombia, begin to specify scenarios that address this situation with programs that develop environmental competencies and attitudes combining the development of science with environmental education, to foster attitudes in the student that allow them to reflect and take actions in a systemic way, granting them the possibility of creating relational conditions aimed at changing mental patterns towards a culture of co-responsibility with the environment in which they operate (Guevara & Martínez 2018).

In addition to this, the research presented by Azorín-Abellán (2017) and Aldana et al., (2021), shows that the challenge for educational entities in Latin America is to promote an education that achieves the sustainable development goals (SDGs), promulgated by the United Nations (UN, 2015) in the 2030 agenda, constituting an action plan that integrates the environment, the economy; the same as society and education with research; so that, within school institutions, participatory spaces can be built with research proposals to face the socio-environmental crisis, considering as transversal axes that encourage the formation of a culture that promotes research in environmental education to timely address ecological problems with a multidimensional perspective in synergy with government entities.

Accordingly, studies such as those by Díaz-Bazo (2017), after a systematic analysis of participatory action research in basic education in Ibero-America, show how educational development policies should focus on a reflective practice where the classroom becomes a laboratory of exploration whose protagonist is the student; so that their participation can be transformed into a dynamic learning context, which allows enriching academic competencies under a cyclical process, which includes a moment of recognition of the problem; the formulation of hypotheses accompanied by an action plan, and finally reflection, building from practice a theory with collaborative work.

In relation to the topic, Arredondo et al., (2018), affirm that the curricular platforms of academic institutions lack interdisciplinary methodologies that link different sources of knowledge to generate research actions, leading to an environmental education that trains students with

competencies that allow them to handle information with verifiable data, making them aware of their co-responsibility to present alternative solutions to the problems of the environment environment in order to conserve and preserve their environments. p.22

This panorama is corroborated by the studies of Guillén et al., (2022), who agree that the deterioration of environmental deterioration requires that education in the twenty-first century change its perspective to modify the scenarios of teaching, moving from compulsory to the management of research capacities as a ladder that promotes the competencies to enter universities or perform as a professional in any field. inviting both teachers and students to look around so that they can actively participate in the construction of a culture aimed at solving problems that promote the preservation of an environment for the benefit of the community in general; thus inducing a development of knowledge with a favorable attitude that impacts a sustainable environmental system in the region and the country.

However, educational institutions seem to be isolated from reality, since despite technological and global advances, they maintain traditional methods that hinder the development of research actions on environmental education in pedagogical scenarios, stopping the activation of action research strategies and interdisciplinary knowledge production to create awareness about the problem from school spaces.

In this sense, environmental education is understood by Al-Naqbi and Alshannag (2018) as an educational approach where knowledge is generated, which seeks to encourage the participation of teachers to identify environmental problems and train citizens who propose solutions with an awareness that promote the protection of nature.

However, the implementation of research strategies within the classrooms is kept away from teaching dynamics to sensitize community members about caring for the environment, prevailing the persistence of traditional approaches that fail to empathize with the needs of students or the changes derived from progress, a situation that stands out as a challenge for the interrelational spaces that are established in institutions Pulido & Olivera (2018, p. 336).

As can be inferred, when considering these perspectives, action research is required, as a method that enhances environmental education within academic spaces, to become a transversal axis in micro-curricula to reinforce educational quality, creating competencies and habits on ecological thinking, through innovative activities that allow those involved to empathize with the problem and recognize the relational impact they have on the care of the planet.

In this context, participatory action research as a scientific method systematically approaches the behavior of human beings and their relationship with their ecosystem, transforming environmental education from pedagogical and didactic action with understanding of the problem to establish solutions with a commitment to environmental management that involves the triad of teachers, students and community. constituting itself as a support for productivity; as well as for the economic growth of the educational system, including universities, companies and industrial organizations.

Therefore, when educational institutions link action research with the guidelines of the SDG of environmental education, knowledge is aligned in the pedagogical and didactic context both at the social and environmental levels, thus engaging the conceptual, epistemological, methodological and academic frameworks of the teaching-learning process inside and outside the classroom. becoming a decisive and active component of knowledge, reflection and participation in educational-ecological practices.

However, in Colombia, even though it maintains its privileges for its natural resources and its environmental policies, which are based on international treaties in accordance with the guidelines of the ministries of environment, housing and education; Because it is part of a system, it does not escape the problematic environmental reality worldwide, being reflected not only in the biophysical conditions or the availability of natural resources, but also in the culture of educational institutions.

It should be noted that the implementation of the School Environmental Projects (PNA, 2019); (MEN, 2019; 25) and the National Environmental Education Plan 2017~2022 (PLANEA) approved by Supreme Decree No. 017-2012, underlines the need to promote knowledge aimed at building ecological awareness and behavior for the care of the natural environment that improves the quality of life immersed in a global system of environmental crisis reflected in educational institutions.

