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ENVIRONMENTAL EDUCATION PROJECT AT THE CASEMIRO KARMAN STATE SCHOOL IN THE MUNICIPALITY OF CAMPO LARGO, PARANÁ

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ABSTRACT

This article discusses an environmental education project for students from the sixth year of elementary to the third year of high school carried out at the Casemiro Karman State School that is located in the city of Campo Largo in the state of Paraná, metropolitan region of Curitiba, promoted by the Center for Teaching, Research and Extension in Agroecology (CEPEA) of the Federal Unit of Paraná. The project took place on August 8, 2023 through a free extension event and had as its main subject the composting and making of home composters to contribute to the organic garden that is located at the school and to expand students' learning about sustainability, with a theoretical and a practical part, using the action research methodology. Thus, two questionnaires were carried out, one with an investigative character to understand what was already known by the participants and another with an evaluative character, after the event, to conclude whether the objectives of the project were achieved. With the analysis of the questionnaires, it was possible to conclude that the event made the students expand their domains about composting, considering that after the event, on average, 90% of the participants stated that they had an enriching experience with the project and that they will certainly apply sustainable practices in their routines, in this way, demonstrating the importance of environmental education in children and adolescents since they are proactive and how composting can be effective as a learning tool in this age group.

Keywords: Environmental Education. Composting. Sustainability.

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INTRODUCTION

Environmental education plays a crucial role in the formation of citizens who are aware of and committed to the conservation of the environment. In this context, the implementation of projects that address waste management in schools has proven to be an effective strategy to promote sustainability and encourage the active participation of students in this process.

This project aims to introduce composting through an extension event as a sustainable practice for waste management at the Casemiro Karman State School, located in the municipality of Campo Largo in the state of Paraná, promoted by the Center for Teaching, Research and Extension to Agroecology (CEPEA) of the Federal University of Paraná. Composting consists of transforming organic waste into fertilizer through the action of microorganisms. By implementing composters in the school environment, students will have the opportunity to actively participate in this process, contributing to the reduction of the volume of waste sent to landfills and to the production of quality organic fertilizer for the gardens that are already present on site.

By implementing composters in this school environment, it is possible to promote concrete environmental education actions that will directly impact the community and, consequently, the environment. Students were encouraged to identify problems, propose solutions, and implement effective practices. This approach provides more meaningful learning, promoting students' sense of responsibility and autonomy, as well as stimulating critical thinking and environmental awareness. The project contributed to the formation of a critical and engaged environmental awareness, preparing students to deal responsibly with the environmental challenges they will face in the future.

In this context, the main objective of the project was to promote the environmental awareness of the community and the students of the Casemiro Karman State School from the correct disposal and cycling of organic waste, especially from the composting process.

THEORETICAL FRAMEWORK

ENVIRONMENTAL EDUCATION IN SCHOOLS

The importance of Environmental Education in the school environment began to be discussed in 1972, when the most crucial events for the evolution of the concept of Environmental Education in the world took place, on July 16, in Sweden, the United Nations promoted the "UN Conference on the Human Environment", at this conference it recommended that an International Environmental Education Program should be created. After this conference, UNESCO, in 1975, promoted the International Meeting on

Environmental Education in Belgrade, bringing together experts from 65 countries, in this meeting the principles and instructions for the International Environmental Education Program were formulated, which should be multidisciplinary, integrated with regional differences, be focused on national interests and be continuous, this document became known as the Belgrade Charter. In 1977, in Tbilisi, USSR, the Intergovernmental Conference on Environmental Education took place, which constitutes the culmination of the International Environmental Education Program, at the conference the objectives and strategies at national and international level for EE were defined, it was postulated that EE is an essential element for a global education, complementing the values already inscribed in the Belgrade Charter. (EFFTING, 2007).

In Brazil, in 1996, the National Council for the Environment (Conama) defined Environmental Education (EE) as a process of training and information aimed at developing a critical awareness of environmental issues and promoting activities that involve the participation of communities in the preservation of environmental balance. This definition was established based on the principles and guidelines established by the International Commission during the preparations for Rio-92 in 1992. (EFFTING, 2007).

According to Lamanna (2008), environmental education, as a means for the sustainable preservation of the planet, has been the target of educational programs, discussions, academic analyses, research and wide dissemination due to its indispensable contribution to the development guidelines of contemporary society and, above all, to the sustainability of all forms of life. The critical approach provided by education in relation to environmental issues achieves its purpose when the resulting impact is reflected in the daily life of society, transforming habits and behaviors.

