Eco-education: an intervention in the curriculum and in the training process of teachers in the Feira Nova-PE School System

Ecoeducação: uma intervenção no currículo e no processo de formação de professores no Sistema Escolar de Feira Nova-PE

Ecoeducación: una intervención en el currículo y en el proceso de formación de profesores en el sistema escolar de Feira Nova-PE

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ABSTRACT

Eco-education plays a crucial role in shaping a sustainable future by fostering environmental awareness and responsibility in students. This study investigates the incorporation of eco-education in the curriculum and teacher training in the Feira Nova-PE school system, with the goal of promoting sustainable practices. The primary objective is to understand how eco-education can be effectively integrated into school curricula and teaching practices to encourage environmental responsibility. The specific objectives are to engage students in hands-on learning about sustainability, equip teachers with the necessary tools to teach eco-education, and establish a model that can be replicated in other regions. The research question guiding this study is: How can eco-education be successfully embedded in the curriculum to promote long-term environmental consciousness? The methodology is bibliographic and includes action research, focusing on interventions with 75 fifth-grade students and 23 teachers from public schools. The results demonstrate that integrating eco-education into the curriculum requires continuous collaboration between schools, local communities, and policymakers, and that it positively impacts students' and teachers' understanding of environmental issues. The conclusion emphasizes the need for ongoing curriculum adjustments to reflect contemporary environmental challenges and highlights the importance of teacher training in fostering eco-education.

Keywords: Eco-education. Sustainability. Curriculum Development. Teacher Training.

RESUMO

A ecoeducação desempenha um papel crucial na formação de um futuro sustentável, promovendo a conscientização e a responsabilidade ambiental entre os estudantes. Este estudo investiga a incorporação da ecoeducação no currículo e na formação de professores no sistema escolar de Feira Nova-PE, com o objetivo de promover práticas sustentáveis. O objetivo principal é compreender como a ecoeducação pode ser efetivamente integrada aos currículos escolares e práticas pedagógicas para incentivar a responsabilidade ambiental. Os objetivos específicos são engajar os alunos em atividades práticas de aprendizagem sobre sustentabilidade, capacitar os professores com as ferramentas necessárias para ensinar ecoeducação e estabelecer um modelo que possa ser replicado em outras regiões. A pergunta de pesquisa que orienta este estudo é: Como a ecoeducação pode ser incorporada ao currículo de forma eficaz para promover uma consciência ambiental de longo prazo? A metodologia utilizada é bibliográfica, aliada à pesquisa-ação, com foco em intervenções realizadas com 75 alunos do quinto ano e 23 professores de escolas públicas. Os resultados demonstram que a integração da ecoeducação no currículo requer colaboração contínua entre escolas, comunidades locais e formuladores de políticas, além de impactar positivamente a compreensão de questões ambientais por parte de estudantes e professores. A conclusão destaca a necessidade de ajustes contínuos no currículo para refletir

os desafios ambientais contemporâneos e a importância da formação docente para promover a ecoeducação.

Palavras-chave: Ecoeducação. Sustentabilidade. Desenvolvimento Curricular. Formação de Professores.

RESUMEN

La ecoeducación desempeña un papel crucial en la conformación de un futuro sostenible, fomentando la conciencia y la responsabilidad ambiental en los estudiantes. Este estudio investiga la incorporación de la ecoeducación en el plan de estudios y la formación docente en el sistema escolar de Feira Nova-PE, con el objetivo de promover prácticas sostenibles. El objetivo principal es comprender cómo la ecoeducación puede integrarse de manera efectiva en los planes de estudios y las prácticas de enseñanza escolares para fomentar la responsabilidad ambiental. Los objetivos específicos son involucrar a los estudiantes en el aprendizaje práctico sobre la sostenibilidad, equipar a los maestros con las herramientas necesarias para enseñar ecoeducación y establecer un modelo que pueda replicarse en otras regiones. La pregunta de investigación que guía este estudio es: ¿Cómo se puede integrar con éxito la ecoeducación en el plan de estudios para promover la conciencia ambiental a largo plazo? La metodología es bibliográfica e incluye investigación-acción, centrándose en intervenciones con 75 estudiantes de quinto grado y 23 maestros de escuelas públicas. Los resultados demuestran que la integración de la ecoeducación en el plan de estudios requiere una colaboración continua entre las escuelas, las comunidades locales y los responsables de las políticas, y que incide positivamente en la comprensión de los estudiantes y los maestros sobre las cuestiones ambientales. La conclusión enfatiza la necesidad de realizar ajustes curriculares permanentes para reflejar los desafíos ambientales contemporáneos y destaca la importancia de la capacitación docente para fomentar la ecoeducación.

Palabras clave: Ecoeducación. Sostenibilidad. Desarrollo Curricular. Formación Docente.