Based on the above, it is appropriate to highlight that the objective of action research as a method that enhances environmental education is not only focused on addressing the problems that cause damage to the ecosystem and the impact it has on human beings; rather, it focuses on trying to build solutions with the participation of the actors within the school institutions with actions that integrate research competencies with the curricular contents of the subjects, in such a way that a link can be established between knowledge and experience that builds a culture with solution options from a social position, economic and legal (Arantzazu, 2014).

However, the Municipality of Valledupar, being a microsystem of the Colombian country, reflects the problems observed in its school campuses, which find it difficult to establish a dialogue between communities to undertake actions with strategies that dynamize knowledge; therefore, environmental education processes are still slow.

In addition, they are affected by the absence of guidelines that mark research processes in combination with elements of environmental education, which direct actions to counteract the environmental problems that arise within them. They also lack micro-curricular programs that strengthen the training of research skills in teachers on environmental management, resulting in the absence of strategies to promote environmental awareness that is part of the academic culture and that has an impact on the common good.

Now, when located in the context of the Alfonso López Pumarejo Educational Institution**,** located at 13B bis Street N°.19-120, Cesar, Valledupar, it could be verified through the description of its PEI, (2019,2025) that it is made up of approximately 757 students, who follow the guidance of 34 teachers and is divided into two locations: the main one with preschool and basic primary, basic secondary and the technical middle school and the one in San Miguel with students from preschool to fifth grade.

At the level of curricular design, the curriculum proposed by the institution considers the needs of the environment, results of both internal and external evaluations and incorporates labor competencies and citizenship competencies; in accordance with the guidelines of the Ministry of National Education, the standards and the DBA.

However, through unstructured observations by the researcher who is part of the faculty, it was possible to verify that despite the fact that there is a master document that guides the achievement of the institutional objectives of the PEI, the reality reveals that the management given to research and environmental education is still anchored to the old structure, where a diagnosis at the beginning of the school year is disregarded to plan strategies according to the needs of the

groups, and to innovate in the field of science and evaluate to achieve better results in the acquisition of necessary competencies to face the environmental problems of the institutional reality.

With reference to the subject, research such as that of Benjumea (2021); Orcasita, (2021) and Rivera (2019), agree that institutional projects in most opportunities mark a different trend than what is shown in reality, since there is a mismatch between the interests of government entities and the needs of those who are part of the context.

Consequently, a large part of the teaching population does not have the training to develop academic programs with proposals based on scientific knowledge to amalgamate within the curricula topics related to action research as a method that supports environmental education, stagnating in the approach to topics, through subjects aimed at the natural sciences.

In this sense, the environmental deterioration that occurs in current times marks a guideline for the construction of new educational pedagogical strategies that build attitudes and behaviors based on the solution of problems, from the smallest spaces that constitute a glocal and global school institution, to the closest environments, sensitizing and committing the actors of the community in terms of the care of the environment and natural resources.

By virtue of the above, since there is no presence of action research strategies as a method that enhances environmental education, it is necessary to emphasize that the community understands that their combination marks a different process inside and outside school institutions; therefore, it would be difficult to consolidate a culture that impacts research skills and awareness that focuses on caring for the environment; then, the actors in the process will maintain behavior under traditional paradigms behind the back of becoming aware of the ecological system of the environment.

Hence, consolidating a culture of environmental education based on participatory action research promotes within the Alfonso López Pumarejo educational institution, a teaching and learning process with transversal strategies of care for the environment, allowing both teachers and students to appropriate solid knowledge that allows them to face the ecological problem inside and outside the academic spaces, benefiting the community that makes part of the environment where they develop.

In this sense, this research is part of the institutional research line in Environmental Pedagogy for Sustainable Development, attached to the Faculty of Basic Sciences and Education of the Popular University of Cesar called: Natural Sciences and Exact Sciences; and it is in line with the content of the thematic area: Environment - Sustainable Development.

For all of the above, this research aims to be an instrument and strategy of support in the process of strengthening research competencies, which lead to promoting environmental education scenarios, facilitating the construction of a culture for ecological management that aims at the sustainable development of the region and the country; with direct repercussions on the physical and social environment, adapting teaching performance to the demands of this century; because, once aware of their actions in the classroom, they generate internal and external changes to achieve the proposed objectives.

Under these interpretations, this research article entitled participatory action research as a method that enhances environmental education in the elementary and middle school of the Alfonso López Pumarejo educational institution, intends from the results of the analysis to

answer the question: In what way does participatory action research as a method that enhances environmental education in elementary and middle school students of the Alfonso López Pumarejo Educational Institution? and from there make a proposal with pedagogical guidelines that serve as a guide for the teacher to implement research strategies in favor of environmental education, minimizing the problems within the institution related to the care of the environment that impact the educational system and can serve as replicas in other scenarios with similar problems.

