Engineer for the Future

Keeping you up to date with current events!

Engine4F

01.09.2015 – 01.09.2018

Objectives

• Increase the exposure to engineering professions (starting in VET schools);
• Promote the learning of STEM related subjects through creative and innovative teaching practice;
• Deconstruct gender stereotypes and promote gender equality in technical areas;
• Increase labour market relevance of VET courses;
• Deconstruct negative pre-conceived ideas related to VET learning paths;
• Contribute to the comprehension and documentation of women's employment in technical professions in the involved partner countries;
• Promote the dialogue between successful women working in technical areas and students, as a means to shorten distances between school and the labour market;
• Enhance communication skills – both in mother tongue and in foreign languag;
• Enhance digital integration in learning and youth work at various levels.
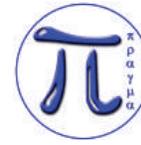
Partners

A – Associação para a ducação e Valorização da ião de Aveiro (Portugal)

ITIS "E. Mattei" (Italy)

Tallinn Polytechnic School (Estonia)

Pragma Engineering srl (

dem dos Engenheiros (Portugal)

NEAPOLIS UNIVERSITY (Cypros)

POLITEKNIKA IKASTEGIA TX

UNIVERSIDADE DE AVEIRO (Portugal)

Greek Women's Engineering

APOPSI SA (Greec

Estonia

Tallinn Polytechnic School (Estonia) has changed the work a little bit and continued working with one basic school. Still we have not organized any special big events in the schools; just we have invited the students to come to our school. They have taken part in to different activities and also taken them to different visits.

Some of the students keep participating in the robotics club, be members of robotics competition team.

For the students our teachers and students have organized electronics workshops, electrotechnics labs, chemistry labs.

They have made electronics schemes: flashing lights, "sweet-hearts".

During the „Open Doors 2017 "more than hundred students from general education schools participated in different workshops and lab works. During the academic year 2016-2017, the students met several times with teachers and project manager of our school to discuss the competition activities and the best way to present them. The outcomes are not totally finished yet.

In December 2016, we hosted all the partners in Tallinn. All the meeting passed very successfully, both working time and sightseeing. We visited old town, also we made a short bus trip around Tallinn. During the meeting, we discussed Intellectual output2: Virtual Learning Environment; evaluation plan – feedback from partners and evaluation of the 1st Project year; Project Management: staff, resources, procedures, financial documents.
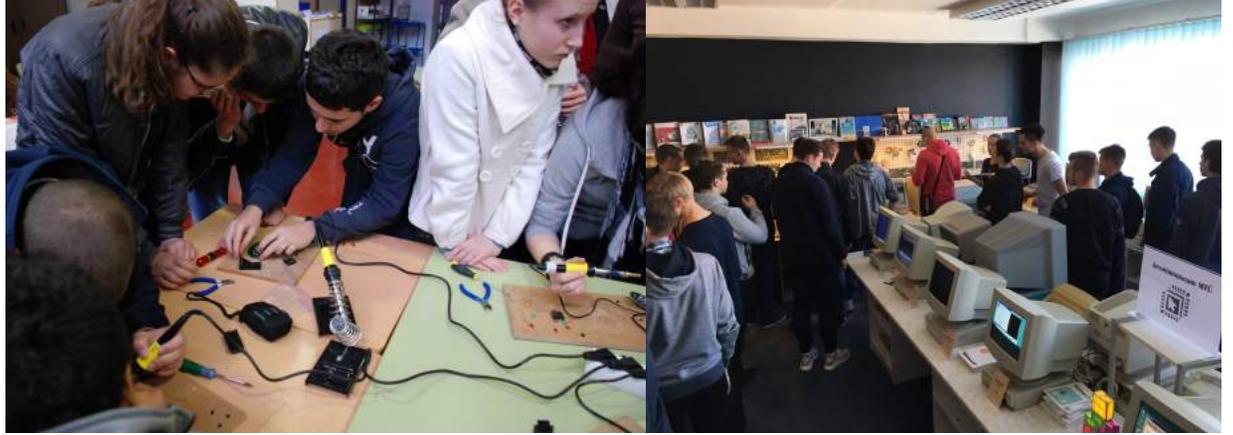
Different workshops at Tallinn Polytechnic School

Visiting Tallinn watercenter

Meeting in Estonia

Spain

On March 20th Salesianos Urnieta's students organized an event to show the students and staff members in their school the work carried out by the forty two students who had participated in the Engine4F competition. There were eleven teams made up of three or four students each. There was at least one girl in each team. Students started their projects by first detecting a real need in society, for instance how to help blind people to jog; how to help people in a wheel chair to open doors; how to help to produce energy from natural sources; how to help people being bullied by developing an App …. The next step was to contact and interview the target people in order to understand their needs better. The final step was to develop the product.

