

Barrancabermeja, Colombia

Institución Educativa El Castillo

**How to train students to be
environmental leaders**



**WORLD'S
BEST SCHOOL**
Environmental
Action

accenture

**AMERICAN
EXPRESS**



**WORLD'S
BEST SCHOOL
PRIZES**

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Introduction

Institución Educativa El Castillo is a low-income state school in Barrancabermeja, Santander department in Colombia. The school lies in an urban area close to the Juan Esteban swamp, which has presented a variety of environmental hazards to the low-income community. To address this, the school worked with a National Educational Environmental Project strategy (PRAE), for over the last 14 years to develop a project-based, community-centred approach which puts sustainability and ecological protection at the heart of their curriculum. Students at the school graduate as technicians in Environmental Evaluation aside from achieving a national high-school degree. The school has worked with several government entities and other schools, always ensuring that what they do is shared with and empowers their community. Amidst many others, projects have included an “Opportunity shop”, an Ecological Queen contest, science to the park and a science lab where teachers, students and parents worked with biodegradable and environmentally friendly materials to create cleaning products, which are then sold at accessible prices on an e-commerce website by students. Their mission is to make their students protagonists and leaders who generate transformation processes in their environment and surrounding community.



School Profile



Country:

Colombia



Region:

Barrancabermeja,
Santander



School type:

Public school



Location area:

Urban



Student population:

2000+



Prize Category:

Environmental Action

“We live in a region that gets very, very hot, people need to drink a lot of water and the water is usually bought in plastic bags which are then thrown out. One of the participants of the contest collected the discarded bags and made a beautiful dress which won the Ecology Queen contest!”

– Luis Francisco García Centeno, Science & Environmental Studies Teacher at El Castillo



In-depth look

CONTEXT AND CHALLENGE

Institución Educativa El Castillo is a state school that caters for 2200 learners approximately, located in a low-income, working-class area in Barrancabermeja, Santander department in Colombia. The school has a main campus for secondary school students and four small headquarters for preschool and primary. Most families at the school live in a community with high levels of poverty. Many learners come from complex family situations, with a substantial number living in single-parent households or otherwise being raised by grandparents, uncles, aunts, and guardians due to the absence of parents. The students' community share a home with the Juan Esteban swamp, which was once a rich and beautiful fountain of biodiversity.

The area itself was in fact a nature reserve in the past. Luis Francisco García Centeno, Science and Environmental Studies Teacher at the school explains: “this place in the past had plants, animals, and a forest, it was a paradise! But unfortunately, when people began moving here, they began building indiscriminately and that paradise was lost, nowadays we have no more wildlife. Still, it is a very green area, and we want to make it flourish once again”.

Over time, the school's context began experiencing the burning of forest areas, contamination of water bodies, high levels of solid waste which was being poorly managed, deforestation, and air, sound, and visual pollution. The school's English Teacher, Lizmagda Lopez Florez explains how the school saw these rising environmental hazards affecting their students and loved ones.



Luis Francisco Garcia mentions how “the swamp had become an environmental hazard”. So, with the help of the community, the school staff carried out investigations of the neighbourhood and Juan Esteban swamp. The results were concerning, with water from the swamp being deeply polluted by untreated sewage and solid waste which urged the school to change its vision and structure. In the next 14 years, El Castillo made radical changes at their school, putting forth numerous initiatives which focus on action learning, applying concepts of environmental protection in their context.

The school integrated two new subjects into their curriculum – Ecology and Environmental Studies, making these two central themes at the school overall. These changes were also applied to existing subjects. Lizmagda Lopez Florez emphasizes on the fact that they do not teach anything in isolation.

Teachers attempt to show students how specific subjects link to others, to the ecology and to students' lives. El Castillo worked with the National Education Services of Colombia (SENA) to create a double curriculum for their students. Today learners graduate with a double diploma. Upon leaving the school they receive a national high school degree and a specialisation which qualifies them as Environmental Evaluation technicians. El Castillo has also gone on to form numerous partnerships with entities such as SENA and PRAE or Proyectos Ambientales Escolares, a National pedagogic strategy for promoting environmental education projects in schools of Colombia. Moreover, the school itself has been renovated and maintained to provide students with a harmonious environment. Students and teachers decided to install LED lamps that reduce energy consumption as well as low-consumption air conditioners.