Methodological Foundations

Scientifically, the methodology is a systematized procedure to achieve the objectives proposed in the research, in this sense, an orderly procedure will be followed to highlight the significance of the study on participatory action research as a method that enhances environmental education in the Elementary and Middle School of the Alfonso López Pumarejo Educational Institution. Valledupar. Colombia, aimed at the interest of the latter.

Epistemological Orientation

Participatory action research as a method that enhances environmental education in elementary and middle school students of the Alfonso López Pumarejo Educational Institution, is supported by the positivist epistemic paradigm with a quantitative approach that, according to Hernández et al. (2014), allows coordinating and achieving the objectives proposed in a given research or study, with the possibility of addressing the problem from a neutral position of the researcher without intervening directly in context.

Considering the above, the authors place the study in a quantitative, descriptive, explanatory approach, marking a non-experimental, cross-sectional field design since it is developed in a social context, building a theoretical construct that exhibits the reality of participatory action research as a method that enhances environmental education in the students of the Alfonso López Pumarejo Educational Institution, with an adequate and functional guideline that mobilizes the dynamics of the research culture and ecological awareness, promoting the sustainable development of a region.

The population corresponds to the total number of teachers and students of Basic Secondary, which is categorized as finite, delimited by thirty-four (34) teachers of the school, one (1) counselor, one (1) director, One thousand one hundred and forty-seven (1147) students of Basic Secondary and Middle School, enrolled for the year 2024. See Chart #1 & #2

Teachers	Administrative Staff	Students	Total
34	2	1147	1183

Table 1

Distribution of the population Alfonso López Pumarejo Educational Institution

Note. The table shows the distribution of the student and faculty population at the Alfonso López Pumarejo Educational Institution. Own elaboration (2025).

Teachers	Administrative Staff	Students Grades 9, 10, and 11	Total
16	2	260	278

Table 2

Distribution of the sample- Alfonso López Pumarejo Educational Institution

Note. The table presents the distribution of the sample used in the study, segmented by educational level at the Alfonso López Pumarejo Educational Institution. Own elaboration (2025).

Survey. Two (2) questionnaire-type surveys are designed, one aimed at the eighteen (18) administrative participants and the other for the two hundred and sixty (260) students of groups 9, 10 and 11 of the Alfonso López Pumarejo Educational Institution that are part of the study sample, which maintain a systematic structure containing three statements per indicator that are measured by degree of intensity to facilitate the response of the respondents and assess their opinions through a nominal scale (Hernández, et al., 2014).

For the assessment of the survey, a Likert-type scale was constructed considering the two (2) variables, with their dimensions and 48 indicators, with a scale of alternative responses: Always (S), Almost always (CS), Sometimes (AV), Almost never (CN) and Never (N). to measure the reaction of the subjects in their different categories, (Hernández et al., 2014). The results from the responses will form the guide to establish the proposal of the pedagogical guidelines on participatory action research as a method that enhances environmental education in elementary and middle school students of the Alfonso López Pumarejo Educational Institution (See Table #3).

Response alternatives	Category
Always	Very favorable
Almost always	Favorable
Sometimes	Neutral
Almost never	Unfavorable

Table 3.

Questionnaire item weighting scale

Note. Own elaboration.

Results and Discussion

To quantify the results of the variables participatory action research and environmental education, the application of two (2) survey-type instruments containing fifty-four (54) statements, three (3) for each indicator to a sample of two hundred and seventy-eight (278) participants; divided between eighteen (18) subjects of the administrative area and two hundred and sixty (260) students, who are part of the educational community, as can be seen in tables # 1 and 2.

Therefore, the analysis of the variables, as well as the discussion of the results, is carried out in an organized manner through descriptive statistics, with the calculation of measures of central

tendency, which allows the dimensions and indicators to be systematically tabulated (See Table 1).

Alternatives	**Scale**	**Category**	**Results**
Always	4.21 ≥ X < 5.00	Very high proficiency	Favorable
Almost always	3.41 ≥ X < 4.20	High dominance	
Sometimes	2.61 ≥ X < 3.40	Moderate proficiency	Neutral
Almost never	1.81 ≥ X < 2.60	Low dominance	Unfavorable
Never	1.00 ≥ X < 1.80	Very low proficiency	

Table 1.

Scale for the interpretation of the mean

Note. Own elaboration.