1 INTRODUCTION

Since the 1948 Declaration of Universal Human Rights by the United Nations (UN), several social advances have emerged, including education. This is evident from the fact that in 1900, seven out of ten people globally were illiterate. This figure is around 20%, meaning that two out of every ten people are still illiterate (UNESCO, 2023).

Several countries have already advanced in this segment, especially those in the OECD (Organization for Economic Cooperation and Development) group,

especially the countries of Northern Europe, the so-called “Asian Tigers” and North America, among others (OECD, 2022). The developing countries in the G20, whose economies are among the twenty largest on the planet, like Brazil, China, India, and Mexico, have one of their biggest educational challenges despite their investments and progress in recent decades.

Regarding peripheral countries, the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2023) reports that around 244 million children and teenagers between 6 and 18 years old are still out of school, especially in sub-Saharan Africa. In addition, the data revealed in the previous publication is still worrying, as it affirms the urgent need to address school failure. Concerning Latin America, in 2022, at the end of the Covid-19 pandemic, UNESCO revealed that around 20% of the 170 million students were out of school. Specifically in Brazil, this proportion was around 5.5 million, out of 47 million students, i.e. something close to 12%.

Since the end of the Second World War, UN-led global actions aimed at public policy have been endorsed by the majority of its member countries, as was the case at COP 21, held in Paris 2015, which outlined the Sustainable Development Goals (SDGs), made up of 17 targets and 162 sub-actions. The eradication of illiteracy by 2030 appears in Goal 4 as one of the key targets, since education can mitigate basic problems of social inequality and is a way of accessing the other goals. When considering education as the driving force behind these demands, it is necessary to “think/rethink” which educational approach better suits the contemporary demands. Considering the complexity that this education entails, it cannot be dissociated from sustainability, which must be assumed in its entirety (Cordeiro et al, 2024).

For education to proceed systematically, understanding the concept of systematization here as a structural arrangement, with goals and objectives defined by law, one of the most important pillars is the curriculum. For Goodson (1997), the curriculum is a social construction reflecting a political, historical, economic, cultural, and project-based societal moment. This statement is corroborated by what Gadotti and Romão (1997, p.16) say when they point out that the curriculum is a collective construction and an achievement for everyone.

Thus, the school consolidates itself as a catalyst and transformer of society in the search for what to teach and how to teach. From this perspective, the Elementary School Curriculum of the State of Pernambuco, released in 2018, based on the National Common Core Curriculum-BNCC, was engendered by a look at social, economic, and environmental sustainability, as Pereira (2017) and Selva (2018) record.

However, the challenge facing schools today is to provide different educational experiences, following paths and pedagogical models that contribute to the consolidation of long-term, reasoned knowledge, but allowing everyone to constitute themselves as subjects of their education and to experience themselves collectively as responsible agents of knowledge and integrated and sustained transformation of their life contexts (Cordeiro et al, 2024).

In one of the methodologies with the greatest heuristic and explanatory value, Lesne (1984) organized the different educational practices into a typology comprising three Modes of Pedagogical Work (MTP), relating them to the extent to which education depends on people's relationship with their contexts. Thus, in MTP1, the context exerts an educational action on people, reserving them the role of training objects. In MTP2, it is people who appropriate knowledge to make personal changes, becoming training subjects. In MTP3 people learn together and transform themselves while transforming and caring towards the context. In this sense, suppose it is in social relationships that Man is formed. In that case, it is the assumption of different roles, in teaching and learning scenarios, which can best contribute to an education as a whole person, prepared from the earliest school years to act in society.

From this perspective and based on the typology suggested by Lesne, we can understand MTP1 as translating predominantly hetero-educational practices, MTP2 indicating experiences more focused on strengthening the capacity for self-direction of learning, and MTP3 more identified with eco-educational practices. Within this context, Alcoforado (2014) states that eco-education is the “differentiated and articulated set of experiences” that allow everyone to learn together, “in a harmonious balance with the environment in which they live and share, influencing it while influencing themselves, questioning it while questioning

themselves, transforming them whenever they are modified and promoting their development whenever they develop" (Alcoforado, 2014, p. 11).

The aim is to motivate schools to provide eco-educational experiences from the perspective that Freire (1996) called liberating education, promoting autonomy and responsibility for oneself and others in a context where everyone interacts. Corroborating this, there is no choice but to act immediately to save the planet or future generations will be doomed to extinction (LEFF,2019). Promoting education capable of providing people with this environmental awareness, developing the necessary and urgent actions, starting in school circles.

