AN AUTONOMOUS RECYCLING ROBOT - "WasteWarrior"

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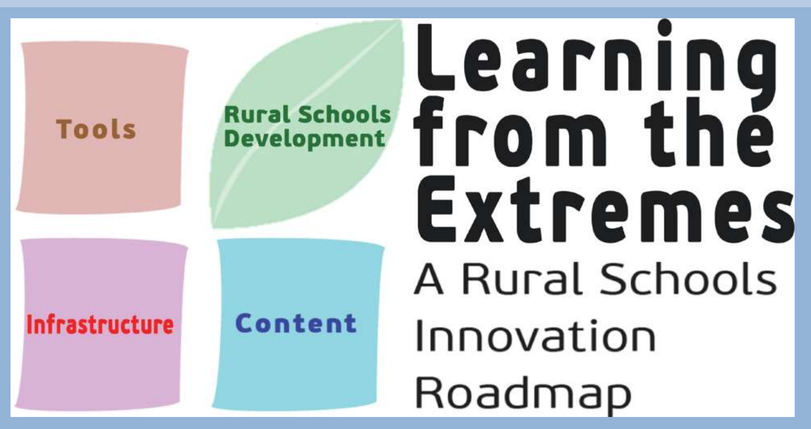


Abstract

On the island of Erikousa, the four children of the Primary and Kindergarten school started an ambitious project to address the growing problem of waste in their community, as there was a lack of knowledge about the recycling process, both from the children themselves and much more from the few permanent residents. This project was based precisely on this lack of knowledge, but not only on it, but by going one step further and introducing the subject of ICT in our classroom. The students felt the problem within their community, but also how they could protect themselves from potential threats, imagined the possible solutions with the help of New Technologies and created an autonomous robot that separates the garbage it collects on its way, depending on its material, as well as places it in the corresponding bins. They also shared the knowledge they gained during the project with the residents of the island, participating jointly in voluntary beach cleaning actions and bringing together the special bins they created for this reason. The autonomous robot "WasteWarrior" was put into operation on a smaller scale of the island of Erikousa, in an effort of the students to attempt the implementation of such an ambitious thought, starting from their own remote island.

Keywords:
Environmental Education, Recycling, Robotics, STEAM, New Technologies, Volunteering, Inquiry-Based Learning

Description

The Primary and Kindergarten school of Erikoussa is a border school. It is located at the northernmost point of the Ionian Islands and Greece. School students do not have the necessary contact with New Technologies, so contact at least in the school context is particularly important. The digital divide between our children and urban city children is wide. Addressing the digital divide requires policies and initiatives that promote equal access to technology and digital learning opportunities for all learners. Our main action, therefore, focuses on the fact that the students of our school do not have the opportunities and capabilities that students of schools in other areas have, to get to know the new world of technologies that unfolds and evolves in their eyes, STEAM and Educational Robotics.Technology can provide various interactive and engaging learning experiences that can enhance students' engagement in the learning process. Also, Technology with the use and application of ICT in teaching practice is now considered essential in the teaching of all subjects. In addition, we believe that the tools provided to us through the program help, apart from school, our small community, as our main goal is to raise awareness among local residents about key issues of our island (recycling).
The expected results and benefits for our students are the enhancement of self-confidence and cooperation, the promotion of initiative and the creation of an environment rich in stimuli, which will not differ much from a school in an urban area. Primarily, we want children to come into contact with technology in order to acquire the necessary computer literacy that they will definitely need in later life. In that case the expected benefit for teachers is both pedagogical and personal. Through this action, teachers will enrich their knowledge and methods on digital tools, will become familiar with New Technologies and ICT, since it is now a necessary asset for teaching practice.In addition, every new teacher who comes to this place we believe will feel much more confident knowing that they have the right tools to help their students.

