ERASMUS+ PROJECT – STEM IN SCHOOL DAYS

Project Code: 2024-2-AT01-KA210-SCH000260815

Host School: Istituto d'Istruzione Secondaria Superiore "Giancarlo Siani"

Dates: 26th – 30th May 2025

Focus Area: Robotics and Programming with e.DO (EDO Controller)

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1 Project Overview

The Erasmus+ KA210-SCH project 'STEM in School Days' was designed to strengthen students' and teachers' competencies in programming, robotics, and STEM-related interdisciplinary learning. Through a combination of hands-on workshops, collaborative international exchange, and immersive cultural experiences, the project promoted practical skills development and a deeper sense of European identity. Hosted by the Istituto d'Istruzione Secondaria Superiore 'Giancarlo Siani' in Casalnuovo di Napoli, Italy, the program brought together school delegations from Austria, Turkey, Spain, and Italy for a week of meaningful engagement and mutual learning.

As part of the Erasmus+ KA210-SCH partnership, delegations from schools in Austria, Italy, Turkey, and Spain participated in the mobility program STEM in School Days, held at the Istituto d'Istruzione Secondaria Superiore "Giancarlo Siani" in Casalnuovo di Napoli. The project focused on hands-on learning in robotics, programming, and STEM integration, with a particular emphasis on the e.DO robot, which runs on a Raspberry Pi and is programmed using Python.

International students were hosted by local families, offering them not only accommodation but also an authentic cultural experience. Through these host families, many students were introduced to the beauty of Casalnuovo and the historical richness of nearby Naples. This personal connection significantly contributed to intercultural understanding and the overall success of the project.

2 Monday – Welcome Activities & First Robotics Workshops

The first day began with a musical performance by several students from the host school. Following the official welcome, participants engaged in a series of introductory and intercultural activities. An ice-breaking game, where students answered questions after catching a ball, helped initiate dialogue and build rapport. This was followed by a multilingual Kahoot! quiz focused on the European Union and the four participating countries, encouraging collaborative learning and establishing common ground.

After a short, guided school tour and a coffee and cake break, the technical portion of the program commenced. In the late morning, the first robotics workshop introduced participants to the e.DO Cube system. Students were instructed in the setup and configuration of the robot before being challenged to program it to pick up a small plastic ball and place it into a container. This practical task provided hands-on experience in command sequences, object handling, and robotic control.

Around midday, the second workshop focused on environmental simulation. Students worked on a digital botanic garden using ArduBlock, a visual programming tool for Arduino. Their objective was to control soil humidity by inputting commands that simulated the watering of plants. This interdisciplinary activity bridged coding with environmental science and sustainability themes.

The first day concluded with informal exchanges among students and staff, laying the groundwork for continued collaboration throughout the week.

3 Tuesday – Binary Coding Workshop & Cultural Discovery in Naples

Tuesday combined technical learning with cultural immersion. During the morning hours, students took part in a workshop focused on the basics of binary coding. The session introduced the underlying logic of digital communication and computation, forming a theoretical bridge to more advanced programming topics. In addition to practical exercises, participants engaged in a moderated discussion about how coding, programming, and robotics are perceived by the broader public. Topics included the role of automation in autonomous driving, the medical sector, and household robotics, helping students reflect on the societal relevance and ethical considerations of these technologies.

In the late morning, the group departed for a guided cultural tour through Naples, with stops at some of the city's most important landmarks. Among these were:

- Duomo di Napoli and the Tesoro di San Gennaro
- Quartieri Spagnoli
- Piazza del Plebiscito
- The Galleria Umberto I

- Spaccanapoli
- Castel Sant'Elmo
- A scenic walk along the Lungomare

After a break for lunch and local street food, the tour continued into the afternoon. The combination of technological discussion and cultural exploration made for a well-rounded day, reinforcing both the intellectual and intercultural goals of the Erasmus+ project.

4 Wednesday – Advanced Robotics & Industry Insight

The third day of the mobility program focused on deepening students' practical experience with robotics and expanding their understanding of real-world applications.

In the morning, students took part in the second robotics workshop, where they worked with the e.DO robot to implement "pick and place" routines and explore its drawing capabilities. This hands-on session helped participants further develop their programming skills while gaining familiarity with robotic motion control and automation logic.

Following a short break, each participating country delivered a presentation on their current school-based robotics activities. These presentations varied in format: some included videos introducing their respective schools and STEM programs, while others showcased live demonstrations or documentation of practical work involving robots brought from home institutions. This exchange of approaches, tools, and challenges fostered a sense of shared purpose and inspired mutual learning among the international groups.