The movement that began at the Stockholm Conference in 1972, was present at ECO 92 in Rio de Janeiro, Rio+10 in Johannesburg in 2002, and culminated in the Paris Agreement, in 2015, in which the Sustainable Development Goals (SDGs) - Agenda 2030 - were outlined, Brazil was not only present but also showed reflections of this movement in the process of reconfiguring the school curriculum with an emphasis on the issue of sustainability. As a result of this movement, the inclusion of themes linked to environmental sustainability in the National Common Curricular Base has become frequent, as the final document from the Ministry of Education and Culture (MEC) points out. In the Elementary School version alone, there are at least twenty-eight references to the issue of socio-environmental sustainability, not only in the area of natural sciences but also in the area of social sciences and other areas, as Miranda (2017), Pereira (2017) and Selva (2018) point out.

To respond to new 21st century demands, mainly from the perspective of what is set out in various documents, but especially in the SDGs that came out of Paris 2015, governments must be based on human values and sustainability, with a planet capable of minimally meeting humanity's basic needs. However, for these actions to take place effectively and achieve their objectives, they need to be backed up by public policies that transcend governments and result in a pact signed by everyone (OKAMOTO, 2016). Therefore, it is necessary to design strategic plans to meet these premises, with the main focus on a healthy environment, with basic sanitation and water for all, seeking to eradicate illiteracy and poverty. Therefore, it is at school, through a curriculum that meets the

demands of the present and addresses the issues of the future, that this whole network connects and forms people capable of understanding that the Earth is a common good, whose responsibility for it is collective (LEFF, 2019).

To contribute to the above discussion, this article proposes to present actions that have been adopted in the school network of a municipality in northeastern Brazil - Feira Nova -PE -, involving students and teachers, in the importance of experiencing in the classroom and then taking into their lives actions that can contribute to the planet's sustainability. For these actions to become effective, the school community needs to be in constant dialogue with civil society, the authorities, and academia.

These actions will be presented in the next section of this paper, which will show, in a categorized and sequential fashion, the steps taken, starting with the students, but also focusing on the teacher, teaching staff, involving the school community and civil society, as well as presenting the methodological approaches chosen for each stage to create a new local curriculum in the areas of Human Sciences and Natural Sciences.

2 METHODS

The methodological approach adopted in a piece of work should be treated with discretion and proper importance. This can be explained by the fact that it states which paths were followed and how they were carried out. For Dalvaneide Araújo, what should be highlighted in a methodology is its coherence with the objectives and the context in which this process shows up (Araújo, 2022, p. 99).

In this context, this work was initially based on a bibliographical review, covering topics ranging from the master plan, curriculum, sustainability, training teachers, local education policies, political pedagogical projects, and also considering official documents such as the National Common Curriculum Base - BNCC, Sustainable Development Goals - SDGs, Brazilian Education Guidelines and Bases Law - LDB, Pernambuco Curriculum, among others.

Regarding official documents (Master Plan, BNCC, ODS, LDB and Pernambuco Curriculum), the analysis was carried out to compare and monitor what is

legally required and compliance with the targets set by the controlling bodies and regulatory agencies. At this stage, we analyze the essence of the documents and look for data that can measure progress and/or setbacks concerning the goals established in these documents (PERISSINOTTO & NUNES, 2023).

Furthermore, one of the key aspects of this work was action research, which sought to intervene in the school curriculum of 75 5th grade students from two public schools in Feira Nova, Pernambuco, Brazil (Escola Professor Daniel Araújo de Lima and Escola Municipal João Chéu), about the issue of environmental sustainability. This intervention is endorsed by the BNCC, established in Brazil in 2018 and which has flexibilized up to 30% of the local school curriculum. The primordial goal of this action is to make the students feel part of the context that they are part of. In addition, it is possible to include in the student's curricular structure the demands and specificities that are unique to their region, giving meaning to the teaching-learning process, as well as imbuing it with a sense of belonging, whether it is economic, cultural, social, environmental, among others.

The schools were picked as they are geographically linked to the area covered by the Lagoa do Carro Dam-PE and part of their students belong to the riverside community. According to the Pernambuco Water and Climate Agency (APAC), the dam is the fifth largest reservoir of water for human consumption in the state of Pernambuco, with a storage capacity of 270 million cubic meters (APAC, 2023). According to Companhia Pernambucana de Saneamento Básico e Águas-COMPESA, it supplies around 300,000 inhabitants in six different municipalities. Despite its size and importance, the Brazilian Institute of Geography and Statistics (IBGE) reports that the municipalities surrounding the dam have alarming scenarios regarding the provision of universal basic sanitation. According to the IBGE, only 58% of domestic and industrial effluents are treated before being discharged into water bodies (IBGE, 2023).