The author also states that for Environmental Education programs to be truly effective from an educational point of view, it is essential that they be developed based on guidelines identified by the students themselves, teachers or the community in question, that is, the action research technique. Standardized program approaches fail to achieve satisfactory results. Therefore, it is essential to have a prior understanding of how those involved perceive the theme, in order to ensure that the EE actions, which are intended to be participatory, are not compromised and can achieve the desired results.

Any practice to be developed within the scope of EE must be preceded by an in-depth knowledge of the specificities of the target audience and the reality in which it is inserted, wishing to apply such practice in a multidisciplinary way. This will allow for an appropriate adaptation of teaching and learning strategies, taking into account local needs, values and circumstances.

However, despite being a legal requirement, Environmental Education must be approached in an enjoyable way, even if it is challenging to implement, since it requires concrete actions, such as changes in personal and community behavior. It is necessary to consider that, in order to achieve collective well-being, it is necessary to aggregate individual attitudes in order to sensitize, make the student aware of the values of environmental conservation, seek behavioral change, form an engaged citizen, as well as the teacher and the school community. It is important to emphasize that EE has to be beyond the school environment, the actions and pedagogical programs on Environmental Education must be proposed to also affect the community in which the school in question is inserted, with the objective of influencing students to obtain sustainable practices inside and outside the school. (EFFTING, 2007).

Facing the difficulties in the effective work of Environmental Education is fundamental, because, according to Dias (1992), "we know that most of our environmental problems have their roots in socioeconomic, political and cultural factors, and cannot be predicted or solved only through technological approaches". Therefore, it is of paramount importance to incorporate Environmental Education in schools, in order to raise awareness among students and help them become citizens committed to ecology (Narcizo, 2009).

COMPOSTING

In recent years, the world population has been growing and it is estimated that by the year 2050 it will reach 9 billion inhabitants. Due to this population growth, together with technological advances, the demand for natural resources has been increasing in an unsustainable way and, consequently, increasing the volume of waste generated, notably waste from agricultural or agroforestry activities. Along with this, the need for recycling for this organic waste (from cities, industry and agriculture) has grown, due to the benefits of reducing the consumption of natural resources. In this way, composting becomes an allied technology for the recycling of this type of waste, allowing its recycling and subsequent use as fertilizer for the soil. (SOARES, *et al*, 2017).

Composting is a method of recycling and treating organic waste that uses conditions similar to the natural process of decomposition of organic matter. It is essential to ensure the safety and success of the process by controlling factors such as humidity, temperature, aeration (oxygen level), and nutrient balance (carbon and nitrogen). By controlling these factors, it is possible to promote the action of earthworms, insects and small mammals, as well as microorganisms, such as fungi and bacteria, which accelerate the decomposition of organic matter. This process eliminates pathogens and prevents the presence of disease

vectors. As a result, the waste reduces in volume and turns into an organic compound with a dark color, homogeneous texture and aroma similar to that of the earth. This compost can be used directly in the soil, in gardens, ornamental plant pots, vegetable gardens, and home orchards, to improve the structure and provide essential nutrients to the plants, even contributing to the recovery of degraded areas (EMBRAPA, 2021).

Guenther, *et al* (2020) states that the composting technique, which uses organic waste for the production of fertilizer, is an ancient practice adopted in several crops and widely spread in the agricultural and industrial sectors around the world. Composting organic waste offers a number of environmental benefits compared to disposal in landfills, such as reducing the volume of waste deposited, reducing the emission of gases such as methane, and preventing eutrophication caused by the runoff of contaminating liquids into water bodies. In addition to being an economically viable option, composting has been increasingly adopted as a sustainable alternative. Currently, composting systems are used on a small scale by urban populations in their homes and apartments, as a way to reduce the amount of waste generated and take advantage of the fertilizer produced in small gardens for their own consumption. This practice has been widely studied and adopted as a way to promote sustainability and environmental awareness.

Composting, in line with the principles of environmental sustainability, plays a key role in sustainable agriculture. By providing the conversion of organic waste into a highly nutritious natural fertilizer, this practice nourishes the soil in an equitable way, encouraging healthy plant flourishing. Not by chance, such ideals find an echo in the book "Silent Spring", by Rachel Carson, whose publication in 1962 reverberated concerns about the dangers of pesticides on human health and the environment. Carson highlighted the risks arising from the excessive use of chemicals in agriculture. Composting presents itself as a concrete response to these apprehensions, presenting a natural and harmonious approach to soil enrichment.

