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FLIPPED LEARNING PRACTICES TO RELEASE MATHS ANXIETY WITH THE USE OF ROBOTICS

THE SECOND E-NEWSLETTER OF THE PROJECT MINDMATHS

Welcome to the second Newsletterof the project MIND MATHS

In this e-newsletter we will introduce:

Result of output one, Main Goal, Target, Robotics modules, Ongoing & upcoming evnts and Second transnational meeting.

The project “Flipped Learning Practices to Release Maths Anxiety with the Use of Robots” approved within the scope of KA203-Strategic Partnerships in Higher Education Field in the Erasmus+ Programme coordinated by the European Union and the Turkish National Agency was launched at Kocaeli University, Education Faculty, the Department of Basic Education. The project will last 24 months starting on 01.09.2020 and ending on 30.08.2022.

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Result of output one

Mathematics education is one of the keys to development in today's work life. It is one of the most effective instruments for reducing poverty, social exclusion and inequality since we use math in every aspect of our lives in practical everyday activities and at work such as solving problems, managing personal finance, keeping things well ordered and using quantitative skills required by a great number of jobs.

Primary school pre-service teachers play a crucial role to meet individuals' differentiating needs since the future will be shaped in their hands. Considering the individual differences in learning mathematics, most probably many would agree on the fact that some mathematics learners' excess amount of math anxiety that most likely causes a negative emotional state toward mathematics and low performance in mathematics.

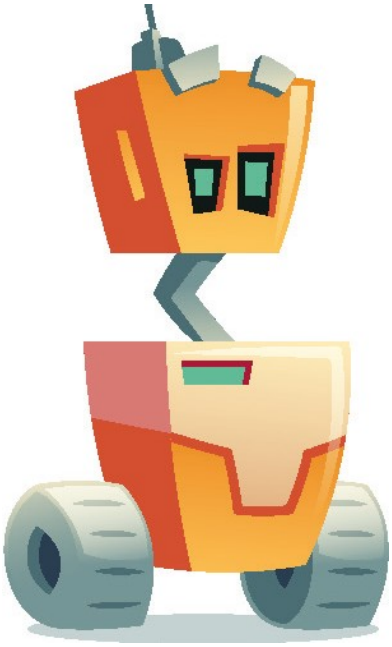
Main Goal

The main goal of this project is to enhance expertise of prospective teachers who are enrolled in primary teacher education programs. The project aims to help prospective teachers develop strategies in their work with students with high levels of math anxiety. Specifically, this two-year project plans to accomplish the following tasks:

- A modular curriculum designed with flipped learning including hands-on learning practices
- A video library including explanations for the use of robotics in maths education in primary schools
- To raise prospective teachers' awareness of mathematics anxiety
- To meet prospective teachers with innovative teaching activities that can be used to accelerate the learning processes of children with mathematics anxiety
- To obtain genuine, valid, and reliable data on the needs of prospective teachers related to the teaching activities to engage children with mathematics anxiety in the learning process more effectively

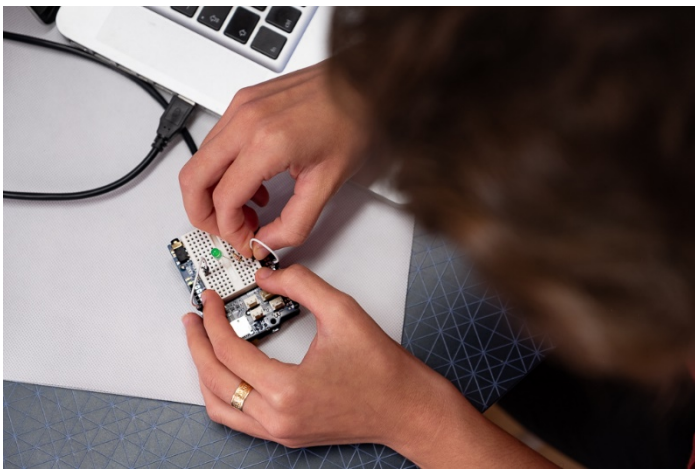
Target

Although an acceptable degree of math anxiety is expected to motivate learners to study and focused on the task at hand, most of the time math anxiety is risk factor for some students for a comprehensive understanding of mathematics. As a result, our goal as educators should be to explore new tools to reduce math anxiety in teaching primary school mathematics. Among many alternatives, the flipped learning approach was chosen as a viable medium to reduce primary students' level of math anxiety with the use of robotics.