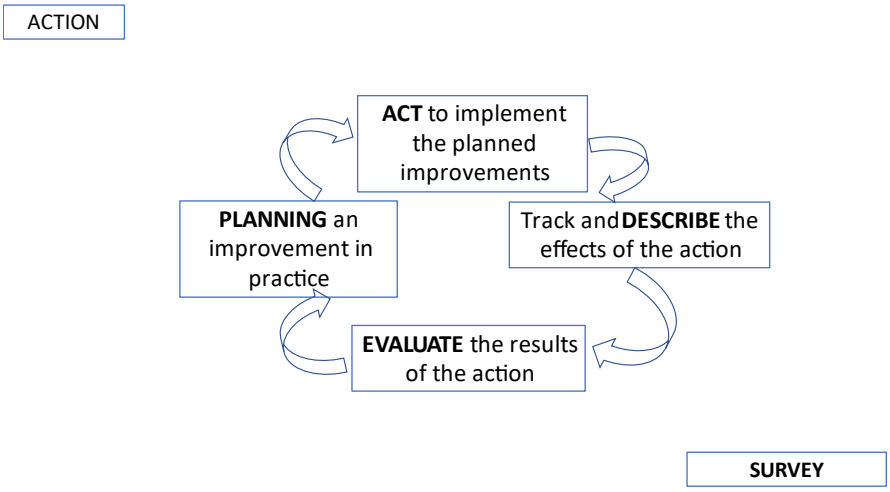
Due to the lack of universal basic sanitation in these municipalities, Albuquerque (2019) states that the bottom sediments of the dam present levels of trace metal contamination above the tolerated threshold, as in the case of Chromium, Mercury and Lead, based on parameters adopted by Brazil's National

Environmental Council (CONAMA), the U.S. Environmental Protection Agency (USEPA) and the Canadian Environment Agency (EC).

There was also an intervention along the same lines (action research) in the process of continuing education with a group of twenty-three teachers, of the final years of elementary school, focusing on Biology, Geography and History professionals, as well as the management teams of the target schools. Professionals in these areas were chosen because, according to the BNCC, they teach subjects in which the curriculum most addresses the issue of environmental sustainability.

Amado (2017) states that action research focuses on the reality experienced by the participants, not just on describing and/or characterizing and analysing them, but on contributing to the transformation of this reality and the people involved. As for Amado and Cardoso (2017), the nature and usefulness of this research strategy is active, making the conception of a dialectical relationship between the two moments, not confusing them, but mutually nourishing them. In this context, according to Tripp (2005), the outline of an action research project is reflected in a flowchart with the following nuances:

FIgurE 1 - Action research scheme according to Tripp.



Source: Albuquerque, 2024

As can be seen in Figure 1, action research is cyclical and proceeds in four phases, which occur in a continuous circular movement, allowing for action-reflection-action in the educational process. It also permits action and intervention during the research process, should a new investigation arise, until the previous process matures, and successively, a concluding pause, and may even need to continue and/or resume the action-reflection-action process. As Brown and Dowling explain, “action research in education has become a catch-all term for projects in which practitioners seek to effect change in their practices...” (Brown & Dowling, 2001, p. 152).

2.1 INSTRUMENTS, SPACES AND INTERVENTION AGENTS

The choice of action research for this work was based on what Tripp (2005) points out, which demonstrates the flexibility and dynamism that the model allows, i.e. being able to stop when necessary, to act and react, to design and redesign the routes. These stops are necessary considering what qualitative research brings, especially in education (Amado, 2020). It is also noteworthy that the choice of schools and classes was since they are territorially located in the area covered by the Barragem Lagoa do Carro and their students have a direct relationship with this water equipment.

The actions in the 5th-year classes of Elementary School, teachers of the Final Years of Elementary School, and the management team of the selected schools, were applied to the action research methodology, by collecting work materials resulting from semi-structured interviews, focus groups, training workshops, and visits to the studied locations.

Google Docs, was used initially as a means for management and teachers. The professionals received a questionnaire regarding their level of knowledge about the SDGs, BNCC, Pernambuco Educational Curriculum, Master Plan, Basic Sanitation, and Water. The approach for the students was carried out through the focus group modality. For Morgan (1997), focus groups represent a qualitative research method, derived from group interviews, by collecting data through group interactions. In this sense, a focus group consists of an interviewing group-based activity, based on communication and interaction. Its main purpose is to gather data on a specific topic of interest from the selected participants. Thus, the focus group seeks to gather information that can provide an understanding of perceptions, beliefs, and attitudes about a topic, product, or service (Bonfim, 2009).

Regarding the group constitution of twenty-three teachers, in addition to the adopted approach, a semi-structured interview was also applied, which means that the questions were derived from a previous plan, a guide where the main points are defined and recorded, following a logical order for the interviewer, although, in the interaction, the interviewee is given freedom of response (Amado, 2020, p. 208).