Aside from these shifts, what stands out with El Castillo is the focus on community empowerment they seek to link with ecological protection. The school has focused deeply on community work and seeks to instil ecological awareness beyond the school walls. Chemistry Teacher, Robinson Cortes speaks about the ongoing commitment to community work at the school, having developed relationships with community members who have participated in the last 14 years of environmental work at the school.



“Colombia is considered one of the happiest countries in the world, we celebrate everything! We have queens – beauty queens, banana queens, coffee queens, and many queens. So we started an ecological queen contest – where candidates had to start a project or campaign with their classroom, school or community using recyclable materials for dresses – in collaboration with parents, classmates or teachers – and at the end, the winner would be the one who brought the most significant or creative dress using those materials.”

– Mr Garcia



EXPERTISE AND APPROACH

El Castillo staff members carried out their initial observations of the Juan Esteban swamp and community over a decade ago, in the hopes of improving the living conditions and restoring the once-abundant local ecology. With the newfound knowledge that they needed to revolutionise the focus of their school, they began to look for ideological models of teaching which would better align with the values of sustainability and community work.

The most critical challenge in this process was changing the mentalities and unsustainable customs of students and their families. So, they looked at sociocultural theory, highlighting the importance of considering students' lived experiences outside the school walls, and making sure that what they teach can be relevant to students' lives and context. The school also integrated a pedagogical model based on Vygotsky's theory of cognitive development. This proposes that cognitive abilities like problem-solving are developed through social engagement. Alongside these two theories, the school has been encouraged by John Dewey's approach, which speaks of centralising Project-Based Learning. With all these in mind, the school went on to integrate these foundations creating the two aforementioned subjects ecology and environment and modelling a new way of teaching in Colombia. This is how the idea of creating tangible projects with students began, today students are encouraged to actively explore and analyse real-world challenges and problems. They propose solutions to the issues around them and centre their focus on reaching Sustainable Development Goals (SDGs). To reinforce this, El Castillo consistently keeps their students and community members up to date on plans proposed by the UN.



Through their Project-Based Learning approach, students at El Castillo become the protagonists of their learning journey. Teachers act as a guide directing the process towards achieving the objectives, setting students' questions and encouraging them to be proactive and construct potential solutions through projects. Importantly, they ensure learners carry out continuous evaluations on all their projects and activities, as well as analyze how to make a community impact a central theme in everything they do. In 10th and 11th grade, students are invited to various companies around Colombia so they can see their recycling projects and the latest green technologies being applied. In this process of transformation, teachers at the school have noticed the changes in attitude amidst students, who have become far more critical and active in their strive towards knowledge. These efforts have been reflected in the community, which is now far more ecologically conscious than when initial investigations were made over a decade ago. As an educational centre, the school believes in its students' efforts to understand the world around them, seeing how they collaborate with teachers, interact, and constantly demonstrate curiosity towards life.

In order to activate their method, the school put forward several proposals for future projects which were well-received by PRAE and the National Ministry of education, who themselves communicated that these projects had the potential of being replicated in other schools of similar contexts of vulnerability. El Castillo worked with PRAE to incorporate local problems into the school's work, considering the local ecology's natural dynamics and socio-cultural context. With PRAE's support, the school went on to integrate the concept of circular economy and urge students to apply this at home. Here, the involvement of parents was fundamental, and today a considerable number of families of the learners apply the four Rs in their homes.