SOME INFORMATION ABOUT THE ROBOTICS MODULES

Why Educational Robotics in primary school?



Educational robotics (ER) is a discipline that aims at the design and application of robotics kits and coding programs for pedagogical purposes. ER is not a new application of robotics and coding, but, rather, it has been growing exponentially in recent years. It has a major impact on learning and it is associated with the STEAM disciplines (Science, Technology, Engineering, Art, and Mathematics) for the development, skills, and understanding of mathematical, physical, engineering, and related concepts (Daniela, 2019).

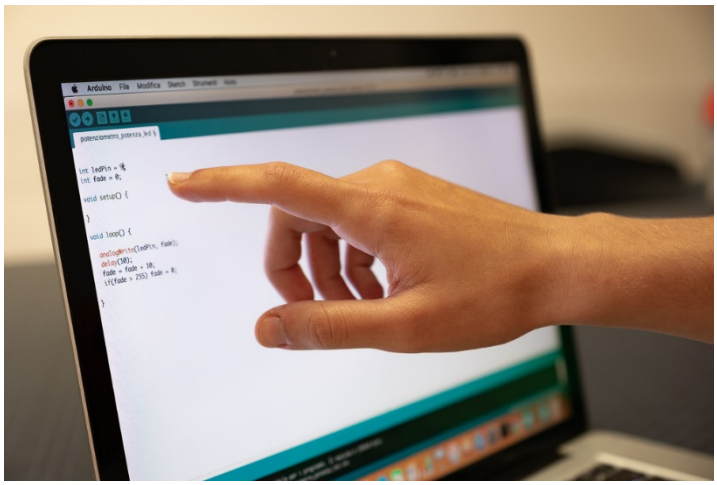
There is a significant and confirmed literature on the benefits of using ER, assessing that ER promotes a learning centered on the student teaching, and that it is offering to education innovative methods.

The integration and use of educational robotics in the teaching-learning process in pre-school and primary, is as a resource to address the diversity of the classroom, as a means to help the inclusion of all students, as well as keep them active and motivated (Scaradozzi et al, 2014).

Introducing students to the areas of Mathematics, through play and constructionist learning in order to generate new knowledge, is one of the goals of the usability of ER in the classroom.

Mathematics occupies a central place in the whole literacy as it is defined in our project. However,

the way it is often taught in school causes it to be perceived as a subject with no relation or at least a limited one with the real world. Integrating mathematics into STEAM allows it to be revalued by students as central elements of scientific and technological work, and always present in real life. Using integrated STEM proposals, practically all the contents of pre-primary and primary school curriculum in the area of Mathematics can be addressed and, in addition, better understood by the students (Bellas et al., 2019). These contents include not only the computational skills, but especially the bae elements of mathematics, we would say, meta-mathematical, such as



- spatial sense
- sense of time
- sense of quantity
- sense of weight
- sense of measurement
- laterality and symmetry
- use of different senses to understand the surrounding environment and sensor fusion
- ability to switch between time and length measurements, etc.
- transformations
- use of filters
- data analyzing.

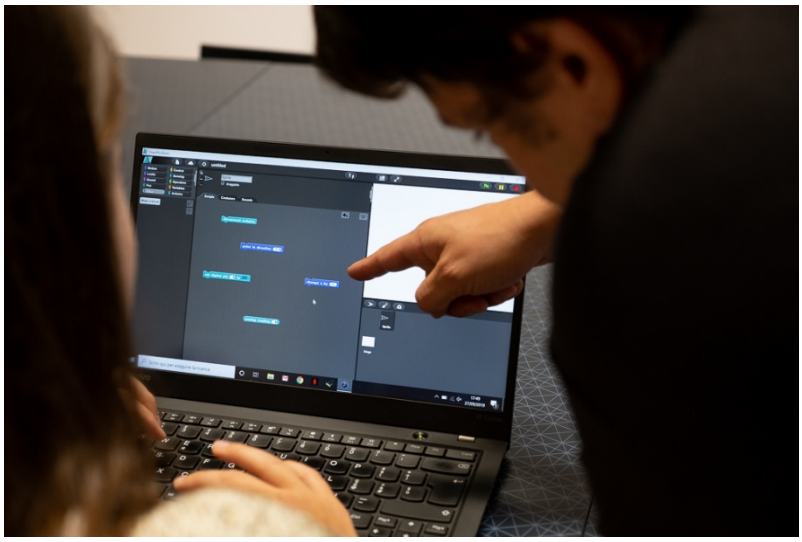
As may be seen, Math's literacy involves interrelated competencies, that are intertwined and overlapping, and often, drive each other forward.

