RoboESL activities at
56th Junior High School of Athens

Activities and experiences from our implementations

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Overview

- Project description
  - Objective
  - General Impressions
- Project Implementation and Methodology
- Key Findings / Results
- Conclusion

Project description: Objective

- Objective
  - develop extra-curricular constructivist learning activities in schools that will encourage the children at risk of failure or Early School Leaving (ESL) to remain at school.
  - Make interventions based on the scenarios developed and discussed with the committee that support us in order to achieve the programs' goals.
    - introduce robotic lessons in our school as:
      - computer science lessons
      - interdisciplinary technology-computer science projects,
    - use our new tools efficiently for all our students

Project description: General Impressions

- General Impressions
  - Communication, cooperation and collaboration skills gradually grew among students through the activities
  - The active participation/ involvement of students (most of them)
    - (in some cases some students didn't seem to get involved but we couldn't say if it was due to the specific activities or to different personal reasons)
  - The girls (2nd implementation) found it difficult to grasp concepts of practical areas but they managed to complete their tasks
  - We don't know how and whether participating in this project will improve their attitude towards school, but they definitely liked it and spent more hours than what was scheduled in the original plan

	Official Hours: 11:30		Dissemination, Workshops, Exhibitions, CodeWeek+: > 48:10					
Class/ Group	Description	Name of Teacher	Date	Start Time	End Time	Total Time	Photo	Video
	Arranged and improved the environment we use for our implementations	MZ, TK & pupils	10/10/2016 : 14/10/2016				N	N
Dissemination of RoboESL activities	-We discussed about our 3 worshops we made in our lab - 3 of our students that participated in our 1st RoboESL implementation would teach 31 elementary pupils and 4 teachers	TK & students	17/10/2016	14:00	16:00	02:00	Y	N
Workshop1	Taught 10 elementary school pupils and 2 teachers	TK & students	18/10/2016	13:40	15:00	01:20	Y	N
Workshop2	Taught 11 elementary school pupils and 1 teachers	TK & students	19/10/2016	13:40	15:00	01:20	Y	N
Workshop3	Taught 10 elementary school pupils and 1 teachers	TK & students	21/10/2016	13:40	15:00	01:20	Y	N
CodeWeek	A brief presentation about the RoboESL during the CodeWeek. Students in each class prefered to be involved with robots instead of programming or designing in Sketch up	TK & students	17/10/2016: 21/10/2016	08:20	14:00	05:40	Y	N
GR02-2nd	- We started with the student/teacher meeting, in the IT Lab where the project would take place. - We discussed why they chose to follow this program - We informed them about the program as well as about the responsibilities that come with it. - They connected onto the web so that they could note their answers down - They assembled their four tribots - they made their mockups fields - they made their first tribot programming	MZ, TK & students	04/11/2016	09:55	14:00	04:10 (5 school hours)	Y	Y
GR02-2nd	- they begun testing their robots movements using a given worksheet - they tested their programs (follow the black line, follow the black line and when white stop, random and not random dance) in their mockups fields and presented them in the plenary ("let's play and dance" scenario) - we discussed the program, the problems they had met - We informed them that on our next meeting we would deal with the "sunflower"scenario - We discussed and students made the appropriate changes in their tribots in order to meet the needs of our new scenario	MZ, TK & students	11/11/2016	09:55	14:00	04:10 (5 school hours)	Y	Y
	Discussed and improved programs for the Conference & Exhibition. Made "poster" and explanatory texts of our projects (Technopolis - 26/11/2016)	MZ, TK & pupils	21/11/2016: 25/11/2016	about 4 hours			Y	N
Conference & Exhibition	Our students showed their programs in the exhibition and our school participated in the conference	MZ, TK & students	26/11/2016	09:00	16:00	05:00	Y	N
GR02-2nd and volunteers	- they reconstructed and dressed their tribots making "stories" (the beauty and the beast, the princess and the lover etc) - they made some other small constructions using lego parts	MZ, TK & students	several times in order to be in touch until the beginning of our 2nd phase of our 2nd implementation (about 6 hours)				Y	Y
GR02-2nd	-they made three programs based on the "sunflower" scenario using the light sensor -they presented their programs in the plenary	MZ, TK & students	12/01/2017	08:10	09:40	01:30 (2 school hours)	Y	Y
GR02-2nd	-they made three programs based on the "sunflower" scenario using the ultrasonic sensor -they presented their programs in the plenary - we discussed about the scenario and the programs' versions they made	MZ, TK & students	17/01/2017	09:55	11:35	01:40 (2 school hours)	Y	Y
Exhibition	Selected and tested programs for the Exhibition (Technopolis - 01/04/2017)	MZ, TK & pupils	27/03/2017 : 31/03/2017	Breaks, before and after classes (about 4 hours)			Y	N
GR02-2nd and volunteers	Exhibition/ Athens Science Festival 2017	MZ, TK & pupils	01/04/2017	14:00	18:30	04:30	Y	N
GR02-2nd	-they made videos about the implementation - they took interviews from each other about the RoboESL project - they made videos with their interviews and their blogs!	MZ, TK & students	03/4/2017 : 07/04/2017	about 10 hours			Y	Y
Dissemination of RoboESL activities	-We discussed about our 2 worshops we made in our lab -2 of our students that participated in ours RoboESL implementations would teach younger children (from our school (1st grade)	TK & students	24/04/2017	14:00	15:00	01:00	N	N
Workshop4	Taught 12 1st grade's students	TK & students	27/04/2017	13:40	15:00	01:20	Y	N
Workshop5	Taught 12 1st grade's students	TK & students	04/05/2017	13:40	15:00	01:20	Y	N