Anabel Menica from Politeknika Txorierri was part of the jury together with a teacher from Urnieta school and a representative of a local technical company. The team who finally won the competition worked on a solution to help people who could not move their fingers and therefore could not use their mobiles. They first had to learn how to program using Arduino open source in order to program the call mode and buttons. Then they built the application.

Celebrating European Day

Robotic University Labs

'From research to production: the challenging world of telecommunications'

Portugal

During the school year 2016-2017, the local Portuguese partners, AEVA, Universidade de Aveiro (University of Aveiro) and Ordem dos Engenheiros (Association of Engineers) have developed the following activities, involving the same 8 classes of three different schools:

On 18 November 2016 we celebrated the European Day of the Engineers with several talks and debates. There were two sessions, one at the University and the other at one of the schools involved in the project (Agrupamento de Escolas José Estêvão). The topic, this year, was 'Engineering and Nanotechnologies'. Besides the lecture given by the University Professor Elizabete Costa, Bruno Costa, from the Business GRAPHENEST, also gave his important contribution to a relevant and current issue. All the students involved were very much motivated and interacted with both lecturers.

Then, on 13/1/2017, under the topic "Engeneering and the Climate Changes", the students had the opportunity to watch the documentary "Before the Flood" which was then discussed with the intervention of the University Professor Carlos Borrego.

During the school year, the students visited several interesting engineering enterprises and/or Labs:

January 2017: Robotic University Labs

February 2017: HFA - Henrique, Fernando & Alves, S.A: 'From research to production: the challenging world of telecommunications'

March 2017: Altice Labs: a different factory

April 2017: OLI-Sistemas Sanitários S.A.

May 2017: Visit to Ria Blades – the energy coming from the wind

Students Competition

Greece

On March 2017 the national "Engine4F" school projects competition on the use of STEM sciences was concluded with the final presentation of the work of each team.

In total, four public schools participated in the initiative that produced nine projects of high quality, creativity and originality and exploitation degree of technological and mechanical knowledge.

In particular the produced projects were the following:

All projects were evaluated by a three-members Evaluation Committee according to the following criteria:

a) Originality and Creativity

b) Presentation

c) Exploitation degree of STEM knowledge

According to the Committee's evaluation, the top performing projects were the following:

1st place: Studying of a robotic vehicle's movement characteristics via video-analysis (3rd High School of Nikaia)

2nd place: Using a robot for the measuring of "acceleration of gravity" (Ralleios High School of Piraeus)

3rd place: Construction of a hydroelectric power plant (1st High School of Zefyri)

4th place: Construction of an aerodynamics testing tube (41st High School of Athens)

Cypros

The Engine4F program in Cyprus is applied in collaboration with the Apostle Pavlos Gymnasium, where a total of more than fifty students currently attending the third gymnasium grade, are involved in the various actions. As part of the program the students, were separated into groups of four and composed a proposal on a new and original invention they came up with, as part of a competition.

During the academic year 2016-2017 the students met numerous times with Dr Natia Anastasi to discuss details of the their proposals and the best way to present them. The outcome was six independent proposals on the following topics:

1. A cell phone case that doubled as a solar panel for charging the telephone. Students proposed a device that had three separate parts; the collecting plate for receiving sunlight, the plate that absorbed the appropriate radiation and converted it into charge and finally the thermally insulated frame on which the rest of the wiring is fixed. The students calculated the optimal size of such a case and the time it would require for a standard telephone battery to charge.

2. A toy car that used water as its energy source. The students came up with a device that contained an electrolysis apparatus that produces hydrogen and oxygen. The Oxygen is to be released to the atmosphere and the hydrogen would get funnel and stored. The combustion of the hydrogen would be the source of energy for the toy car engine.

3. An electric fan that uses in situ solar energy for its functioning. The proposed device involved a solar panel that would charge the fan and allow for its application to the hot beach-front of Cyprus during the summer months.

4. A motorized metal detector with a solar panel for charging. The device involved a small all terrain toy car with a metal detector on it so as to determine the presence of a metal artifact without having to hold the detector by hand at all times.

5. Watering systems equipped with water sensors to determine whether an area needs to be watered or not. The students proposed a series of solutions for the detection of the water level in the soil and how upon values below a minimum that water system would receive a message that they watering process should commence.

6. A solar panel for carousels. The idea is that carousels because of all the lights and all the motion that is associated with them are items that require large amounts of electricity. This feature is possibly one of the reasons that carousels are in decline. The team proposes including a solar panel in the design to overcome the problem.

The proposals were evaluated by an external committee of civil, chemical and computer engineers and the winning team will travel free of charge to Aveiro, Portugal in May 2018 and participate in the final televised multiplier event of the program. The winner was the team "Creative Four" with their proposal on "Watering systems equipped with water sensors".