In such a way, that the findings become the basis for proposing the pedagogical guidelines aimed at promoting environmental culture from action research in the students of Basic and Middle School of the Alfonso López Pumarejo Educational Institution. In addition, it is a point to improve the quality of education in the region and the country, becoming a reference for other research with similar problems. The results and analysis of each variable with their respective dimensions in teachers and students are shown below.

Variable Participatory Action Research.

This variable consists of two dimensions, the first referring to the competence for action research and the second called phases of participatory action research. According to the results, in the case of teachers, it yielded an average of 3.29 and students 2.76, both with a neutral result. (see tables 2 and 3).

Dimension. Competencies for action research

Teachers: Average 3.20 moderate proficiency neutral result (see table 2)

Appearance	**Indicators**				
Mastery of scientific literature	**S**	**CS**	**AV**	**CN**	**N**
Absolute Frequency	14	3	22	9	6
Relative Frequency	26%	6%	41%	17%	11%
Average					**3,37**
Appearance	**Indicators**				
Technology Management	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	27	3	22	7	15
Relative Frequency	50%	6%	4%	13%	28%
Average					**3,63**
Appearance	**Indicators**				
Planning/Time Management	**S**	**CS**	**BY**	**CN**	**N**

Absolute Frequency	27	4	8	6	9
Relative Frequency	50%	7%	15%	11%	17%
Average					**2,52**
Appearance	**Indicators**				
Experimental Design	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	17	4	0	2	31
Relative Frequency	31%	7%	0%	4%	57%
Average					**3,28**
Appearance	**Indicators**				
Data Analysis and Troubleshooting	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	9	20	5	17	3
Relative Frequency	17%	37%	9%	31%	6%

Table 2

Competencies dimension for action research – teachers

Note. Own elaboration.

Students: Average 2.69 moderate proficiency neutral result (see table 3).

Appearance	**Indicators**				
Mastery of scientific literature	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	121	82	141	175	261
Relative Frequency	16%	11%	18%	22%	33%
Average					**2,55**
Appearance	**Indicators**				
Technology Management	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	186	82	141	175	261
Relative Frequency	24%	5%	12%	21%	39%
Average					**3,29**
Appearance	**Indicators**				
Planning/Time Management	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	319	32	130	157	142
Relative Frequency	41	4%	17%	20%	18%
Average					**2,61**
Appearance	**Indicators**				
Experimental Design	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	202	72	64	105	337
Relative Frequency	26%	9%	8%	13%	43%
Average					**2,46**
Appearance	**Indicators**				
Data Analysis and Troubleshooting	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	177	79	5	184	335
Relative Frequency	23%	10%	1%	24%	43%

Table 3

Competencies dimension for action research - students-

Note. Own elaboration.

According to the data presented in tables 2 and 3, it can be seen that in the case of teachers the average was 3.20 and in students it was 2.69, placing them below their teachers; both with a neutral result, evidenced through the trend and behavior of each of the indicators that make up this dimension. where it is revealed that the teacher carries out a planning where he uses strategies for the learning of research; however, there are limitations to implement activities outside the classroom that lead to design situations that arouse the student's curiosity, influencing the ability to analyze scientific texts when technological or contextual resources are used; as well as, the possibility of processing data that broadens the vision of environmental problems within the Educational Institution and offers solutions that benefit the collective.

On the other hand, in the case of students, even when they follow the activities planned by the teacher, their weakness lies in the analysis of data and in the use of scientific literature, accompanied by the misuse of technology to search for information that guides research, conditioning the possibility of understanding the context of the problem and proposing solutions to improve environmental conditions within the Institution.

In conclusion, for the dimension of competencies action research, an average of 3.20 is revealed for teachers with a moderate domain neutral result, while in students it is 2.69 with moderate domain neutral result, which means that on the part of the facilitator there is a certain degree of mastery of the competencies; however, they are not enough to consider that they have the expertise to apply them in their pedagogical practice and create an environment conducive to environmental education being sustained over time, requiring additional training to complement their practice. However, in the case of students, they appear to have knowledge below their teachers; Therefore, applying the participatory action research methodology to make environmental education a culture sustained over time requires the use of strategies that facilitate its understanding.

Hence, even though both groups can identify the importance of action research competencies as a method that enhances environmental education, through systematized planning and using the scientific literature relevant to the process; The lack of knowledge, resources and clear data on the effectiveness of the study is denoted, which is validated with the low result of the indicator Experimental design for the teacher and data analysis for students also with an unfavorable low average.

This panorama opens the need to develop pedagogical guidelines as a transversal axis of the institutional project, becoming a challenge to promote a culture where informed and evidence-based decisions are made, which allow the educational community to prevent future inconveniences; This includes the adoption of practices that address critical issues such as waste management, environmental ethics, and the use of alternative sources of energy, thus promoting an ecological agenda that benefits the educational community as a whole.