DOMESTIC COMPOSTER AS A SOLUTION TO REDUCE ORGANIC WASTE

According to data released by the Ministry of the Environment, annually Brazil generates approximately 64 million tons of waste, with more than 50% of this volume consisting of organic waste. It is alarming to see that approximately 59% of Brazilian cities still adopt inadequate practices for the disposal of these materials. Given this reality, awareness about the correct disposal of garbage has expanded in society, with vehicles such as television and online platforms acting as agents to promote the importance of this awareness, emphasizing its fundamental role in preserving the environment.

The constant increase in the amount of garbage generated in Brazil reflects not only population growth, but also the increase in consumption and industrial production. The improper disposal of waste, especially organic waste, not only contributes to environmental pollution, but also compromises public health and the quality of life of communities. This issue underscores the urgency of adopting effective waste management measures, including practices such as composting, which can not only reduce the volume of waste disposed of inappropriately, but also enrich the soil and contribute to environmental sustainability. (SILVA, et al, 2020)

The composter takes on a role of social, economic, and environmental relevance, while also playing a key role in the cultural redefinition of our connections to food and the land. In a society where these fundamental values have been gradually obscured, composting emerges as a practice capable of revitalizing these relationships. Based on the principles of the three Rs of sustainability – reduction, reuse and recycling – the composter acts as an agent of transformation both at the local level and on a metropolitan scale. (CHIANELLO, et al, 2018)

METHODOLOGY

LOCATION AND REGION OF THE COLLEGE

The project was carried out at the Casemiro Karman State School and is located in the municipality of Campo Largo, in the state of Paraná, it is a model educational institution, located in a peripheral region of the city. The school has an extensive infrastructure, including a library, an indoor sports court, laboratories and two school gardens, among other facilities.

The school's students already have contact with agroecology, both because of the organic garden and because of the Agroecology and Environmental Education Extension Course that was taught at the school in December 2022, where subjects on sustainability, environmental education, agroecological practices and different activities were introduced to arouse students' interest in the topics presented. (LORDELLO, 2023)

ACTION RESEARCH WITH STUDENTS

The methodology proposed for carrying out the composting project with the students of the Casemiro Karman State School followed the action research approach, which seeks the active participation of students in the learning process and in the resolution of real problems.

Michel Thiollent defines action research as:

> "Action research is a type of social research that is conceived and carried out in close association with an action or with the resolution of a collective problem and in which researchers and participants representative of the situation of the reality to be investigated are involved in a cooperative and participatory way (Thiollent, 1985)".

To be qualified as an action research, there must be a social action or solution of collective problems by the researchers, in order to promote a participatory action between the researchers and the people involved in the study. (BALDISSERA, 2001). This methodology consists of first carrying out a data survey to characterize and evaluate the level of knowledge of students on subjects related to agroecology, composting and sustainability, and the reality in which they are inserted, in this way, it is possible to adapt and elaborate a pedagogical program that will be applied in order to increase this knowledge. After this data collection, a theoretical theme should be applied to the issues raised to provide students with an analysis and reflection of the problems being discussed, Adelina Baldissera says that:

> "The way of researching reality implies the participation of the population as an active agent of knowledge of its own reality and enables it to acquire the necessary knowledge to solve problems and satisfy needs. Research, because it is action, the very way or manner of investigating reality generates a process of action by the people involved in the project. The way of doing the study, the knowledge of reality is already action; action of organization, mobilization, sensitization and awareness." (BALDISSERA, 2001).".

Therefore, by applying this method of action research, one of the objectives was to provide and encourage students to actively participate in caring for the environment and promoting more sustainable practices, while offering an enriching and meaningful educational experience by inserting the composting technique in the school environment, this being the last step, the solution to the problem.

This approach allowed students to become directly involved in the implementation and development of composting-related activities, promoting meaningful learning and stimulating environmental awareness.

Initially, it was necessary to carry out an initial diagnosis to identify the students' level of knowledge about composting, organic waste and sustainable practices. This can be done through a semi-structured questionnaire, interviews, or group discussions. The objective of the questionnaire was to understand the students' perceptions and expectations in relation to the project, thus being able to establish appropriate ways to transmit technical knowledge to these students, in order to democratize access to this information.

In this way, it was possible to promote awareness and awareness activities about the importance of composting and its contributions to environmental sustainability. This included an extension course open to the general community, to talk about the importance of environmental education and how composting can help in interdisciplinarity within the school.