In August 2021, the materialization actions proposed in the objectives of this article began. One of these objectives was to intervene in the curriculum of 5th-grade Elementary School students in the Feira Nova Education Network, with emphasis on classes at the Professor Daniel Araújo de Lima and João Chéu Schools, as well as ongoing formation for Biology, Geography, and History teachers in the Final Years of Elementary School in the Feira Nova Municipal Education Network, regarding the “obligation to do” with working on issues related to environmental sustainability in their respective areas of training, proposed by the National Common Curricular Base - BNCC. Furthermore, the aim was also to adopt actions that involved the entire school community

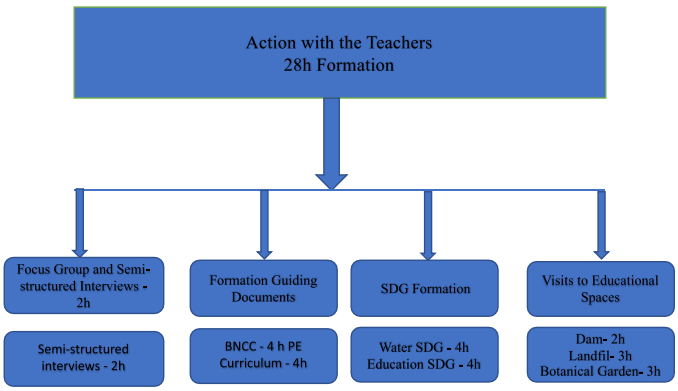
3 RESULTS AND DISCUSSIONS

3.1 ACTIONS AND INTERVENTIONS WITH TEACHERS

The actions with the teachers included focus group work, semi-structured interviews, and ongoing training at the Feira Nova Education Network. The training spaces for the teachers occurred both in the classroom and in the surroundings of the Lagoa do Carro Dam, Passira Landfill, Botical Garden and Jardim Filtrante Parque do Caiara, the latter two located in the city of Recife.

The training process took place in a categorized manner, as proposed by Bardin (2011). Initially, a 4-hour formation session was held to get to grips with what the BNCC had to say about sustainability, followed by another session, also lasting 4 hours to discuss the Pernambuco Curriculum, with a sequence of continuing education lasting 20 hours, being divided into 5 meetings of 4 hours each, to discuss the dialog between SDG 4 (Quality Education) and SDG 6 (Drinking Water and Sanitation). Therefore, this formative phase with the network's teachers lasted 28 hours of direct learning, spread over seven months, with a formative moment and discussion of the proposed theme each month (Figure 2).

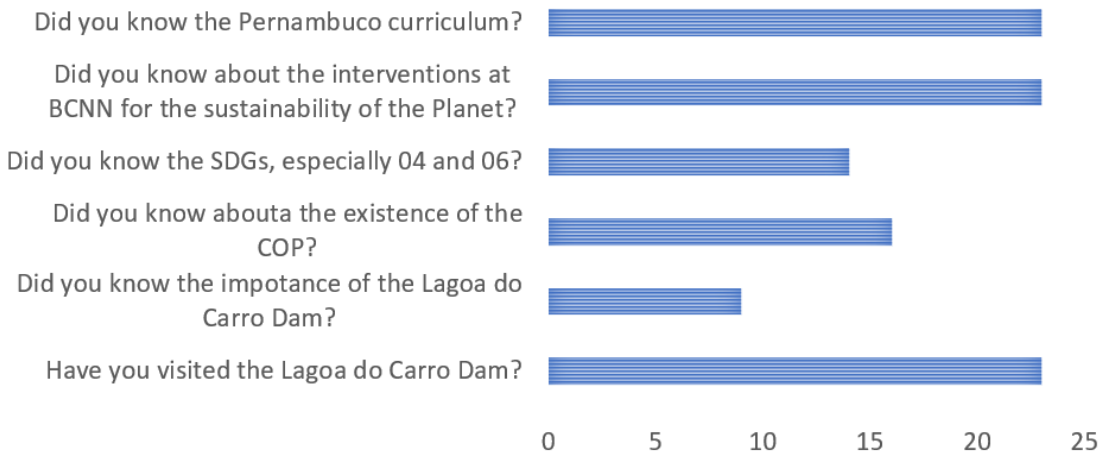
Figure 2: Teacher Formation Flowchart.



Source: Albuquerque, 2024.

The first educational meeting on the SDGs took place using the focus group technique, to hear what the teachers involved in the training already knew and practiced in terms of the SDGs. This meeting took place shortly after the end of the COVID-19 pandemic, in August 2021, when face-to-face classes resumed. A semi-structured questionnaire was administered to collect information about some introduced themes as guiding documents, as well as knowledge about the Barragem do Carpina in terms of water equipment and its social and economic role (Graph 1).

