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# ALGORITHMIC THINKING SKILLS THROUGH PLAY-BASED LEARNING FOR FUTURE'S CODE LITERATES

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**Welcome** to the first e-newsletter of the Project ALGO-LITTLE. We are happy to share information about our goals and the scope of our activities. In today's world, computational and algorithmic thinking skills open the doors of the most crucial competences required by the contemporary professions.

These will continue to be the most desired skills in the future and give the next generations the opportunity to develop innovations, produce technology and work for the benefit of the humanity. We hope you will enjoy reading this newsletter and find interesting topics for your educational activities and practices.



Erasmus+



## WHAT IS ALGORITHM?

An algorithm is a set of actions involving the understanding of objectives of further activities and undertaking a series of steps to solve practical and educational problems (Veronina, Sergeeva & Utyumova, 2016).

Algorithm comprehension makes it possible to transfer the method of solving a problem to similar tasks since algorithmic thinking is a way of reaching a solution by defining the steps clearly (Yıldız, Çiftçi & Karal, 2017).

Algorithmic thinking is the base to understand and learn to code, but above all, this skill is necessary for every moment of our lives since by using this skill we can create and follow simple sequences to perform a task. Hereby, the good acquisition of algorithmic thinking skills will provide future generations to take the most appropriate steps to reach the desired goal.

As computational thinking, coding and educational robotics are entering European schools as tools for thought, teachers and curriculum developers offer to foster algorithmic thinking skills starting from the preschool period (Strnad, 2018), in so providing children with these skills they will be able to interpret data more easily, and develop thinking strategies for understanding and solving problems.

## ABOUT THE PROJECT

### WHAT WE AIM?

We primarily aim at preparing a course programme and teaching materials to teach preschool teaching undergraduates how to reflect the algorithmic thinking skills in all areas of preschool education and integrate it into the teaching of music, art, mathematics, drama, science, behaviour development and language development, which are addressed in early childhood.

We also aim at

- Closing skills gaps in ICT oriented teaching/learning activities for immediate impact on contemporary teaching skills of preschool teaching undergraduates
- Increasing the acquisition of knowledge and skills of preschool teaching undergraduates related to employing algorithmic thinking skills through play-based learning as an innovative teaching approach
- Upskilling the lecturers of the partner universities related to the integration of algorithmic thinking skills into all subject areas focused in preschool education.

### WHAT WE WILL DO?

We will follow two research methods used in social sciences for the preparation of intellectual outputs and for testing their compliance with the project objectives.

a- Descriptive Method

(Preparation, Curriculum Development, Interactive Animated Presentations as teaching materials)

Through literature reviews, workshops, individual works, teamwork and joint-work of the project team members

b- Experimental Method

(Piloting process taking place after the preparation of the curriculum and teaching materials)

Through giving training during the spring semester of 2022, summative and formative assessments will take place to measure the effectiveness of the piloting.

We will disseminate the results through the multiplier events and activities on the virtual platforms.



## STEP BY STEP

Education received in early childhood plays an important role in the development of learning skills and especially in the successful development of behaviour.

One of the most important features of the activities carried out at every moment of life is that they progress step by step, consist of repetitive processes, include choices and classifications.

For example, while folding clothes, we primarily classify them such as pants, sweaters, underwear. Then we fold each one with an appropriate way and then place in their places. Or when we go somewhere, before we leave the house, we wear according to the weather condition. We choose a vehicle (or walking) based on the distance to our destination. Then we reach there by following the road.

Algorithmic thinking is the ability to think in terms of clear, simple and small sequences and repetitive rules to solve a problem or understand a situation (Csizmadia & et al, 2015; Beykoz, 2019).

There can be more than one method (algorithm) to solve a problem. For example, a sweater can be folded in several different ways. Or there may be more than one way to reach a restaurant. The choices can vary according to the goals people have when performing these tasks. For example, someone who does not want to get stuck in red lights while driving can choose a direction without lights, or someone who wants to quickly get to where he goes can choose the shortest route.

A child who learns the steps of the division process (in Maths) divides numbers each time using the same algorithm. Therefore, algorithms are used not only in the ICT field but also in many fields including production, service, education, transportation, and so on.

## WHAT WE FOCUS ON?

In the ICT sector, the main thing that sector representatives invest is not computer programs, but algorithms included in those programs (Beykoz, 2019).

It is necessary to understand the operation of these algorithms that we encounter in every moment and in every aspect of our lives and to organize our daily activities accordingly, to solve the problems we encounter by decomposing them into simple parts, to get the results that we aim for by following the most appropriate ways and to be able to act systematically. Because the correct understanding of an algorithm also allows it to be expressed in different ways.

If we can apply and follow an algorithm easily every time, we come across it and if we can design more effective versions of that algorithm this can be the proof that the algorithmic thinking skills and learning are acquired.

## SCOPE

### WHY PLAY-BASED LEARNING?

Learning motivation increases with play-based learning. The activities are interesting, keep the learner active and enable them to learn through experience.

Learning activities developed with this learning approach extend the focusing time of the learners and facilitate continuous feedback. Thus, errors are corrected without delay.

In addition, the effort to achieve the goals set through the games also helps to repeat learning processes in a fun way and to reinforce learning.

Therefore, sample lesson activities that will be developed within the scope of the project will be handled according to the play-based learning approach.