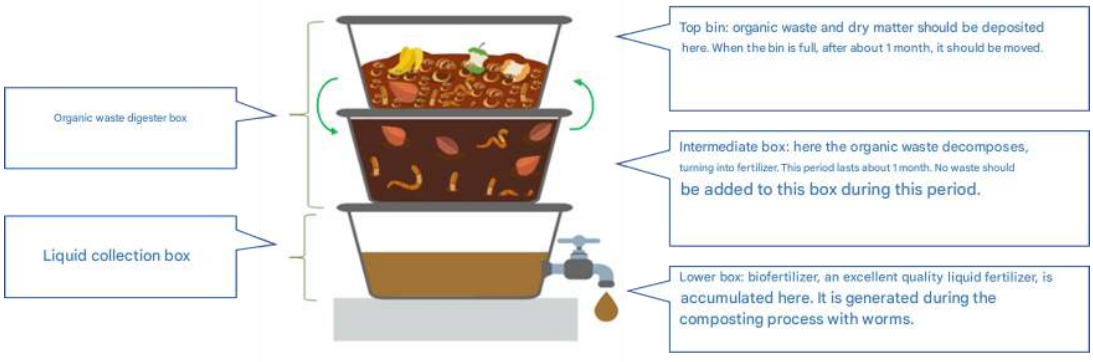
After the installation of the composters, another questionnaire was carried out with the students, with the intention of characterizing and quantifying how much the project raised their knowledge, whether awareness of the importance of agroecological practices, organic gardening and environmental conservation was developed.

The installation of composters suitable for the school environment was taken into account the available space, the amount of waste generated and the local characteristics. The students were involved in this process, from choosing the location to assembling the composters.

Guenther, et al (2020) made composters using PET bottles in a simple and accessible way to compost on a smaller scale. In this sense, during the course, students will create a composter with layers of organic materials, such as pebbles, sand, substrate and wet organic waste.

The home composter has different stages and it is possible to separate it into three: upper, middle and lower box. In the top box, organic waste such as food, leaves and plant clippings are deposited. In the intermediate box, aerobic decomposition occurs by microorganisms, producing heat and carbon dioxide. In the lower box, the materials are transformed into humus, a natural fertilizer rich in nutrients. (FIGURE 1)

Figure 1. Illustration of a home composter and its different stages.



Source: Embrapa (2021)

It was also necessary to guide the students on the necessary care for the proper functioning of the composters, such as humidity control, aeration and carbon and nitrogen

balance. Practical activities will be carried out to monitor and maintain the composters, such as turning over waste and monitoring temperature and humidity.

Taking into account the project of the Federal University of Pará (2018), to make the composter, the materials needed will be: a PET bottle, scissors, pantyhose, soil and dry and wet elements, such as fruits, vegetables and dry leaves. The process was started by cutting the bottom of the bottle and making a small hole in the cap to allow the liquid from the compound to drain.

The assembly of the composter, as shown in Figure 2, followed the following steps: an initial layer of soil was placed, considering the measurements of the bottle in centimeters; Then, 1/3 of the wet elements, such as fruit scraps, vegetables, and peels, and 2/3 of dry elements, such as dry leaves and sawdust, will be added. To finish, another handful of soil was added and the pantyhose will be used to "cap" the bottle.

Figure 2. Making the composter in a PET bottle



Source: Federal University of Pará (2018)

After being assembled, the compost bin was covered to prevent the entry of insects and placed in a place protected from the sun and rain. Over time, the waste decomposes and can be used as fertilizer. When the fertilizer is ready, the students will be responsible for its application in the school's organic garden. Planting, cultivation and plant care activities will be carried out, using the fertilizer produced. This practice will contribute to the reduction of organic waste and environmental sustainability and will also enable students to participate and qualify for the assembly and dissemination of composting techniques.

The proposed action research methodology aimed to promote greater environmental awareness among students, so that they develop practical skills related to composting and encourage the adoption of sustainable practices in their everyday lives. In addition, the

project had the potential to impact the school community and the local community, encouraging the adoption of more sustainable waste management practices.

For data analysis, it was using the content analysis developed by Bardin (2016) who defines his methodology as:

> "... a set of techniques for the analysis of communications in order to obtain, through systematic and objective procedures for describing the content of messages, indicators (quantitative or not) that allow the inference of knowledge regarding the conditions of production/reception (inferred variables) of these messages. (Bardin, 1997, p. 42)"

The analysis was carried out in three stages: pre-analysis, exploration of the material and treatment of the results. The pre-analysis involved the selection of the questionnaires and the constitution of the corpus. In the exploration of the material, the registration and context units were codified. The categorization of the registration units was carried out considering semantic, syntactic, lexical or expressive criteria. The results were treated and interpreted, considering the sender, receiver, message and communication channel. The content analysis contributed to understanding the impact of the project and identifying gaps and challenges in environmental education and provided a consistent theoretical basis for the analysis of the data collected.