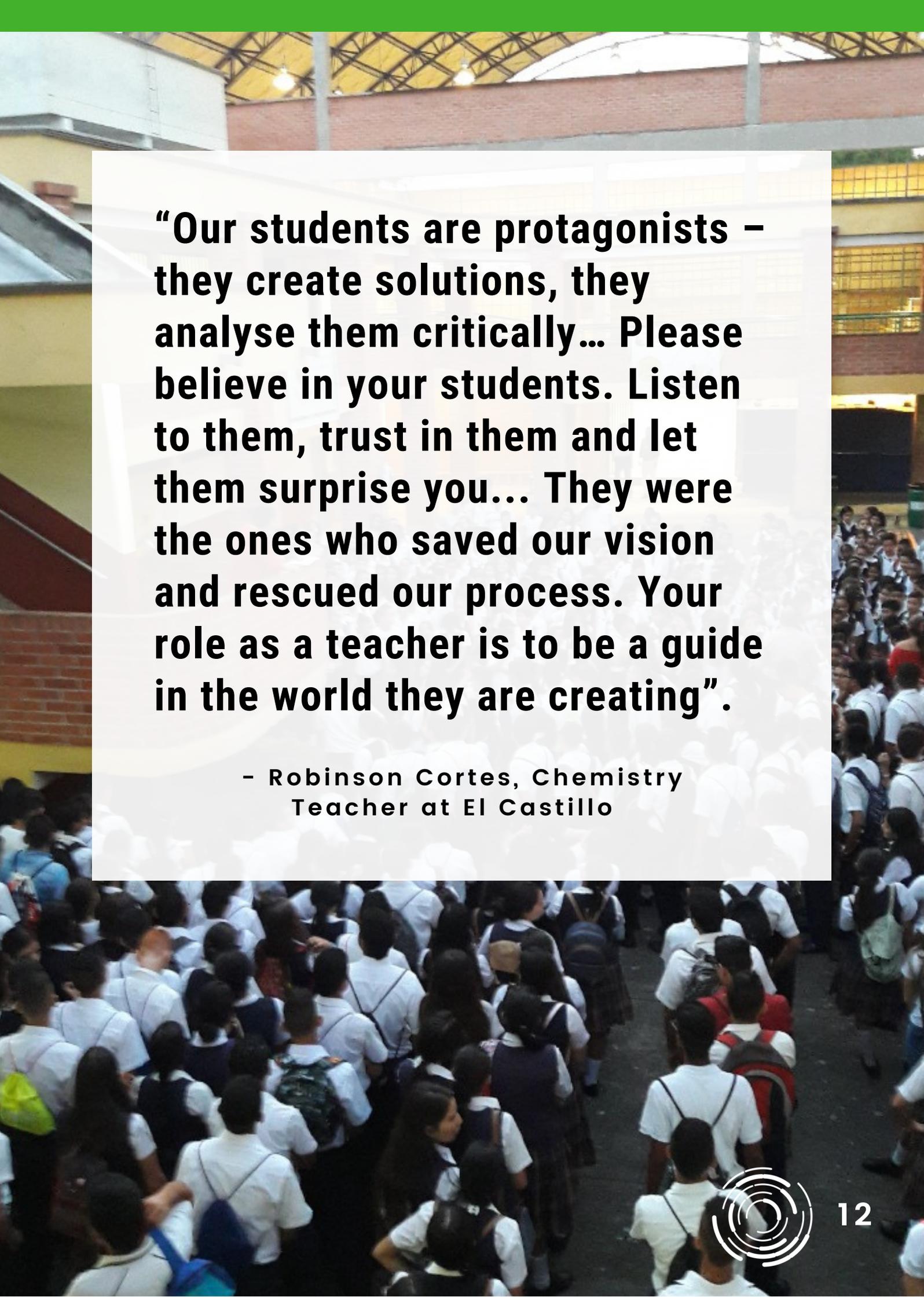
Families also participated in the recent Science to the Park project, where students and parents identified the taxonomy of plants in the neighbourhood park and cleared out layers of waste and pollution. This ensured residents had a clean, safe, green space to spend time in.

All classroom projects involve collaborative work, allowing students to contribute to their learning process. The "Opportunity Shop Project", for example, is one of many of these projects, and proved to the staff members of El Castillo just how much students are able to exercise autonomous leadership. Back in 2018, students worked together to develop a plan of action. First, they collected donations such as uniforms and school supplies. Parents helped them to restore these items. Then, they worked on marketing strategies to communicate with community members. Advertising was mainly carried out through social networks and items were allocated symbolic prices, meaning clients would pay for these but the items would go towards students coming from vulnerable homes. The money collected was then reinvested into the initiative. After two years of remote education, it was reopened, offering a new service; in the school labs, students, parents, and science teachers make household cleaning products using biodegradable and environmentally friendly materials. These are marketed in e-commerce through the digital platform created by the students as a form of entrepreneurship and to put into practice what they have researched and learned at school.

Another success story at the school was their Ecological Queen contest. Luis Francisco García mentions how "Colombia is considered one of the happiest countries in the world, we celebrate everything! We have queens – beauty queens, banana queens, coffee queens, and many queens. So, we started an ecological queen contest – where candidates had to start a project or campaign with her classroom, school or community using recyclable materials for dresses, in collaboration with parents, classmates or teachers".