Robotic Kits Overview

There are some robots on the market that can be used in primary school, according to shape, size, function, working environment, and autonomy. Depending on the shape, there are: zoomorphic (imitation of a creature, e.g., bee), humanoid (reproduction of the shape of a human and its movements, in this case, the NAO robot), hybrid (combination of the above), and polymorphic (different shapes, adapting its structure according to the task).

Modules' actualization modalities

The educational robotics modules to support elementary school mathematics developed here are set for a two-hour session. In fact, unlike other Modules in the project, the educational robotics sessions dedicated to undergraduates in primary education need more time, because building the robots themselves, as well as programming them, or building the unplugged programming tools - which are an integral part of the educational process - takes time.

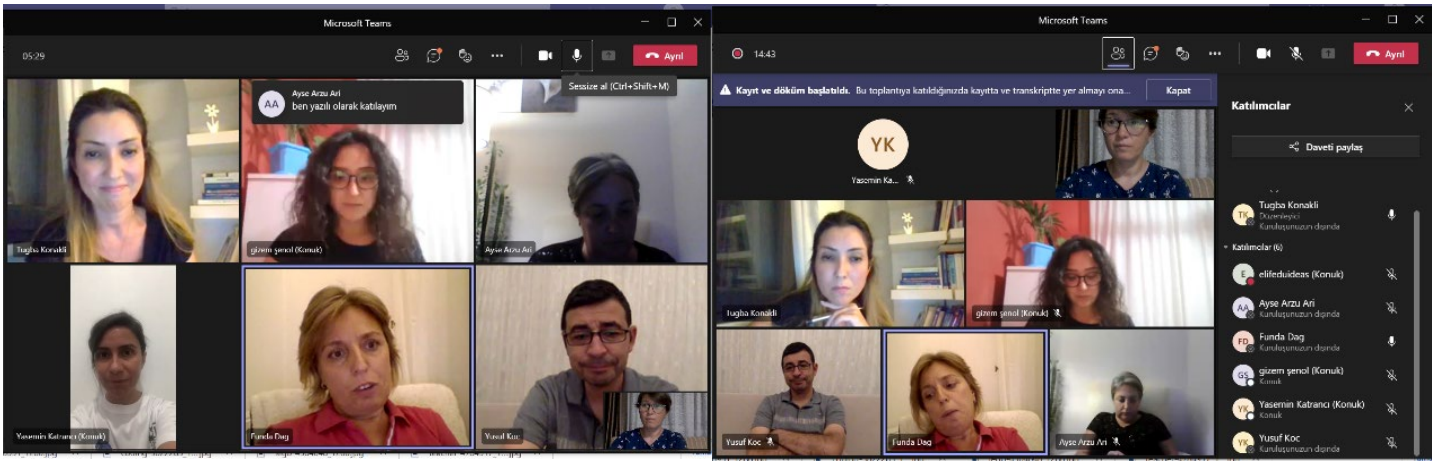


To place the modules in as real an environment as possible, we imagined inventing a smart city where robots move autonomously, and the city is sustainable. In this way, concepts of number, space, measurement, time, and so on become real for children. Here we present some scenarios, describing them from the point of view of programming and the benefits for math learning.