QUESTIONNAIRES APPLIED

The first questionnaire, with an investigative character, was applied during the moment of registration for the event, aimed to understand the level of knowledge of the students in relation to the subject:

1) Do you know what Sustainability is and what sustainable practices are? If so, comment on:
2) Do you have any sustainable practices in your home? Ex: separation of organic and recyclable waste, reduce the use of plastic, etc.
3) Do you know what Environmental Education is? If so, comment on:
4) Do you know what composting is and what its benefits are?

Second questionnaire, with an evaluative character, which was applied after the event to understand if the objectives of the event were achieved and if the students really understood the subject addressed:

1) What have you learned about sustainability?
2) Will you apply sustainable practices in your home and in your daily life?
3) What did you learn about Environmental Education?
4) What have you learned about composting and its benefits?

5) What is the importance of composting for the organic garden and the waste generated at school?

PLANNING AND SCHEDULE OF THE EXTENSION EVENT

Event Schedule

The extension event with the support of the CEPEA extension project registered with the Dean of Extension and Culture (PROEC) of UFPR. The event was held on August 8, 2023 and lasted 3 hours and 30 minutes with a presentation of slides, videos and photos, during the students' class hours (1:00 pm to 4:30 pm) and its objective was to promote student awareness of the importance of environmental conservation through environmental education and teach them how to make a composter using PET bottles.

An initial questionnaire was applied during registration for the event, with the objective of evaluating the students' previous knowledge about environmental education and composting. At the beginning of the course, an introduction to environmental education and agroecology was made, addressing its relevance for the preservation of the environment. Then, the basic concepts of composting, the benefits of using a PET bottle composter and the types of existing composters were presented. After the basic concepts applied, there was a theoretical approach to the domestic composter that will be used by students and teachers in the school garden, followed by a brief explanation of the care necessary for the proper functioning and maintenance of the composter. Guidelines were provided for students to replicate the assembly of the composter at home with the help of their guardians, if necessary.

The students visited the school's vegetable garden, where it was demonstrated how the fertilizer resulting from composting can be applied in the cultivation of plants. A group discussion was conducted on the possible ways of using compost in the school, such as composting food scraps from school meals. In addition, during the visit to the school's vegetable garden, students participated in the application of fertilizer in the garden and will have free time to ask questions and share their experiences with the making of the composter. After this visit, there was a return to the classroom, for the closing of the event.

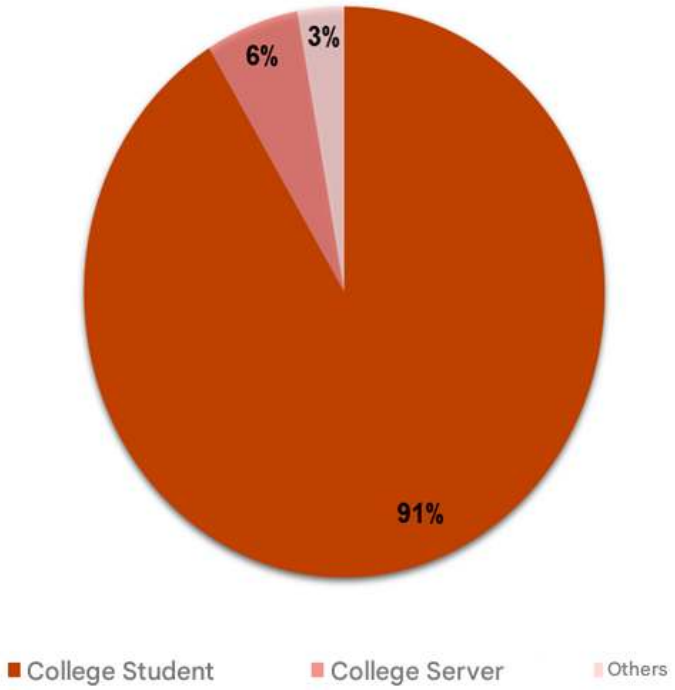
RESULTS AND DISCUSSIONS

PROFILE OF THE PARTICIPANTS

In the context of this work, the fundamental role that the participants played in the environmental education event is highlighted. Registration for the event was conducted through the Google Forms platform, resulting in a total of 69 registered responses. This

expressive number of subscribers shows the interest and receptivity of the target audience in relation to the topic addressed. It is worth mentioning that the primary target audience was the students of Colégio Casemiro Karman, and the event achieved its objectives in this regard. Surprisingly, more than 90% of the participants were, in fact, high school students, which demonstrates the significant adherence of the students to the educational proposal of the event, as shown in figure 3.