So, during their Festival of Environmental Values, held every 2 years, each candidate of the Ecology Queen contest would then go on to present their dresses made of recycled materials. Lopez Florez explains how “the contestants were not princesses but leaders, and the contest was not about who was the most beautiful, but who could create the most creative solution to the problems proposed”. They also had to do so in a creative way, through poetry, song or art. Finally, the winner would be the one who brought forward the most creative dress using those materials. One contestant, for example, noticed how due to the hot weather in the area, many people drink from plastic bags and then discard them. With the help of her community, she gathered as many plastic bags as she could and created her dress. The contest was massively successful and has resulted in gatherings with students and the community, who come to witness the art pieces created from the waste produced in the area and listen to the poems and songs made around ecological awareness.



A large crowd of students in school uniforms walking through a school corridor. The students are seen from behind, moving away from the camera. They are wearing white shirts and dark vests or skirts. The corridor has a high ceiling with a grid of lights and a brick wall on the right side. The overall atmosphere is busy and organized.

“Our students are protagonists – they create solutions, they analyse them critically... Please believe in your students. Listen to them, trust in them and let them surprise you... They were the ones who saved our vision and rescued our process. Your role as a teacher is to be a guide in the world they are creating”.

**- Robinson Cortes, Chemistry
Teacher at El Castillo**



OUTCOMES AND RESULTS

Moving Beyond School Grounds

During the 2019 ConCausa contest in Chile, El Castillo represented Colombia through their Spout and Plate of the Disposables projects and took the winning prize home. The project began when students noticed the vast consumption of disposable cups, and in their investigations found approximately 1200 cups were used in one break. They began a campaign which involved all school members and today, not one plastic cup is used on the campus grounds. Many other events have provided students with national and global platforms to share their work. El Castillo has participated in the 2022 ARC Earth Day Celebration Event, the Global Education Summit for Teach 4 the Planet and has become involved in global projects such as The Goal Project and the Climate Action Project 2021-2022.

The United States Embassy has chosen three of the students as Youth Ambassadors for their contributions and projects to help environmental and community problems and they have travelled to the US for a leadership programme. In 2018, the school organised the third environmental forum: "History and Development of the Juan Esteban Swamp." The event included the participation of the regional water and sewage company, the Secretariat of the Environment, schools, and local universities. The school is currently part of the organisation of the local research seedbeds. In 2019, we participated in CON CAUSA Chile, representing Colombia with the SPOUT AND PLATE OF THE DISPOSABLES. First place in the country in STEM solutions, a contest promoted by Computers to Educate and the National Ministry of Education in 2020.

Within these collaborations, El Castillo joined efforts for fighting against local,



regional, national and international environmental problems – putting Colombia on the map for change. They have gone on to see how their work extends beyond their grounds through their graduates. Many who leave the school go on to partake in STEM careers and projects. One graduate created and led a recycling association which provides individuals from humble households with work opportunities. Perhaps the most profound change has come with the newfound awareness and connection of residents of Barrancabermeja with their rich, and resilient ecology. The last decade has seen countless acts of service and teamwork between students, families, teachers and the community who today all work towards.

Moving Forward

With 14 years of trajectory, El Castillo believes they have a long way to go. So far, they have witnessed a dramatic change in the attitude by part of students and the wider community.

While carrying out subsequent environmental evaluations of the Juan Esteban Swamp and the neighbourhoods in the area, the school staff have confirmed an evident and significant contribution towards the reduction of solid waste and the mitigation of pollution in water bodies and streets. They now intend to recover three parks and ecological trails nearby the school with the support of PRAE. They will be working closely with the Secretariat of the Environment, Secretariat of Education, and other organisations in the municipality Barrancabermeja. Likewise, they will continue to work on their global collaborations within the Climate Action project led by Koen Timmers.



Key Steps



FINDING THE RIGHT FOUNDATIONS

The community at El Castillo School analyzed its context more than a decade ago. The seriousness of the pollution levels pushed the school to begin putting an emphasis on Natural Sciences and Environmental Education. In the beginning, El Castillo didn't know where or how to start, so collectively, teachers and staff began a process of academic and pedagogical training. A pedagogical model was established to allow cultural and social transformation from and within the community. This is how Vygotsky's model of sociocultural learning was found. The model became a key cornerstone, and pivoted the school towards cognitive development and collaborative processes with their social context.