Dimension. Phases of participatory action research.

Teachers: Average 3.38 moderate proficiency neutral result (see table 4).

Appearance	**Indicators**				
Diagnosis	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	28	7	2	18	9
Relative Frequency	52%	13%	4%	15%	17%
Average					3,44
Appearance	**Indicators**				
Developing a Plan	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	17	15	7	5	10
Relative Frequency	31%	28%	13%	9%	19%
Average					3,15
Appearance	**Indicators**				
Execution of the plan	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	15	11	15	5	8
Relative Frequency	28%	20%	28%	9%	15%
Average					3,26
Appearance	**Indicators**				
Plan Evaluation	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	9	22	5	10	8
Relative Frequency	17%	41%	9%	19%	15%

Table 4.

Dimension Phases of participatory action research - teachers –

Note. **Own elaboration.**

Students: Average 2.83 moderate proficiency neutral result (see table 6).

Appearance	**Indicators**				
Diagnosis	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	104	86	16	158	416
Relative Frequency	13%	11%	2%	20%	53%
Average					3,44
Appearance	**Indicators**				
Developing a Plan	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	266	135	144	43	192
Relative Frequency	34%	17%	18%	6%	25%
Average					3,15
Appearance	**Indicators**				
Execution of the plan	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	282	116	63	230	89
Relative Frequency	36%	15%	8%	29%	11%
Average					2,51
Appearance	**Indicators**				
Plan Evaluation	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	46	81	297	154	202
Relative Frequency	6%	10%	38%	20%	26%

Table 5.

Dimension Phases of participatory action research - students

Note. Own elaboration.

According to the data presented in tables 4 and 5, an average of 3.38 moderate domain neutral result was determined for teachers, while students also present neutral result with an average of 2.83, observing that teachers, even when they carry out a diagnosis and planning to take action research strategies towards the route of environmental education, they lack the tools and resources to execute the plan as planned, thus affecting the final evaluation of the process.

On the students' side, it is observed through the answers that the indicator with the weakest is focused on diagnosis, evidencing shortcomings in handling scientific information that leads to investigate the bases of research on the environmental problems of the school system; that is, despite the fact that the teachers carry out the previous study to draw up and execute the plan, the student finds it difficult to keep up with the rhythm, showing limitation in understanding the problem from the beginning.

In this sense, the phase dimension of the action research shows that the average for teachers was 3.38, moderate domain neutral result, while for students it was 2.83, with moderate domain neutral result, these results show the need to establish a more robust framework for the evaluation of educational actions in the context of environmental education. implementing clear and specific indicators; therefore, it facilitates the monitoring of the progress of students and teachers; in addition, it facilitates effective feedback that encourages continuous improvement in the quality of environmental education.

In conclusion, although there is a favorable disposition towards addressing environmental problems in education, there is a need to strengthen evaluation mechanisms that allow validating and improving educational practices, thus ensuring that the involvement of students in specific tasks translates into tangible and measurable results.

In view of the above, the variable participatory action research (PAR) as a methodological approach seeks to involve participants in the research process to generate a change in their learning as well as in their context; however, in the results of the surveys applied to the population of teachers and students who are part of the Alfonso López Pumarejo Educational Institution, it shows an average of 2.76, with low dominance and unfavorable result; which indicates that both groups are trapped in a traditional educational model that prioritizes memorization over the development of research skills.

It should be noted that when carrying out the analysis, the behavior of the dimension of research competencies was verified, yielding an average of 2.69, which suggests that there are significant shortcomings in the formation of competencies that provide students with tools to effectively engage in research practices, in the same order, the phases of participatory action research, with an average of 2.83, reveals that although there is some disposition towards PAR, it has not been translated into an effective practice that promotes active and meaningful learning for the construction of a culture that activates the care of the environment.

In conclusion, in order to transform the current situation in the Alfonso López Pumarejo Educational Institution, it is necessary to maintain an approach with pedagogical guidelines that integrates participatory action research with environmental education, promoting it as a transversal axis in the training programs of the Alfonso López Pumarejo Institution, through

active learning that enhances research competencies in elementary, secondary and middle school students through a process systematic and systemic, which allows them to understand the meaning of scientific activities on the environmental care of the ecosystem.

Environmental education variable

This variable consists of two dimensions, the first referring to the dimensions of environmental education and the second called environmental competencies. According to the results, in the case of teachers it yielded an average of 3.26 and students 2.63, both with a neutral result (see tables 6 and 7).