GRAPH 1: Questionnaire applied to teachers in the Feira Nova-PE school network



Source: Albuquerque, 2023.

As an action and means to provide teachers with equipment, either material and/or non-formal training spaces, four visits were undertaken to different formative spaces, as previously mentioned. For Gadotti (2014), in addition to the classroom, the spaces that may or may not be around the school offer conditions to strengthen the teaching and learning process, whether for the teacher or their students, as can be seen in the case under study (Photo 2).

Photo 02- A - Training with teachers; B - Visit to the Botanical Garden; C - Visit to the Carciniculture and Psiculture Farms in Feira Nova.

Source: Albuquerque, 2023.

3.2 ACTIONS AND INTERVENTIONS WITH STUDENTS

With the face-to-face return of students, soon after the end of the Pandemic crisis, which in Brazil and especially in the state of Pernambuco, occurred gradually and interspersed in August 2021, the actions aimed at fulfilling part of the specific objectives of this work began. The first interventions were carried out at the Professor Daniel Araújo de Lima School and the João Chéu Municipal School. At first, an interview was held with the management team, teachers, and students from the 5th year of elementary school, to make a diagnosis and start the work.

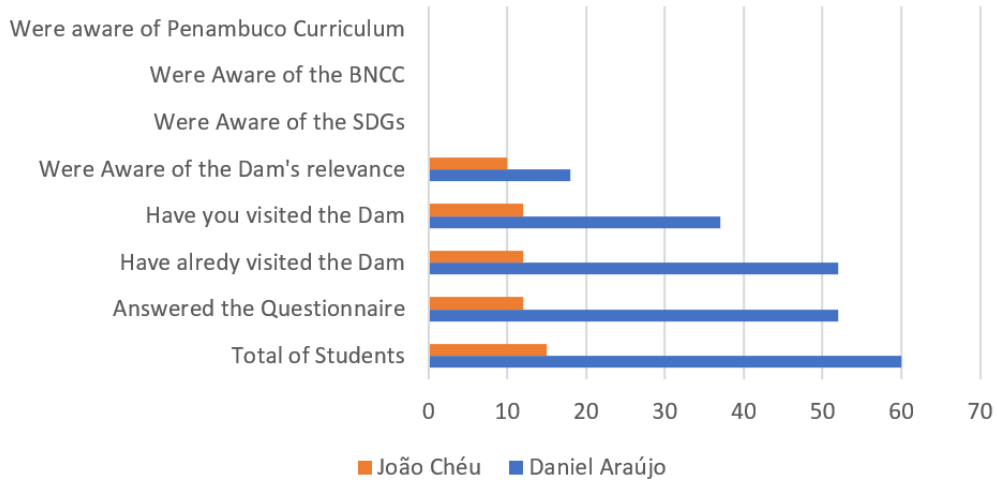
The work developed with the students took place over one hundred and twenty days, from September to December 2021. The classes were visited a period of every two weeks, and the areas were: Lagoa do Carro Dam and the bed of the Corunguba River (the main affluent on the right bank of the Médio Capibaribe, where Lagoa do Carro Dam is located).

Throughout September 2021, visits were conducted in the schools to perform the diagnosis by applying the questionnaires to the management team and the 5th-grade teachers, setting up focus groups and listening to the students, and analyzing the material prepared and assembling the strategies adopted for the following visits, in addition to producing materials for the activities and workshops.

In the questionnaire survey of the 75 5th-grade students selected for the research, 11 did not respond to the questionnaire. As a result of returning to school soon after the pandemic, some parents chose not to send their children to classroom lessons, either because they were children with comorbidities, therefore in the risk group, or because they were not yet in the priority group for vaccination

or because of their parent's choice. It is important to emphasize that according to Amado (2020), the absence of a percentage of this magnitude, in this specific case, only 11 students of the total expected, does not compromise the research. Therefore, the number of questionnaires delivered, answered, and analyzed, a total of 64, provides methodological support to validate this work (Graph 2).

Graph 2: Consolidation of the Questionnaire Applied to the Students of Daniel Araújo and João Chéu



Fonte: Albuquerque, 2023.

As can be observed from the data in this graph, of the seventy-five questionnaires distributed among the students at the schools selected for the current survey, sixty-four responded. Of these, forty-nine had already visited the dam, but only twenty-eight answered that the dam is an important water facility for the community and the surrounding municipalities. When asked about the guiding documents that addressed issues related to the SDGs, the BNCC, and the Pernambuco Curriculum, the answer was negative for all sixty-four participants. Considering that they are 5th grade students and that these documents are relatively recent, the SDGs from 2015, the BNCC from 2017, and the Pernambuco Curriculum from 2018, the rejection of these answers was to be expected.