In addition during the academic year the students were given lectures by Prof. Klitos Christodoulou on new careers in computer science, participated in demonstrations on the role of engineers in waste management and recycling and were active in a series of lectures in new careers in engineering.

Neapolis University Pafos hosted the Consortium Meeting of the Erasmus + project Engine4F on May 17th and 18th. Below, there is a picture of the consortium visiting the Chrysorroyiatissa Monastery in Panagia as part for the get-to-know Pafos tour, which NUP organized. On behalf of NUP Dr Natia Anastasi and Ms Iliana Keli-Georgiou of the Department of Research are working on the implementation of the project.

CODING TEACHERS

Fifty students of our institute (ten for each group) have participate at "Coding teachers" project, with the supervision of Dr. Giacomo Alessandroni. The project is aimed to disseminate the computational thinking in the students of ten and eleven years old.

This school year there will be the second edition of this project, strongly wanted by the teachers of the little students of the last school year same as our headteacher.

During these days, the computer science students have tutored to the little students what is meaning computational thinking (we also used the term "lateral thinking"). The idea of using our students instead a teacher is simple: the little students see our guys like an elder brother, closer to them, to them way to think and study.

The target of the project is to develop an "ordained think" in the little students which allows them to make their homework alone and trying to make the most of the time they have. Learn to evaluate the several levels to face a problem. Therefore, this project is think not only for the people that would like study computer science, but for everybody that would like use the problem solving as didactical method and of work.

For the student of our Institute, instead, the project goal become into know how to communicate and guide boys who move their first steps in the world of coding. The skills requested – of course – are not only of informatics kind. We want develop their empathy and dialogue skills, in addition to the correct exposition of an issue that they know.

To obtain the desired result, we have teach coding "plugged" and "unplugged" (without any use of computers). The coding plugged was done with use of the portal "Hour of Code" [1, 2] where the guys have done an educational path of computational thinking. This activity is recognized by the Ministry of University and Scientific Research, as specified in the attestation page [3].

We have also teach the use of the programming language "Scratch" [4] because it show as assign some commands to a machine and it no require any computer science knowledge. With Scratch the guys have learned how to draw geometrical figures of growing complexity.

STUDENTS OR ENGINEERS?

During the period from November 2016 to April 2017 the classes of 8th level students involved in E4F worked hard to design and realize the prototypes of their inventions to participate to the international contest.

In Italy we named it "Noi… inventori!" (Us… Inventors!) which have involved more than one hundred students and six teachers from three different schools and four teachers of our school, ITIS "Enrico Mattei".

Before starting all the design phase the teams met ITIS teachers to have a brainstorming activity to evaluate the effectiveness for the realization of the wide amount of ideas the students had, and to make a plan of the uses of materials and labs.

In the preliminary phase a lot of proposals were discarded and emerged around 9 ideas carried on from just as many teams.

Among them, a solar concentrator, a solar cap power bank recharger, an Eolic turbine, a puzzle math game, a biodigester, a solar greenhouse…

The design phase had been made during the months of Janu
ary and February 2017 mostly with after school meeting in the labs of the secondary schools, teams supported from their teachers; ITIS, in this period, helped finding materials from our labs.

Lateral thinking

"Noi… inventori!"

In Spring 2017 we had the realization of the prototypes of the best design works made; finally it was built four devices: the biodigester, the Eolic turbine, the solar cap and the solar concentrator.

Students team realized all this materials during school time, in the morning, but plenty of them had to work also in the afternoon. A very fine job was made from the school "D. Bramante" from Fermignano, in their impressive (for Italian standards) technical lab.

The final actions was directed to evaluate the efficiency of the devices.

EVALUATION
In May 2017 the works were presented to the local commission of the contest that chose as follows:
   1st prize: biodigester; "D. Bramante" school, Fermignano.
   2nd prize: Eolic turbine; "D. Bramante" school, Fermignano.
   3rd prize: solar cap; Pian del Bruscolo, Tavullia.

EUROPEAN MEETING IN CYPRUS
In May, 2017, there was a meeting of the European Erasmus+ Engine4f project in Paphos, Cyprus.

The meeting was carried out with a relaxed and friendly atmosphere between all participants. This helped us to make important decisions regarding the project, tasks were assigned to all participants and everyone was fully involved in the decision-making process.

In addition to the project's scheduled planning sessions and work sessions, there were numerous moments of cultural interest and exchange between participants, and this favoured a serene and productive atmosphere in which to work on the project and attempt to create a follow-up project. At the final session, in fact, the decision was taken to present a project which follows on from the current project, possibly focusing more on innovative companies, such as those working in Industry 4.0.

Special thanks to Natia, for the great organization and friendship shown to everyone.

Contest winners