NEWS

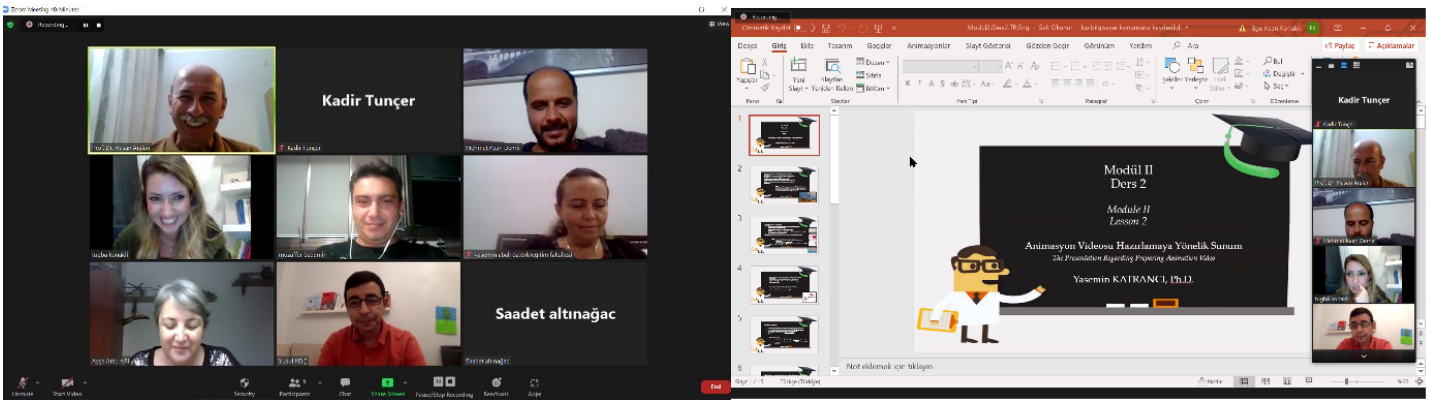
News 1

KOU and EDUCLOUD organised a small focus group discussion to specify the content of the videos for Modules 2 and 4 with the participation of KOU and EDUCLOUD project team members and an ICT expert from KOU as a guest. During the meeting, issues related to the computational thinking, flipped learning were discussed in detail and the answers to how to use robotics to release maths anxiety were sought.



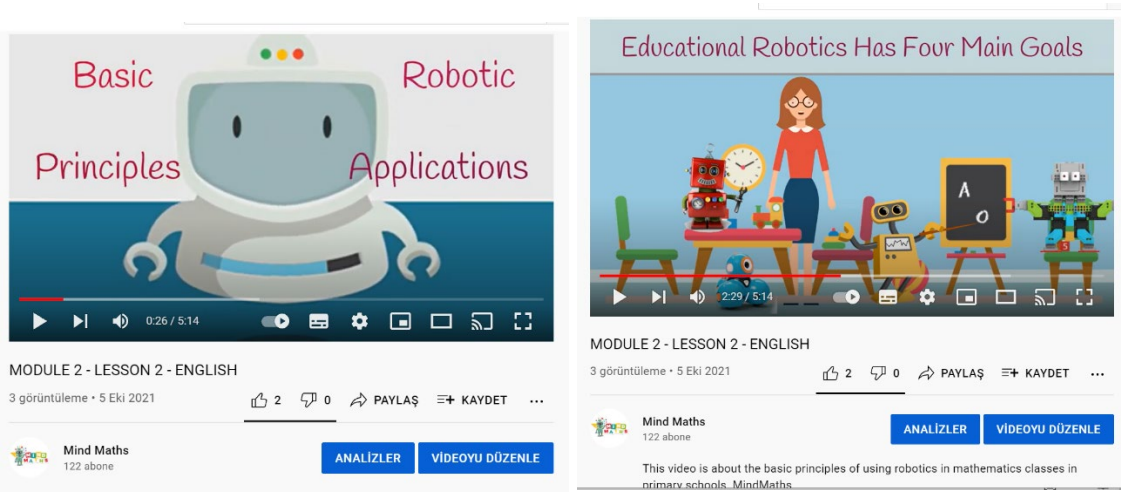
News 2

KOU and COMU team members organised a small workshop and came together online to discuss the content of the IO2. During the workshop, experts handled the blended learning applications in primary schools and integration of computational thinking in detail. The preparation process of videos were discussed in detail.