In the survey carried out in one of the articles that integrate the global work (Albuquerque et al., 2024), of the forty-two selected studies, in none of them was there a survey similar to this one, regarding knowledge of guiding documents, such as public policies and/or guidelines on socio-environmental sustainability.

In October 2021, there were trips to Lagoa do Carro Dam viewpoint and to the Cotunguba River, with students from Professor Daniel Araúdo and João Ché schools, although many of the students were from the community, the report was that it was the first time they had been to the dam from an educational perspective. During the class presentation, the experiences of the students who live around the dam and whose families depend on fishing were shared. As a result of the outdoor class, the students produced a book containing written and visual information, (Albuquerque et al., 2021).

In October, the material covered was analyzed and the strategies to be adopted in the following activities were put together, as well as the materials for activities and workshops (photo 02-B).

The following month (November), and immediately after the visits to the dam and the Cotunguba riverbed, work was carried out under the guidance of teachers from the three classes (two from the Daniel Araújo School and one from the João Chéu School) and the pedagogical team from the two schools involved in the project, the production of a booklet about the experience of visiting the dam/river, as well as their feelings about the need to preserve and care for the space (Photo 02, C).

The culmination of this action took place in December 2021, during the 2nd - FETEC (Feira Nova Education Network Technology Fair), the presentation of the produced material (booklet and oral reports) at the II International Meeting of Intelligent Territories in Feira Nova- PE.

Photo 02 -A (Visit to the Dam); B (Material Production); C (Publication by UFPE Publishing House).

Source: Albuquerque, 2023.

Naturally, the results of interventions based on the methodological model adopted in this work cannot be fully measured in a short period. Pedagogical work requires cycles and, therefore, changes in attitudes and habits, as the concept of caring for the environment, in this specific case, the dam's surroundings, cannot be measured and modulated in the present moment. Kirkipatric (2010), states that a complete assessment process consists of four stages - reaction, learning, behavior, and results - and that only at the end of this cycle are the results effectively and conclusively evaluated. Due to its educational peculiarity, the fruits of which are only seen in the medium and long term, this work focused only on the reaction and learning phases. Thus, further work, research, and interventions need to be developed afterwards to measure, in numbers, the results of the desired changes in terms of achieving the aims proposed by the UN's SDGs, in their targets 04 and 06, concerning the interventions with the students from the selected schools.

3.3 ACTIONS AND INTERVENTIONS WITH THE SCHOOL COMMUNITY

Following the objective involving the actions aimed at the entire school community/civil society, these were applied on three different fronts. The first was aimed at schools and the community, as a strategy to introduce civil society to the SDGs of the 2030 Agenda. The second, despite also proposing to present to civil society, is created and strengthened within the school and takes to the streets aiming to demonstrate what is produced within the school and, with this, discuss

and propose solutions to environmental sustainability issues. The third was an action - International Meeting of Intelligent Territories in Feira Nova -PE - which involved (and continues to involve) a group of institutions, ranging from the Feira Nova Mayor's Office to the Department of Education and other municipal departments, universities in the TISSE Network, as well as the Department of Education of the Government of the State of Pernambuco and the Union of Municipal Directors of Education of Brazil-UNDIME, Pernambuco Section), in its fourth edition, (2019/2021/2023 and 2024).

Still from the perspective of civil society becoming aware of the public policy that this research set out to build, in September 2022, an action was carried out that directly involved fourteen schools, including public and private schools, the Department of Health and Social Assistance of the Municipality of Feira Nova. All the units involved in the action initially worked on a Sustainable Development Goal. The next step was a parade down the city's main avenue, where the public was introduced to what the different SDGs represented and what they comprised. In this context, a differentiated approach was promoted for the units presenting SDGs 4 and 6. Approximately three hundred education professionals, two thousand eight hundred students, thirty professionals from the health and social welfare departments, and more than one hundred and fifty people from the group to strengthen the coexistence of the elderly were involved in the action, also from an intergenerational perspective. The initiative took place on September 7, the day that celebrates Brazil's Independence, marked by a Civic Parade, which lasted from 3pm to 9pm, parading through the main streets and avenues, with an audience of more than 5,000 people (Photo 03).

Photo 03- Photo mosaic of the 2022 Civic Parade under the SDG Theme.

Source: Albuquerque, 2023.

3.4 ACTIONS AND INTERVENTIONS FOR CIVIL SOCIETY

As an action from within the school and designed to present to civil society the activities that are carried out daily at the school, it was implemented as a public policy in education, the establishment of the Scientific Initiation Group (GPIC), involving teachers and students from the four schools that offer classes from the 6th to the 9th grades (EREF Iva Ferreira de Souza, EREF Padre Nicolau Pimentel, Escola Manoel Antônio de Aguiar and Escola Francisco Coelho da Silveira). This group focused on SDGs 4 and 6 over six months, for presentation in December at the Feira Nova Educational Technology Fair (FETEC). The fair took place in the town's Events Courtyard throughout the day (8am to 5pm) and was attended by both schoolchildren and civil society (Photo 04). This fair is the second action that seeks to achieve what is set out in the specific objectives of this project regarding the macro scope of curricular interventions.