carried out > 50 school hours

Scheduled: 12 school hours

and keep roboting...

Project implementation and methodology

- Prepared the implementations
  - Checked and arranged the Mindstorms core sets
  - Made the necessary class arrangements
- Decided about/ calibrated:
  - the time we would spend
  - the path and the steps of our implementation
  - the activities of scenarios we would use
  - the theories and the learning model that would support our efforts
  - the locations and the resources available in order to achieve our goals

Project implementation and methodology

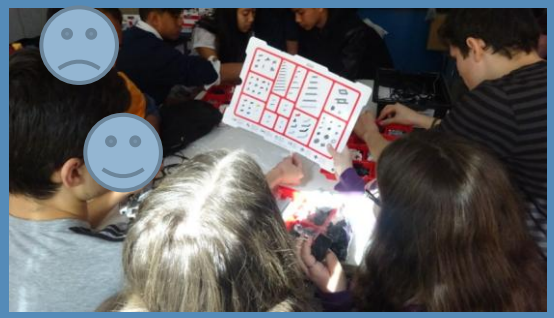
Prepared the implementations (Set up the physical environment, familiarization)

- Made the necessary class arrangements

(to create a warm environment where students would be comfortable to work in)

- Checked and arranged the Mindstorms core sets+

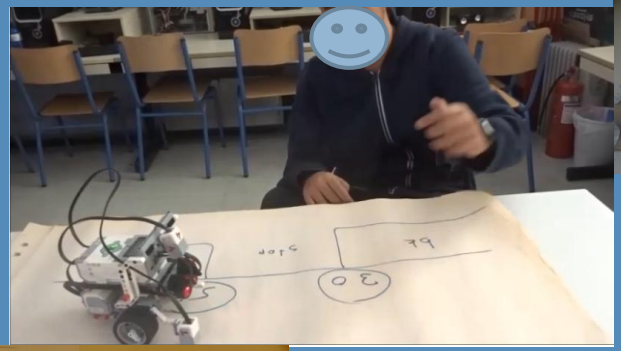
(made sure all the participant students get to know the lego parts, to reduce the cognitive load of their work)

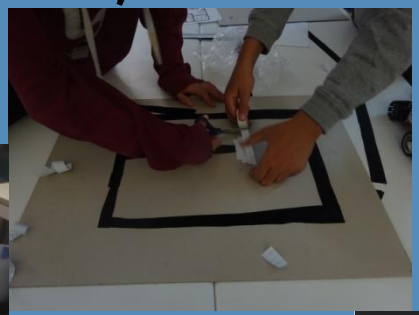


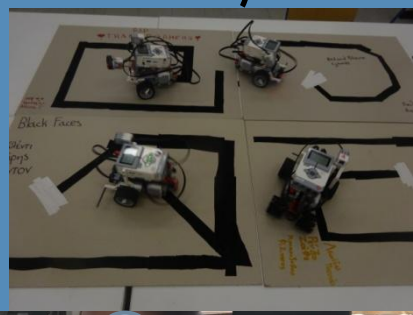
Project implementation and methodology

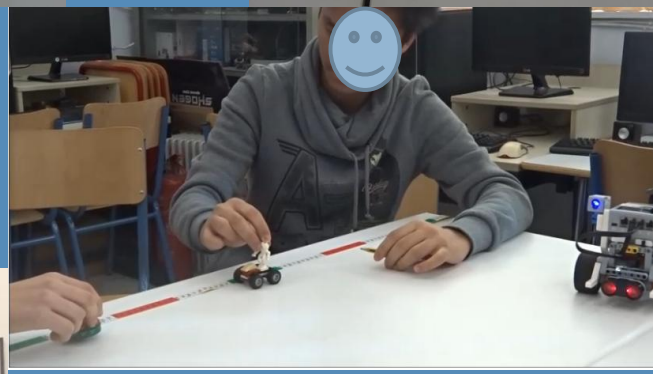
Decided about the activities and the ways they would be introduced