Dimension: Environmental Awareness

Teachers: Average 3.26 moderate proficiency neutral result (see table 7)

Appearance	**Indicators**				
Cognitive	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	27	0	2	13	12
Relative Frequency	50%	0%	4%	24%	22%
Average					3,24
Appearance	**Indicators**				
Affective	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	19	7	8	8	12
Relative Frequency	35%	13%	15%	15%	22%
Average					3,13
Appearance	**Indicators**				
Conative	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	20	10	0	6	18
Relative Frequency	37%	19%	0%	11%	33%
Average					3,13
Appearance	**Indicators**				
Active	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	5	18	13	15	3
Relative Frequency	9%	33%	24%	28%	6%

Table 6.

Dimensions of environmental awareness – teachers-

Note. Own elaboration.

Students: Average 2.63 moderate dominance neutral result. (see table 8)

Appearance	**Indicators**				
Cognitive	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	118	31	131	223	277
Relative Frequency	36%	29%	17%	29%	36%
Average					**2,43**
Appearance	**Indicators**				

Affective	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	27	32	233	449	39
Relative Frequency	3%	4%	30%	58%	5%
Average					**3,35**
Appearance	**Indicators**				
Conative	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	305	138	90	66	181
Relative Frequency	39%	18%	12%	8%	23%
Average					**2,40**
Appearance	**Indicators**				
Active	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	15	81	273	240	171
Relative Frequency	2%	10%	35%	31%	22%

Table 7.

Dimensions of Environmental Awareness - Students –

Note. Own elaboration.

In view of what is shown in tables 6 and 7, it can be seen that the environmental awareness dimension presents greater results for teachers with respect to students; since their level of environmental awareness is higher motivated by their experience, training and the responsibility they have in the performance of their educational role. Understanding that during their career within the framework of the continuous training process, they develop a critical vision of the relationship between human activity and the environment; achieving strengthening information on sustainability, environmental regulations, as well as the effects of climate change, which leads them to adopt more responsible habits to promote them within the classroom.

On the other hand, students, especially at basic and secondary educational levels, are still in the process of building their critical thinking and becoming aware of global problems, making their relationship with environmental education depend to a large extent on the pedagogical approach and the external stimuli they receive, such as institutional campaigns or access to practical experiences in contact with nature. However, in many cases, environmental education is limited to the transmission of theoretical knowledge without a clear link to the daily reality of young people, which can generate a disconnection and reduce their level of commitment; evidencing the need to establish guidelines with educational strategies of participatory action research that enhance environmental education, capable of integrating students in activities to strengthen their commitment and promote a more deep-rooted environmental awareness from an early age.

According to the information obtained as a result of the answers provided by teachers (average 3.26) and students (average 2.63) on the environmental awareness dimension, it is evident that both groups need to strengthen concrete actions for the protection of the environment to a greater extent than others; Specifically, although it is true that teachers have greater experience and knowledge about ecological problems with a key role in guiding students towards sustainable practices, it is necessary that they change their educational paradigms in order to inspire the student on the relevance of reflecting and acting responsibly in the face of environmental challenges. relying on research.

That is, so that the teacher's knowledge has a real impact by taking advantage of their level of

environmental awareness acquired through academic training and professional experience; which allows them to understand in a deeper way the relationship between human activities and the deterioration of the ecosystem, they have the responsibility to work on raising the environmental awareness of students, raising their sustainable habits, as well as their perception of the magnitude of ecological problems.

In this sense, the role of the teacher is key to awakening in them a sense of commitment and fostering attitudes that allow them to be actively involved in the conservation of the environment by applying dynamic methodologies, practical experiences and environmental education supported by action research, which shorten this gap, and manage to promote a new generation with greater ecological sensitivity.

Dimension: Environmental competencies

Teachers: Average 3.37 moderate proficiency neutral result. (see table 9)

Appearance	**Indicators**				
Raise awareness	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	26	0	12	1	15
Relative Frequency	48%	0%	22%	2%	28%
Average					3,02
Appearance	**Indicators**				
Acquire values and commitments	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	18	0	17	3	16
Relative Frequency	33%	0%	31%	6%	30%
Average					3,70
Appearance	**Indicators**				
Create behavior	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	16	16	15	4	3
Relative Frequency	39%	30%	28%	7%	6%

Table 8.

Dimension Environmental Competencies – Teachers –

Note. Own elaboration.

Students: Average 3.18 moderate proficiency neutral result. (see table 10)

Appearance	**Indicators**				
Raise awareness	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	349	6	150	10	265
Relative Frequency	45%	1%	19%	1%	34%
Average					2,94
Appearance	**Indicators**				
Acquire values and commitments	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	237	22	245	10	266
Relative Frequency	30%	3%	31%	1%	34%
Average					3,35

Appearance	**Indicators**				
Creating behavior towards the environment	**S**	**CS**	**BY**	**CN**	**N**
Absolute Frequency	232	211	94	124	119
Relative Frequency	30%	27%	12%	16%	15%
Average					3,40

Table 9.