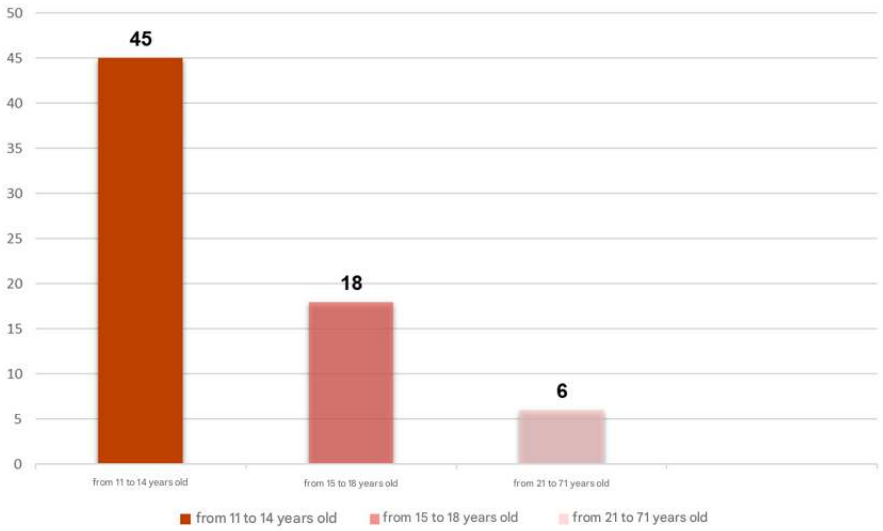
Figure 3. Occupation of those enrolled in the event at the Casemiro Karman State College



Source: Authors (2023)

Regarding the age of the participants, they had a large variation, between 11 and 71 years old, but the concentration shows that most were elementary school students due to the age group of 11 to 14 years with 45 enrolled, showing that environmental education aimed at pre-adolescents and adolescents was the most appropriate methodology for the study.

Figure 4. Age group of those registered for the event



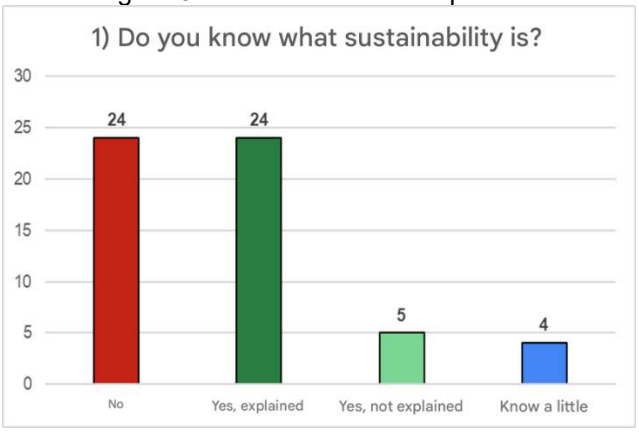
Source: Authors (2023)

ANALYSIS OF THE FIRST QUESTIONNAIRE

As the first questionnaire, which was not mandatory, 57 responses were obtained from the 69 registered, that is, 82% of the participants had the initiative to answer the questions, where it was possible to delimit the students' previous knowledge in relation to sustainability, composting and environmental education before the event.

Knowing that this first questionnaire has an investigative character, that is, with the objective of raising a previous diagnosis of the knowledge of the target audience, it was applied during the registration of the participants. The answers obtained in the first question of the questionnaire were analyzed to support the content on sustainability in the course. Thus, after analyzing that 51% of the participants answered that they knew what sustainability was, in addition to 24 putting some concept in their answer evidenced in figure 5, an initial part of the course was idealized, with concepts and videos about sustainability, to be able to pass on and remember this content to participants who did not know or who knew little.