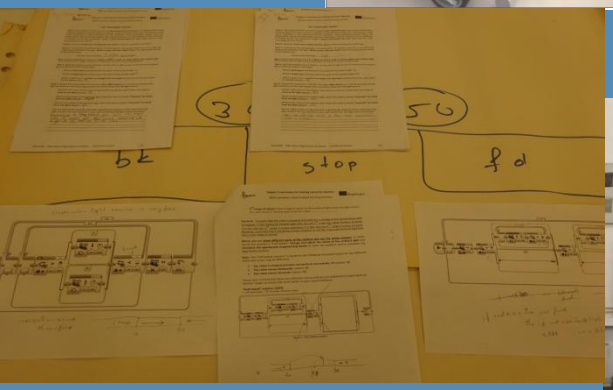
- e.g. Ways to understand the problems (mock ups, drawings, helping questions, embodied experiences...)











Project implementation and methodology

Process / Methodology

- **Ages – Attendances**

Ages – Attendances			
1st implementations		2nd implementations	
Hours (sum)	12	Hours (sum)	14
Hours Per Day	4	Hours Per Day	5. 5. 2. 2
Dates Of Implementation	5, 6, 7/04/2016	Dates Of Implementation	4,11/11/2016 & 12,17/01/2017
Students	10	Students	11
Class	2nd	Class	3rd
Groups	3	Groups	4
Ages Of Students	14-16	Ages Of Students	15-16

Attendances (1st implementation)		Attendances (1st implementation)	
Number of students (sum=10)	Number of attendances	Number of students (sum=11)	Number of attendances
9	3	11	11
1	2		

Project implementation and methodology

Process / Methodology

- **Framework – Selection**

School Year: 2015-2016

Students (10 boys) chosen between those who:

- met the program conditions
- wanted to take part in the project

School Year: 2016-2017

Students(11 students) chosen between those who:

- wanted to take part in the project
- met the program conditions (8 boys)

- One team was made up of 3 girls, very good students but not very comfortable with technology.

Project implementation and methodology

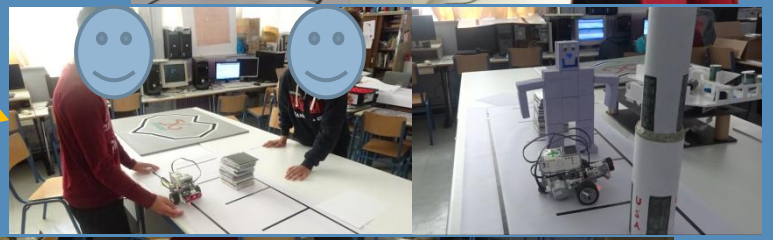
Project activities

- **Construction of their tribots and scenarios discussed**

(3 teams/
3 scenarios/
7 programs)

<u>School Year: 2015-2016</u>

- Follow the black line
- The RoboRail
- Go to park (parking program)
- The desert scout (hexagon)



Project implementation and methodology

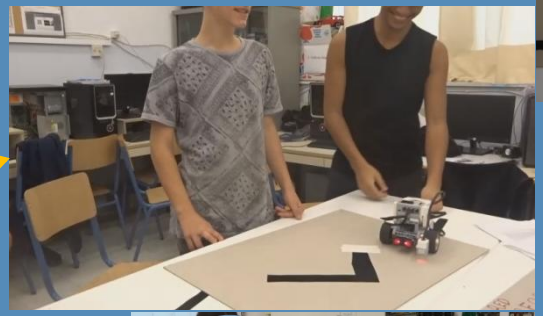
Project activities

- **Construction of their tribots and scenarios discussed**

<u>School Year: 2016-2017</u>

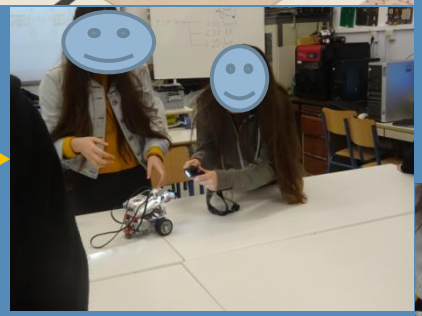
- Follow the black line
- Let's play and dance
- The sunflower

Follow the black line (mock ups and testing)