Photo 04- Photo mosaic of the FETEC event.

Source: Albuquerque, 2023.

Finally, the third and last action for intervention in the curriculum, and in materializing the school/civil society relationship, referring to the propagation of the SDGs, focusing on SDGs 4 and 6, the main object of this intervention project, the "International Congress of Intelligent Territories of Feira Nova-PE" was organized. This event was scheduled to be held every two years, with the first taking place in December 2019, the second in December 2021, and the third in December 2023. The event proposes the discussion and suggestion of solutions aimed at improving sustainability practices in the municipality, whether they are related to teaching, but also in the field of basic sanitation, water, urban planning, and technologies for education. The event is a two-day action promoted by the Feira Nova Department of Education. It is supported by the Office of the Mayor of Feira Nova, the public higher education institutions and universities of the TISSE Network, the Department of Education of the State Government of Pernambuco, and the Union of Municipal Education Directors of Brazil - UNDIME, Pernambuco section. The event counts the participation of students and teachers from Feira Nova's municipal and state schools, students from postgraduate programs (master's and doctorate), professors and researchers from the participating institutions, and invited public managers (Photo 05).

Photo 05: Mosaic of photos from the Intelligent Territories Congress

Source: Albuquerque, 2023.

As a result of this congress, the municipality established the Territorial Intelligence Center (CIT) in 2022, a space for building data, along the lines of a datacenter. The CIT collects, analyzes, and consolidates data, focusing on the municipality's education findings. It also encompasses other areas, and through reports, it provides the study dimensions performed by the team that composes the executive branch for public policy, and decision-making, not only concerning the SDG topics under analysis but also in different areas associated with the municipality's education system. The CIT is made up exclusively of undergraduate and postgraduate students. The CIT has already compiled data on cases of violence in Feira Nova's school system; data on the demand for and supply of school transport for elementary school and university students; and a map of students in the school system with various disabilities (ADHD, Autism, Dyslexia, Down's Syndrome, Deafness, among others). Alongside this focus on database construction, the center also includes professionals who take care of the physical and emotional health of students and professionals from the municipal education network, such as Psychopedagogues, Occupational Therapists, Psychologists, Speech Therapists and LIBRAS Interpreters, who make up the CIT Pedagogical Support Center team.

Photo 06- Photo mosaic of the Smart Territories Center.

Source: Albuquerque/2023.

4 CONCLUSION

Education does not directly transform the world, but it transforms people, who in turn change the world. For this to materialize, effective educational actions must be planned, executed, and monitored. When necessary, these actions should be re-planned and resumed, ensuring that as many people as possible are reached, if not in their entirety.

According to the 1988 Federal Constitution and the 1996 Law of Guidelines and Bases of Education, it is the role of the public authorities to spearhead these actions. However, this responsibility cannot fall solely on them; it is a commitment shared by all of society. For education to succeed, there must be a pact among all spheres of society, starting with public authorities and extending to all other segments of society.

The reports presented in this work describe various co-creation initiatives, designed and implemented transversally, with the aim of changing structural, conceptual, and behavioral paradigms in the municipality of Feira Nova-PE. Several sectors were involved, including the Departments of Health, Environment, and Social Assistance, alongside the Department of Education. This allowed the projects to reach diverse population groups, promoting discussions, proposals, and various solutions.

Focusing on 75 fifth-grade students and 23 teachers from the municipal network in Feira Nova-PE, connected to the Lagoa do Carro reservoir, numerous interdisciplinary, intracurricular, and extracurricular actions took place. These

actions sought to establish new paradigms in pedagogical practices, particularly those geared toward socio-environmental sustainability.

It is important to emphasize that these actions were planned and executed with the involvement of various segments, including public authorities and higher education institutions, both national and international, as well as research and development institutions. The continuous training of teachers, the creation of scientific research groups, the Feira Nova Technology Fair (FETEC), field classes, and established partnerships indicate that the path has already been set, and society will soon notice the impact of these changes.

The integrated action carried out by different sectors, forming a multisectoral network, enables the effectiveness and success of the established projects. Although the results cannot yet be fully measured, the importance of this work is recognized, as is the need for continuous action and future monitoring to measure the outcomes of the proposals and public policies implemented here. This will ultimately transform mindsets and actions toward sustainability, particularly regarding water, one of the most vital resources for humanity.

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