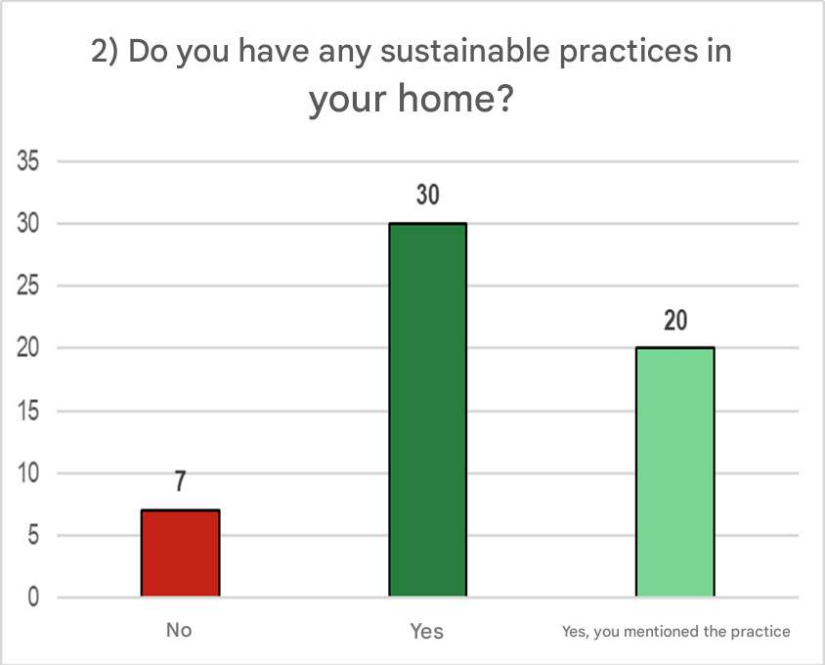
Figure 5. Answers to the first question



Source: Authors (2023)

The second question obtained the best answers from the first questionnaire, about 88% of those interested in the course answered that they have sustainable practices in their homes, in addition to 35% mentioning what practices are carried out, as shown in figure 6, and the most common among them was the separation of garbage between organic and recyclable. This demonstrates how long-term environmental education, such as incentives and advertisements for waste recycling, impacts people's daily lives, especially among children and pre-adolescents.

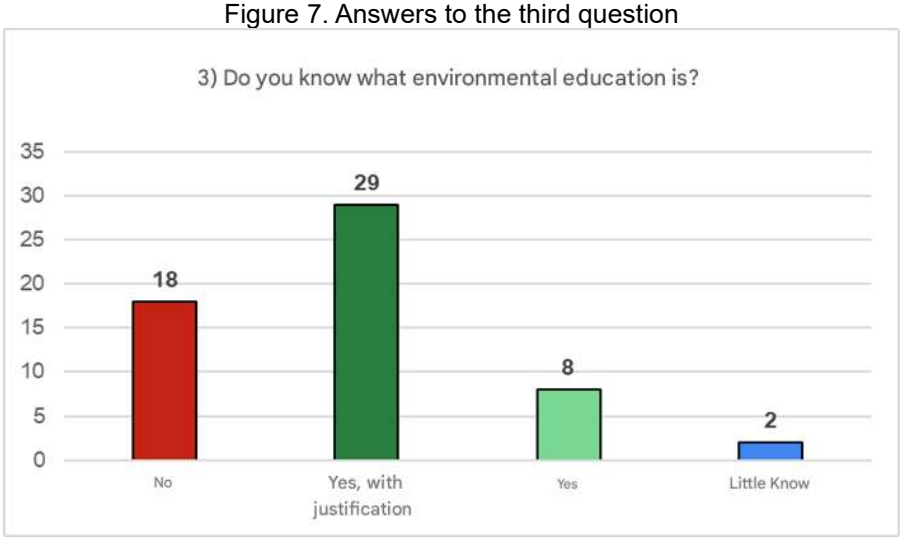
Figure 6. Answers to the second question



Source: Authors (2023)

Question number three presents important data, most of the interviewees, about 37 of them, know about environmental education and 29 of them put definitions in their answers, this indicates that the environmental education approaches at the Casemiro Karman State School are being efficient, although 20 participants do not know what environmental education is about or did not know how to explain, shown in Figure 7. For this reason, during the course, it was exemplified and reinforced several times how much the activity was a form of environmental education.

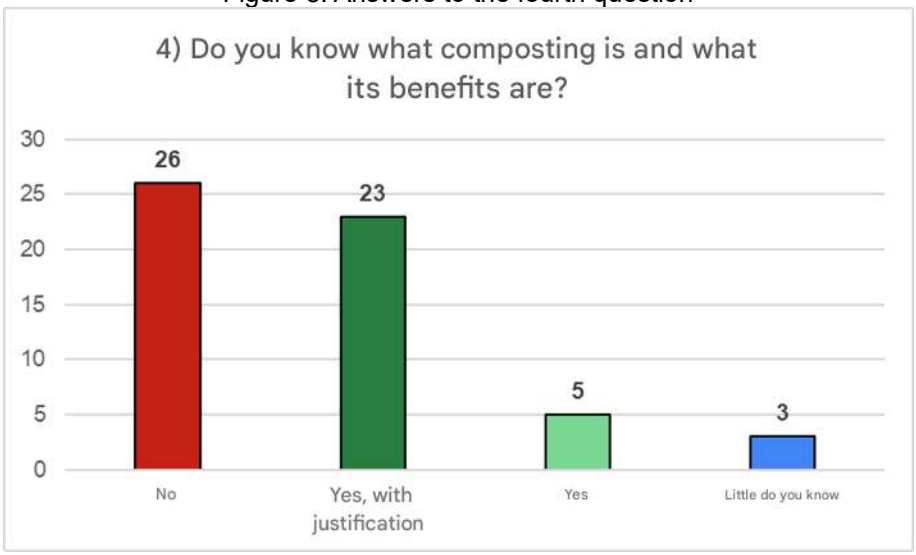
Figure 7. Answers to the third question



Source: Authors (2023)