MAKING THE CURRICULUM PEOPLE CENTRED

Once the school chose the emphasis on Natural Sciences and Environmental Education, the curriculum was reformed, creating new subjects, such as the aforementioned Environmental Education and Ecology, in grades 10 and 11. In addition, they reached an agreement with SENA (National Learning Service) which now allows students to obtain a double degree diploma: A high school diploma in Natural Sciences and Environmental Education and a Technician in Environmental Management. But it was still necessary to find a strategy to raise awareness and motivate students and the community towards the school's new emphasis. This is how gaming, dancing, theatre, and cultural activities played an important role inside and outside the school. These kinds of activities involve people. Children, teenagers, and adults celebrated Water Day, Earth Day, and World Environment Day. In addition, the Festival of Environmental Values, hosts a number of artistic, creative exhibitions where students share what they have learnt with families and community members through song, poetry, written art and dance. At the event's close, the candidates from the Ecological Queen contest mentioned above exhibit their recycled material dresses.





BRINGING STUDENTS ON-SITE

Simultaneously, ecological nature walks projects and technical visits to companies were established. Students were able to visit natural environments and learn about the key issues. They have learned to appreciate nature, fall in love with their territory, and be critical of the region's issues. These projects were key for promoting the student's and community's environmental awareness. They have also helped strengthen the Teaching- Learning process through play, coexistence, observation, and exploration, and learnings were integrated into all subjects, forming an interdisciplinary lens. The ecological nature walks project gave way to spaces for reflection, analysis, and proposition to the different problems students address in their daily lives, complying with our Institutional horizon, specifically Training Leaders for a Territory of Peace.



STRENGTHENING SKILLS

In 2011, the school decided to turn towards more systemic changes. They recreated the pedagogical model at the school, moving away from more traditional strategies.



The new model was founded on the idea of constant critical thought and reflection. It entailed creating research seedbeds where students were trained in formative research. They learned to identify problems in the context and propose hypotheses, thinking of alternative solutions and becoming the protagonists of their learning process. This strategy allowed the students to be promoters of the construction of knowledge and to socialize and share their learnings in academic events. They strengthened their oral skills and the ability to share and defend their projects and proposals. As a result of this work, the school has been recognized on local, regional and international levels, participating in conferences, calls, and contests to show and evaluate our process.



MAKING THEIR SUBJECTS INTERDISCIPLINARY

Afterwards, the school searched for ways of making its school subjects as holistic and interdisciplinary as possible. This was done to generate active learning experiences connected with the dynamics and challenges of the learners' context. Students are now trained in: capacities, skills, processes, and necessary practices carried out through STEM activities. Finally, the school began focusing on attitudes and values in all their subjects, presenting students with real-life



situations from their own lived experience, which they then had to solve. Tenth graders students have been developing projects since 2011 in their Research Methodology subject, for example.



BUILDING ON REAPING FRUITS

In recent years, the school has received national and international recognition for their outstanding environmental education projects. The school selected some projects to participate in local events at the Universities. Other school projects have succeeded in events organised by the Colombian Network of Research Seedbeds (RedColsi), thanks to El Castillo's push for creating more research seedbeds in school environments. Now they have begun planning an aquaponic system which they believe could be a solution to issues around hunger and nutrition in their community.



Advice and Guidance

El Castillo encourages other schools to create environments where students can become leaders. Chemistry Teacher Robinson Cortes urges to “please believe in your students – listen, trust in them they have a lot of skills to develop and change. Your role as a teacher? you are a guide in the world they are creating”. He expresses how change can only happen if we motivate students, give them the right skills and allow them to surprise us with their capabilities. At the beginning of their project, Cortes mentions how they didn't know how to start the project and mentioned how it was the students themselves who ended up pushing the changes they made forward. “They were our saviours!” he says. The focus on community empowerment, and social context has meant students have taken the learning process onboard and is something they find paramount for the success of any sustainability project. Lastly, the school encourages teachers to find new teaching styles and methods which align with much-needed values around social and environmental protection. The incorporation of STEM strategy is key to this.

More information

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 [Luis Francisco garcía Centeno](#)

 <https://castillo.edu.co>

[Watch El Castillos' participation at the #EduDigitalSTEM20 local Innovation challenge](#)

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Learn more about their work by watching their event at 2022's T4 World Education Week: [watch here](#)