**Scuola di  
Robotica**

**The School of Robotics (Scuola di Robotica)** is an Educational and Training Center Certified by the Italian Ministry of Education and member of the European Robotics Platform. It has extensive experience in employing robotics to support educational needs. A Committee consisting of robotics scientists and scholars in Humanities has instituted School of Robotics, serving as



**İzmir Demokrasi University** was established in 2016. In spite of being young, the university has 10 faculties, 3 institutes and 3 colleges which have competent academic staff in its field. İzmir Demokrasi University is open to 13 graduate and 5 doctoral programs and continues its education in Turkey working with the highest criteria.



**Educloud** is a newly founded enterprise. The expertise area of Educloud works on developing technological solutions to meet the needs of companies and target groups. Educloud develops interactive education platforms that include participants in the learning processes. The team members are experienced in ICT technologies on "Web-based software".

## CONSORTIUM



**The University of Maribor (UM)** is the second-largest Slovenian public university with more than 20.000 students and around 1.000 of academic staff. It is striving for excellence in education and increase of knowledge with the help of applicative and basic research. UM is carrying out study programmes at all levels, undergraduate, postgraduate, and the PhD level.



**Politécnico  
de Viseu**  
40 anos

The creation of the **Polytechnic Institute of Viseu (IPV)**, on 26th December 1979, is framed by the broader philosophy which supported the successful implementation of public polytechnic higher education in Portugal. Polytechnic Institute of Viseu has 413 academic staff, 5000 students attending bachelor's degrees, master's degrees, postgraduate courses and higher technical professional courses.

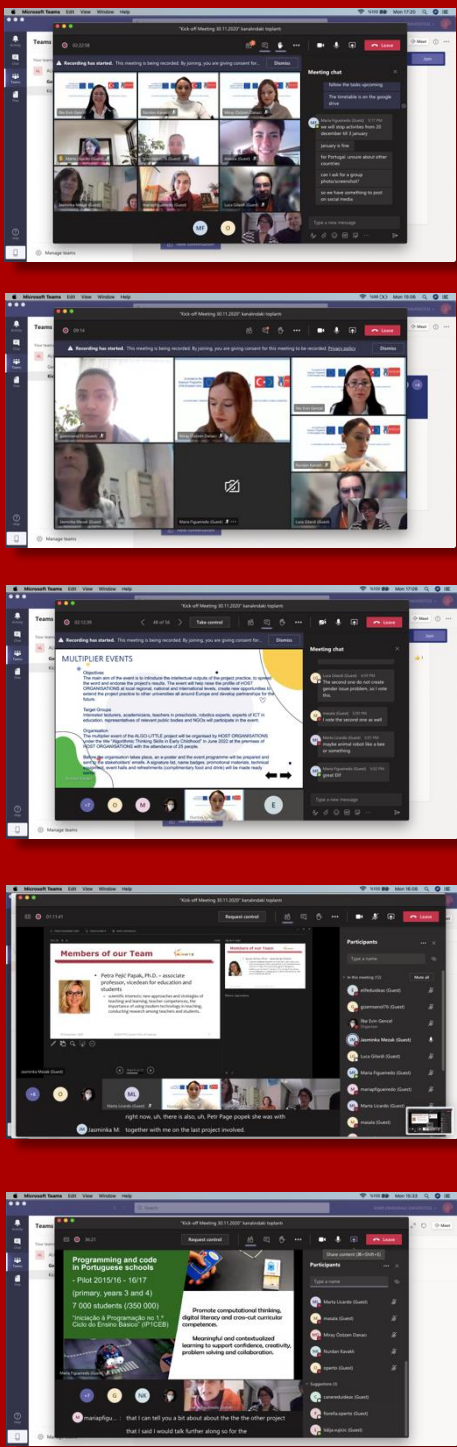


**The University of Rijeka (UNIRI)** is the fundamental educational and research institution in the western part of Croatia. Founded in 1973 following a long-standing tradition of higher education institutions, UNIRI has 16 constituents: an academy of applied arts, 10 faculties and 4 university departments, with over 161 study programmes. UNIRI has 16 500 students, over 1700 employees and almost 1000 researchers.



# KICK-OFF MEETING

We held the online kick-off meeting on 30<sup>th</sup> November 2020 with the participation of all partners. At the meeting, we discussed all project activities and handled the preparation of the knowledge paper in detail.



# ONGOING & UPCOMING EVENTS

## KNOWLEDGE PAPER

We started to carry out a literature review to clarify the focal points of the curriculum. EDUCLOUD prepared a report template to let the partners continue their literature reviews under the same headings. The report has been uploaded to a cloud service for the joint-work of the partners.

The report titles include algorithmic thinking skills, learning areas where these skills can be used in preschool education, the importance of algorithmic skills in preschool education, future benefits, and also country-specific studies on this topic.

Partners will decide which learning areas are the best for the integration of algorithmic thinking skills into the preschool education according to the evidence collected in the knowledge paper.

## ONLINE WORKSHOPS

We will organise online local workshops after the literature reviews. At these workshops, we will collect experiences, practices and suggestions of the participating educators.

SDR will come together with robotics experts and coding teachers teaching in preschools during the workshop in Genoa.

Partner universities will come together with lecturers, experts of ICT in education and preschool teaching experts.

All partners will make efforts to involve coding teachers teaching in preschools. IDU will carry out the workshop together with EDUCLOUD.

Partners will use the results of the online workshops to determine the content of the curriculum.