Environmental Competencies Dimension – Students

Note. Own elaboration.

According to what has been seen in tables 8 and 9, it is shown that teachers have greater environmental competencies compared to students, because they not only have greater theoretical knowledge about ecological problems, but they have also developed a critical awareness that allows them to understand the interconnection between human beings and their environment. facilitating them to transmit sustainable values and principles with greater depth and coherence within the classroom.

In addition to knowledge, teachers tend to show a greater commitment to the promotion of responsible environmental practices using pedagogical strategies, which encourage students to appreciate the importance of recycling, reducing consumption and conserving natural resources; that is, perhaps students can perceive these topics as school subjects, however for teachers, in their role as guides, they seek to instill sustainable habits that transcend the educational field and are reflected in daily life.

Based on what has been described, the dimension of environmental education competencies implies the need in the Alfonso López Pumarejo Institution to promote a proactive environmental awareness where knowledge is built and programs are executed to create behaviors in line with the care of the environment, implementing pedagogical strategies supported by action research and integrating environmental values that increase the participation of students in the environment. Resolution of problems related to the institution's ecosystem.

To close, the environmental education variable with a result for teachers of 3.32 and 2.91 student, both neutral results evidence the need to encourage interest in developing critical-reflective thinking, through action research linking environmental content to sensitize the Alfonso López Pumarejo educational community, in order to take care of the ecosystem.

In conclusion, considering the results for both teacher and student samples, the environmental education variable presents higher averages with respect to participatory action research, which indicates the need to dynamize the activities inherent to the research process to consolidate a culture of environmental education in the Alfonso López Pumarejo Institution, where it emerges as a key tool to generate positive and sustainable changes within the system educational, allowing teachers and students to work together in the construction of effective solutions to current environmental challenges.

The main problem evidenced in the environment is the impact on the environment through the unsustainable use of biotic and abiotic natural resources of the natural ecosystem of the area of influence attended educationally. Among the environmental projects developed by students and teachers of the institution, there is the reforestation and plant restoration project of the school and the surrounding areas, the Integrated Management Project of School Solid Waste, the Project

of Conservation and Protection of Wild and Domestic Fauna and Flora, central axes of the PRAES School Environmental Project.

Pedagogical proposal to promote participatory action research as a method that enhances environmental education.

In the results of the application of the surveys to the population of administrators and students of the Alfonso López Pumarejo Educational Institution, it was possible to show that there is a need to promote participatory action research in the formation of environmental education, in order to improve action research competencies aiming at the development of experimental designs within the classroom that strengthen the mastery of scientific literature so that both students and teachers handle statistical data with the use of technology, so that a course of activities can be planned with time and resources adapted to the needs of the context.

Another of the needs that supports the pedagogical proposal is to consider the phases of participatory research with emphasis on compliance with the execution of the plans and their evaluation, avoiding that they remain only in approaches. Thus, the management of environmental education has direct implications in the teaching-learning process and allows strengthening individual and collective commitment to experiential behavior of responsibility with the environment within the institution and outside it.

This approach promotes a before and after in the institution's IEPs, since it is intended that the pedagogical proposal is inserted in the academic programs as a policy of the institution with social responsibility over the environment, where a culture of participatory research is installed, sustained with the management of data that generates knowledge to apply strategies on the care of natural resources. always in alignment with the provisions of the Ministry of the Environment, the Ministry of Education and the PRAES (School Environmental Project), under an environment of healthy coexistence that is beneficial for the members of the system and for the world in general.

It should be noted that the mechanisms that both the Ministry of National Education and the Ministry of the Environment, in their provisions, indicate that Educational Institutions are obliged to design and execute environmental projects, committing the entire community in favor of the construction of an education that provides students with resources to interact with the ecosystem, which promotes research on environmental problems to generate solutions that impact the context.

On the subject, in order to structure the pedagogical proposal, it is necessary to link action research with environmental education, as a process that recognizes the relational system of the members of the community with the ecosystem, constituting themselves as active parts that dynamize the development of teaching-learning (De Zubiría 2006), where physical capacities are involved, technical, intellectual and emotional.

In this sense, the proposal has a constructivist cut; since it has a social purpose, it also reinforces the integral training of students in participatory research, which forces the teacher to look at them as builders of knowledge which can be transferred to any context managing coexistence with the ecosystem, recognizing themselves as actors responsible for environmental problems (Dewey, 2004. p.21).