After another brief break, students began the third and final workshop of the day, which focused on M-Bot assembly and directional programming via remote control. The session provided insight into mobile robotics and user interface design, allowing students to assemble and test devices in small teams. This practical task was followed by an extended lunch break.

The day's program concluded with an afternoon visit to Stellantis, the local automotive manufacturing plant. As one of the leading players in the European car market and the fourth-largest automobile producer worldwide in 2023, Stellantis offered a valuable industry perspective on robotics and automation. The excursion contextualized the day's workshops within real-world industrial practices, demonstrating how programming and robotics are implemented at scale in the automotive sector.

5 Thursday – Arduino Workshop & Visit to Pompeii

On Thursday morning, students participated in the fourth robotics workshop, which centered around STEM and Arduino-based coding. The main task was to assemble a functioning traffic light model. To achieve this, students were provided with a comprehensive materials set including wood panels, LEDs, Arduino kits, laptops, soldering irons, glue guns, and paints for finishing touches.

Using the Tinkercad Circuits platform, students designed basic electronic circuits that interfaced with Arduino boards. The activity encouraged interdisciplinary thinking—combining coding, basic electronics, design, and manual craftsmanship—while simulating real-world applications in urban technology.

After a short break, the group departed from Casalnuovo train station and headed to Naples, where they transferred to another train bound for Pompeii. Upon arrival in Pompeii, the group first visited the Sanctuary of the Blessed Virgin of the Rosary, one of the most important religious sites in the region. After lunch, the main highlight of the day followed: a guided tour of the ruins of Pompeii.

Participants were divided into two groups for the archaeological visit. Each person was equipped with AR glasses, a Bluetooth headset, and an audio guide system that linked directly to the visual content in the glasses. A professional guide led the groups through the ancient Roman city, highlighting its most significant sites and providing detailed historical background. The use of digital technology added an interactive and immersive dimension to the learning experience, bringing Roman history vividly to life.

6 Friday – Final Workshop, Project Reflection & Farewell

The final day of the mobility began with the fifth and last robotics workshop, which focused on the binary counter and 7-segment display. The session served as both a new learning module and a review of previously acquired knowledge and skills from earlier workshops. Students revisited core programming and electronics concepts, consolidating their understanding of binary logic, circuit design, and output display functionality.

Following a short break, the project partners gathered for a final review session. Teachers from all four participating countries reflected on the outcomes of the week, shared impressions, and discussed the pedagogical value of the workshops and activities. This session also included a brief planning discussion regarding the upcoming mobility phase in Spain.

The program concluded with a farewell gathering hosted by the Italian team. Certificates of participation were awarded, and the atmosphere was marked by warm goodbyes, expressions of gratitude, and a strong sense of shared achievement. The farewell party provided a final opportunity for Austrian, Turkish, Spanish, and Italian participants to

exchange contacts, consolidate friendships, and celebrate a week of successful collaboration and intercultural learning.

7 Conclusion

The STEM in School Days mobility project achieved its core educational goals while also fostering valuable intercultural exchange. Throughout the week, students refined their programming and robotics skills through a sequence of well-structured workshops. They engaged in hands-on tasks involving the e.DO system, Arduino platforms, and M-Bots, building confidence in their ability to understand and apply digital technologies.

A key highlight was the visit to the Stellantis automotive factory, which allowed participants to observe the real-world application of robotics and automation in industry. Seeing how programming directly supports large-scale production helped students connect classroom theory to practical, high-impact contexts—especially in areas such as logistics, robotics arms, and manufacturing automation.

Equally important was the cultural immersion offered through excursions in Naples and Pompeii. Students and teachers alike explored historical landmarks, churches, archaeological sites, and vibrant city quarters, gaining a deeper appreciation for Italy's cultural and historical significance. The use of AR glasses during the Pompeii visit added a modern layer to the learning experience, bridging ancient history with today's technological possibilities.

Beyond the student-centered activities, the project also generated meaningful professional experiences for the participating teaching teams. Working side by side in workshops, lesson observations, and planning sessions, teachers shared methods, teaching philosophies, and educational challenges. The exchange revealed both shared values—such as the importance of hands-on STEM learning and digital competence—and regional differences, which sparked enriching discussions about curricula, student engagement, and learning environments.

The week encouraged the emergence of a stronger European identity among participants. As teachers and students from Austria, Italy, Turkey, and Spain collaborated, ate, worked, and celebrated together, the abstract idea of European unity took on a tangible, human form. The shared classrooms and workspaces were more than just logistical arrangements—they became microcosms of international cooperation, showing how diversity can be an asset in problem-solving, creativity, and innovation.

In summary, the Erasmus+ mobility in Casalnuovo was not only an opportunity to build technical competence in robotics and programming, but also a catalyst for cultural exchange, professional growth, and long-term collaboration between European partner schools.