The last question of the first questionnaire was designed to be more specific, carried out with the intention of understanding the level of knowledge of the participants about the main theme of the course, composting. A surprising result was verified, a large number of respondents had knowledge of what composting was, in addition to the fact that 23 of them wrote a brief concept of composting in their answers, as shown in figure 8.

Figure 8. Answers to the fourth question



Source: Authors (2023)

After analyzing the investigative questionnaire, the course content was developed, emphasizing the main points in which the participants had little or no knowledge.

ANALYSIS OF THE SECOND QUESTIONNAIRE

Evaluating the impact of the event, the second questionnaire has an evaluative character, its main objective is to quantify and analyze how much the students of the

Casemiro Karman State School have learned, understood and will apply the practices taught during the event. Thus, soon after the end of the course, a non-mandatory questionnaire containing 5 questions was sent for the participants to answer. In this study, 50 responses were obtained from the 69 initially enrolled.

The first of the 5 key questions of the questionnaire was in relation to what they learned about sustainability and sought to understand the degree of assimilation of the concepts covered during the environmental education event. Of the 50 participants who answered the question, about 80% expressed having learned significantly about sustainability. Of these, 40 reported having gained deep and comprehensive learning. In addition, 12% (6 participants) indicated that they had acquired moderate knowledge on the subject, while the remaining 8% (4 participants) declared that they had not learned anything about sustainability.

Analysis of responses revealed that the vast majority highlighted an in-depth understanding of the principles of the 3 Rs of sustainability: reduction, reuse, and recycling. They stressed the importance of reducing waste, reusing materials whenever possible, and adopting recycling practices.

The second question about applying sustainable practices in their homes and daily routines brought positive answers. 95% of the participants expressed the desire to adopt or were already adopting such practices, particularly highlighting the adoption of composting, which stood out as a valuable learning from the event and the recycling that was already widely used by several participants. On the other hand, a minority, representing 5% of respondents, indicated that they were not willing to incorporate these practices, although without providing specific justifications.

Evaluating the third question, which refers to learning about Environmental Education after the event, the results reflect that approximately 92% of the interviewees reported having obtained an enriching understanding, highlighting the essence of Environmental Education in sharing knowledge about the environment and taking responsibility for its care. The connection between the environmental awareness passed on and the knowledge applied during the event was evident in their answers. Even so, 8% of the participants expressed difficulties in absorbing information, even after the event.

In the fourth and penultimate question about the understanding of composting and its benefits, the answers capture the diversity of concepts absorbed. Approximately 64% of the participants learned that composting emerges as a way to reuse the organic waste generated in the domestic environment, promoting the reduction of waste. Another 18% highlighted their relationship with plants and how they can improve their growth, while 12%

understood their nature as a valuable fertilizer to enrich the soil. However, a small proportion of 6% failed to provide a clear answer regarding learning about composting.

The last question was about the importance of composting for the organic garden and the waste produced at school. The answers obtained were: approximately 94% of the participants recognized the beneficial impacts that composting can have on the plants in the garden, consequently, for the healthy growth of organic crops. In addition, waste from school meals can be channeled to the composter, reducing food waste and associated environmental impacts. In addition, the active participation of students in the assembly of composters was highlighted as a way to strengthen environmental education practices, strengthening practical learning and promoting a deeper understanding of the environment. On the other hand, a minority of 6% of respondents do not attribute relevance to composting in this context.

FINAL CONSIDERATIONS

After the comparative analysis of the two questionnaires applied, the first before the event and the second right after the end, it is possible to conclude that the Action Research methodology was effective in all cases, showing a significant increase in the students' knowledge after the execution of the course based on their weaknesses and remembering the strengths with which the students had previous contact in school subjects, The increase in knowledge about sustainability stands out, with a 29% increase in content assimilation. From this study, it is possible to indicate the methodology of Action Research for educational purposes, and, consequently, for environmental education purposes, in which it is possible to adapt the contents passed on to the students, in such a way that their assimilation becomes easier and more effective.

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