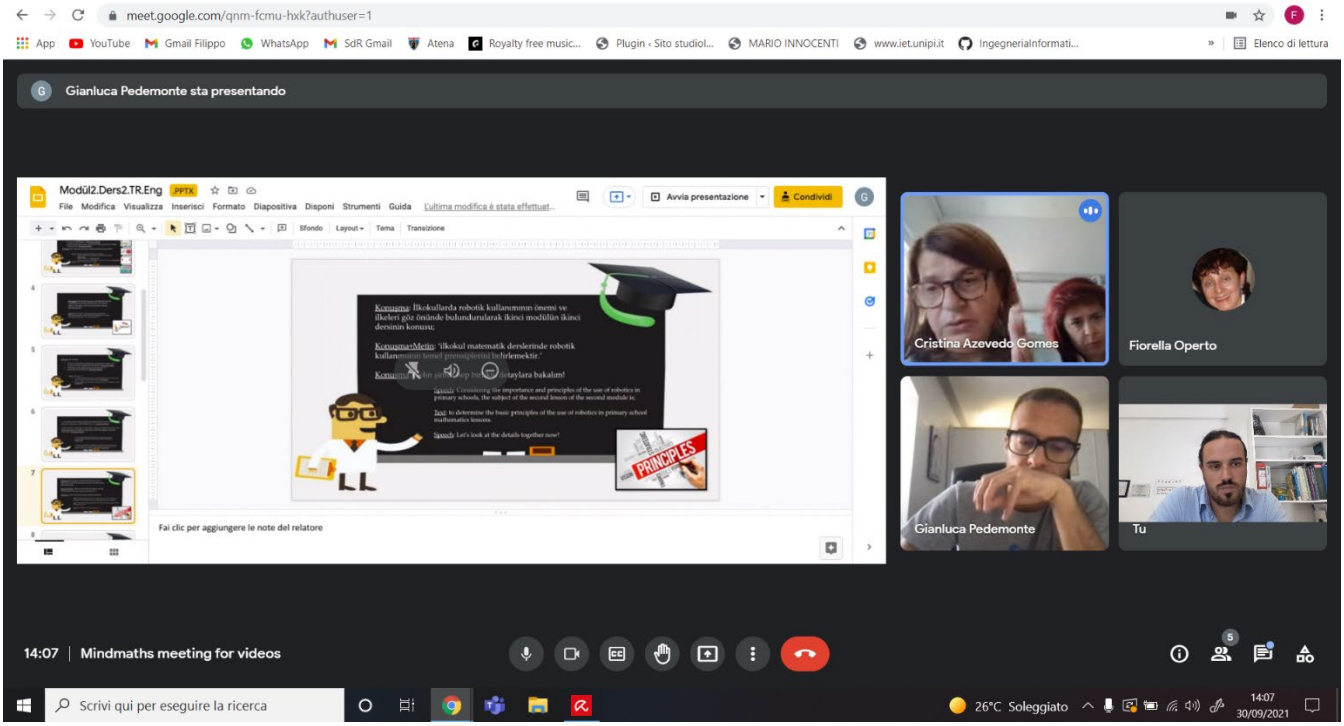
News 3

The first video of the video library has been prepared by EDUCLOUD (Module 2 Lesson 2) and published on the internet. The video can be seen on https://www.youtube.com/watch?v=vxBePD_ysSo



News 4

IPV and SdR organised a small focus group discussion To discuss regarding the progress of the Erasmus project and decide on the breakdown of the videos in module 5. It was also discussed about the format to be kept during the videos and the main topics to be included.



ONGOING & UPCOMING EVENTS

Transnational Project Meetings

The COVID-19 situation caught the whole world off guard last year. We have still been experiencing its negative effects around us. The pandemic also changed the way we live and work.

Consequently, we held our first transnational project meeting online. However, we have been adapted to the new conditions and working hard to close the gaps developing as a result of this situation.

Knowledge Paper

A Knowledge Paper has been produced for the project and can be downloaded at this address:

http://www.mindmaths.org/knowledge-paper/

Transnational meeting

The second Transnational meeting of the project "MINDMATHS" took place on 3rd September 2021. It was a great opportunity to partners (Kocaeli Universitesi (Turkey), Latvijas Universitate (Latvia), Scuola Di Robotica (Italy), Instituto Politecnico de Viseu (Portugal), Canakkale Onsekiz Mart Universitesi (Turkey), Educloud Egitim Organizasyon Teknoloji Ticaret Limited Sirketi (Turkey)) define the next steps of the Project.