- **Learning objectives:** Problem-solving skills/STEAM Learning/Environmental Awareness/Teamwork and collaboration/Volunteering/Critical thinking/Creativity and Innovation
- **Age group of students:** 5 to 12 years old
- **Number of students involved:** 4
- **Number of teachers involved:** 2

Feel

At first we sought the know-how of the Environmental Protection Consultants from METOPI, an organization dedicated to conservation and education for the environment. Our initial contact with METOPI was facilitated through technology, utilizing the use of laptops to organize a collaborative project that would benefit our students, teachers and the wider community. Utilizing digital communication platforms, we were able to plan and successfully carry out a visit of the advisors to the school of our island.The advisors of METOPI undertook a series of activities, with a basic session with our teachers and students.

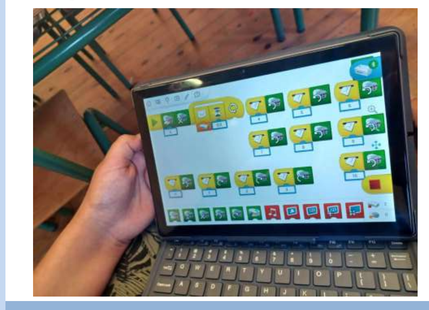
They enlightened us about the serious pollution of marine waters, highlighting in particular the catastrophic consequences of the oil spill. These discussions were not limited to the theoretical framework, but extended to practical examples, helping our students to understand the seriousness of the issue more tangibly. The advisors, along with the students, teachers and members of our local community, showed practical readiness to deal with the oil spills in the port of Erikousa, floating barriers and sea cushions and innovative tools to reduce the spill. This hands-on experience was an opportunity for the whole community to come together, a demonstration of unity in the face of a shared responsibility.

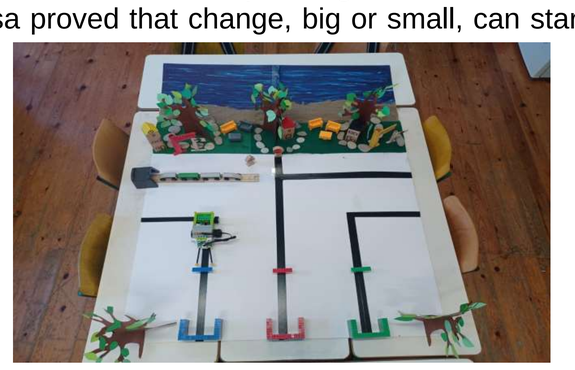
Imagine

We embarked on an innovative journey to create a unique learning platform for students, revolving around interactive presentations and games. Our primary goal was to instill knowledge and awareness about different types of materials that can be recycled, thus laying the foundation for a sustainable and environmentally friendly mindset in young minds. These presentations and games served as an interactive medium, turning otherwise boring and monotonous lessons into exciting and stimulating activities. The students were not just spectators, but active participants, learning to identify recyclable materials and how to classify them correctly. This method has been particularly effective in getting them to understand the crucial concept of recycling in a fun and engaging way. Specifically, we used Scratch Junior, an innovative programming language specially designed for young children. We designed a unique recycling simulation in the platform, reflecting the process that takes place in a real recycling environment. The task was twofold. First, we had to design an intuitive user interface, ensuring that it was easy to understand and navigate, even for young children. It was important for us that the interface be visually appealing, stimulating curiosity and interest among users. The second aspect was the programming of the logic behind the simulation. This involved meticulously planning of each element and action to mimic the recycling process as accurately as possible. For example, when a user selects a specific recyclable item, simulation would guide them through the appropriate recycling process for that material. Combining education with entertainment, our interactive presentations, games and simulation at Scratch Junior have provided an engaging way for students to understand the importance of recycling and preserving the environment. It's more than a game, it's an experience, a lesson and a step towards a greener future.