In response to these interpretations, the proposal to bring environmental education to the Alfonzo López Pumarejo Institution from action research, aims to activate a series of strategies through

its implementation to sustain research work that reinforces environmental education systematically, adapted to the specific contexts of the institution; hence, 3 stages are proposed with a duration of ten (10) months considering the period of the school year that facilitates the construction of an environmental culture: the first directed towards a strategic diagnosis: *Know the environment;* the second of conceptualization and projection to participate in a collaborative co-creation space with environmental projects and the third of evaluation verifying the continuous improvement of the proposal.

Pedagogical strategies to promote participatory action research as a method that enhances environmental education.

1. First stage. Strategic diagnosis: Knows the environment. Time 2 months (4 weeks)

***Actions*:**

To diagnose the current situation of teachers and students in the educational community with reference to participatory action research in environmental education, through surveys, interviews and workshops, identifying the problem in order to systematize possible solutions.

Design a SWOT instrument that allows validating the real situation of the context, verifying both the weaknesses and the strengths of the institution, clarifying the causes for the approach of opportunities for improvement and facing the threats of external actors.

Create a call to invite other institutions and the sector of public and private companies close to the Alfonzo López Pumarejo Institution to participate in the program, in such a way that it becomes a transversal axis of the PEI and is maintained over time, extending the benefit to the Municipality.

Prepare a master document on action research, as a method to solve the problem of environmental education, possible alternative solutions and a schedule of activities that involves the participation of the educational community.

2. Second stage: Conceptualization and projection. Cooccreation of a collaborative space with environmental projects. Time 7 months (14 weeks)

Actions:

To prepare a space within the institutional facilities to provide students and teachers with permanent training with participatory methodologies of action research and environmental issues, including theoretical knowledge as well as practices integrating PAR in the pedagogical context of teaching and learning.

To create inclusive and interdisciplinary integration spaces in strategic alliance with other communities through dialogue circles or forums that allow students to nurture with scientific arguments the exchange of ideas for the development of projects in order to have a real and tangible impact on their environment, reinforcing the participatory nature of PAR with ecological awareness.

To provide investigative learning tools that allow teachers and students to learn with activities outside the classroom with guided visits to natural parks, rural areas, sustainable companies or environmental intervention areas that offer the possibility of observing, analyzing and proposing solutions to specific environmental problems in their community or region.

Formally incorporate participatory action research as a method that enhances environmental

education in the curricula of the institution's Basic, Secondary and Middle School subjects, in accordance with the guidelines of the Ministry of Education and the Ministry of the Environment.

Use formative and participatory evaluation methods within the classroom in order to assess action research and environmental education skills with cases observed in guided tours where problems are identified, hypotheses are developed, solutions are proposed and work is done collaboratively, encouraging the group to self-evaluation and peer evaluation promoting critical reflection on the process.

Create a committee made up of students, teachers and community members in charge of supervising action research activities which can range from the organization of recycling campaigns, reforestation, school gardens or awareness in the community about the responsible use of resources to promoting student leadership and ensuring the continuity of projects.

3. Third stage: Evaluation. 1 month (4 weeks)

Actions*:*

Continuously evaluate the progress of the implementation of the strategies through a portfolio of evidence, pre-test and post-test, self-evaluation and co-evaluation carried out on student teachers and the sustainability of the actions.

To validate the use of action research tools for the strengthening of the environmental culture in teachers and students of the institution.

Collect information data on student empowerment and protagonism in IAxP, for decision-making on the solution to environmental problems.

Verify the displacement of the participants by reflecting a comparison with those subjects who did not participate in order to project the scope.

Assess the level of participation and ability to work as a team of both students and teachers in the different stages of the program.

Generate strategic reports to present the progress and results of the program at the institutional, local, regional, and national levels, showing the impact on the relational system of the participants.

Conclusions

To answer the problem question: How does participatory action research as a method that enhances environmental education in elementary and middle school students of the Alfonso López Pumarejo Educational Institution? And considering that participatory action research yielded an average below environmental education; a proposal was established that demarcates pedagogical guidelines.

This scenario allows the teacher to carry out a planning aimed at strengthening the competencies of the students, both at the level of research and in environmental awareness, so that they use research tools in spaces inside and outside the educational campus, and enable them to integrate knowledge with practice and thus propose alternative solutions to the environmental problem from different points of view. activating the participation of the entire community and transforming the issue into collective interest as an institutional culture relevant to the entire system.

Recommendations

To ensure that participatory action research as a method enhances environmental education in teachers and students of the Alfonso López Pumarejo Educational Institution, the commitment of all is required to promote pedagogical guidelines with experimental and sustainable practices that guarantee the development of competencies, as well as the use of research tools that guide the resolution of environmental problems in a timely manner and with results that impact the system.

In the same way, it is recommended that teachers be permanently trained with reference to research practices conducive to creating an environmental culture within the institution, with motivating spaces that invite participants to continue learning and to take the experience to other contexts in similar conditions.

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