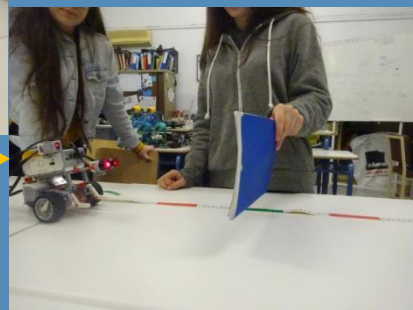
(4 teams/
2 scenarios/
10 programs)

Let's play and dance (short mock up for our scenario)



Programs using <u>light</u> sensors

Programs using <u>ultrasonic</u> sensors



Project implementation and methodology

Computer Science – Technology lessons. Interdisciplinary activities about the sunflower effect

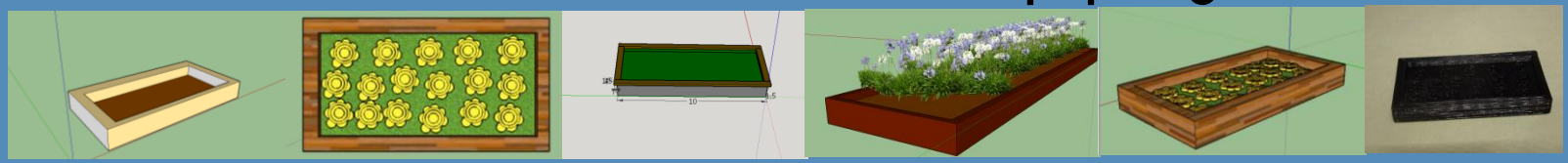
- **Construction of their tribots and scenarios discussed**

School Year: 2016-2017 (The sunflower)

- Program in Scratch/BYOB about the heliotropism

- Plant sunflower's seed

- Create a 3D flower bed in sketch up program



- Make presentation and videos about the heliotropism

Project implementation and methodology

Constructivist pedagogy - Activities

- Scaffolding 
- Zone of approximate development
- Creative thinking and involvement through the "transparent" construction of their tangible model (robot/ vehicle EV3) 
- Our interventions tried to follow the methodology and both constructivist and constructionist approaches proposed in our courses in Athens and Riga 

Project implementation and methodology

Problem Based Model*

- Identify the problem (understand, motivate)
- Represent the problem (drawing, diagram)
- Selecting a strategy (choose the appropriate strategy for the problem)
- Carry out the strategy (try out the quality of their thinking)
- Evaluating results (judge the validity of the solutions)
- Analyzing Problem Solving (most important in long-terms goals)

*Eggen, P. & Kauchak, D. (2001). *Strategies for teachers: teaching content and thinking skills*. Boston: Allyn and Bacon

Key Findings / Results

quality results / cases

- Case1:

Before:

He was always kept to himself. During breaks he was standing alone against a wall looking at the others in the schoolyard. In class he was passive.

During the implementation:

He started discussing with others. He explained his views and was an active member of the team

After:

He wanted to participate in videos we made about the program (although he was a bit anxious), he wrote the text he communicated in English, he participated as a member of the team in RoboESL exhibitions, in the Athens Science Fair too and taught robotic activities to younger students (from our school (1st grade), children in the fair and pupils from the neighboring elementary school) helping in the dissemination of the program!

Key Findings / Results

quality results / cases

- Case2:

Before:

He failed passing classes twice. Before beginning robotic classes he had just exceeded the number of absences. He had to repeat the class..

During the implementation:

He came to robotic lessons and stayed in school all day during the days of our implementation, although he had failed to pass the class due to his absences…

After:

He came several times to the lab to work with other team members improving their programs.

Key Findings / Results

quality results / cases

- Case3:

During the first hours of the implementation:

She encountered lots of problems constructing the tribot. Consequently she didn't participate much in the construction and disputed with the other team members.

After the familiarization:

She reconstructed the tribot, she participated in "stories" made for our tribots (the beauty and the beast, the princess and the lover etc) and made some other small constructions using lego parts. She even asked to construct from scratch a tribot and made the programs we had done during our 1st implementation

Conclusions

- Robotics activities can potentially change students' attitude to learning
- Activities, more flexible in time, help students keep pace with the more experienced classmates

- The studies have not concluded whether robotic activities has good or bad effects on the process of learning and students' attitude toward learning, so each of us has to reach his or her own conclusion -of course there are, always, lots of parameters to be discussed.

Photos from dissemination of the project

Athens Science Festivals 2016 and 2017 / Conference & Exhibition RoboESL / Workshops in our lab

Future plans at 

- 3rd implementation at school (2nd "semester" of 2017-2018 school year)
- Integration (computer science, projects …)
- Cooperation with other teachers (maths, music …)
- Workshops (pupils from elementary school, scouts …)

Thanks a lot for your attention ☺