Create

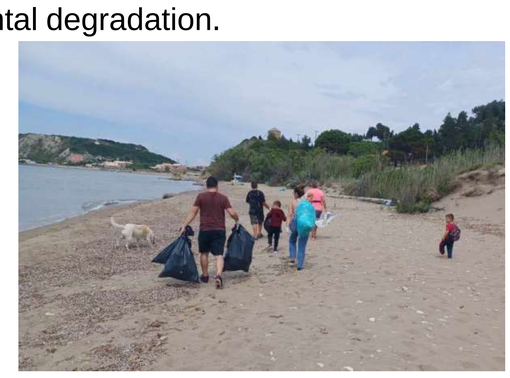
On the island of Erikousa, the four children of Primary and Kindergarten school started this ambitious project to address the growing problem of waste in their community. Their solution was as original as needed – an autonomous robot named 'WasteWarrior', designed to collect garbage and transport it to designated recycling points. These imaginative children devoted many afternoons to the design and construction of their work. Together, they navigated the complexities of engineering and programming, turning their innovative ideas into a tangible, functional robot with the help of the robotics kit, WEDO 2.0. The process of creating them was remarkable. First, they outlined a plan for the WasteWarrior, imagining every place, every function, the paths it would traverse, and the challenges it would encounter on the island. In their minds, they saw the WasteWarrior not just as a robot, but as a guardian of their environment. Then they were engaged in assembling their creation. From mounting mechanical components to inserting lines of code, they put their creativity and effort into every aspect of WasteWarrior. Their dedication and teamwork were evident in the careful assembly of the robot. However, their effort did not stop at the construction of the robot. The children also sought to create a test model that reflected the geographical elements of Erikousa. Picking up sand from local beaches and stones from all over the island, they created a realistic model for WasteWarrior's navigation. The model also included elements of the local flora, copying the soil in which their creation would operate. Once assembled, the WasteWarrior went into effect. The children eagerly watched their creation traverse the terrain model, picking up trash and delivering it to sorting points. The work undertaken by these four young people turned out to be more than a solution to their local garbage problem. It was a testament to their resourcefulness, environmental awareness and the ability of young minds to innovate and adapt using the resources at their disposal. Through the design and construction of WasteWarrior, the children of Erikousa proved that change, big or small, can start from anywhere – even on a remote island.

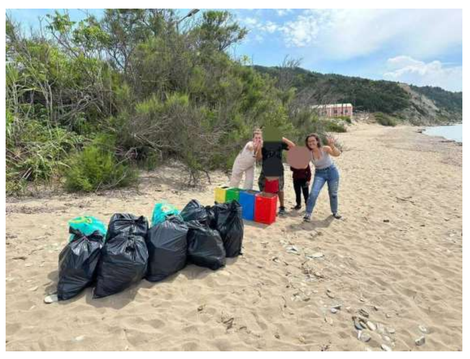




Share

In an effort to share the knowledge gained during the project, an impressive community initiative was carried out that changed not only the look of local beaches, but also the mentality of its inhabitants. Some of the island's residents, along with the four students, rolled up their sleeves to begin the mass cleaning of their favorite beaches. The collective goal was not just to rid beaches of garbage, but to simultaneously raise awareness of the urgent issue of recycling. The action was not only about waste collection. It was a practical lesson for children about the tangible consequences of neglecting our duty to recycle. As the garbage bags grew, students saw firsthand the significant impact of accumulated garbage on their graphic environment. After cleaning, discussions were held to emphasise the importance of recycling. This practical, outdoor classroom provided an intense and immersive lesson about the consequences of our daily actions and the role each of us can play in mitigating them. In conclusion, the initiative to clean the beach of Erikoussa is a beacon of community action, student participation and environmental management. It highlighted the incredible transformations that can be achieved when people come together for a common purpose, not least the preservation of our precious natural world. Through such initiatives, we can inspire the younger generation to become more aware of their actions, encouraging them to recycle and participate in the ongoing fight against environmental degradation.





Link on the portal

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