MILAGE LEARN+ app

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Building communities of teachers producers to implement personalized learning of mathematics supported by machine learning and block chain to assess competences

For many students' math is boring, abstract, lacking in creativity, complex and very difficult to understand. However, mathematical thinking is a competence, which equips young people for life. It is a powerful way of thinking about things in the world - logically, analytically, and with precision.

In Spain, Portugal, Cyprus and Germany, 22%, 24%, 42.6% and 17.2%, students are low achievers in mathematics.

On the other hand, according to the U. S. Department of Commerce, STEM occupations are growing at 17%, while other occupations are growing at 9.8%. STEM degree holders have a also higher income.
It is also known that low performance and grade repetition are also critical factors to early school leaving (ESL). The Portuguese, Spanish, Cyprus and Germany ESL rate are 12.6%, 18.3%, 8.6% and 10.1% in 2017, respectively.

In this project, we want to help all students to succeed in the learning of mathematics. Goals for the project:

1) Improve motivation towards learning of mathematics, reduce inequalities and promote successful schooling for all, for children from 9 to 12 years.

2) Promote "Bring Your Own Device" technologies in the classroom. You can buy tablets starting at 50€. Schools can buy these devices for disadvantaged students.

3) Extend the classroom to a virtual classroom where students can study autonomously. Math curriculum often requires daily practice and review for mastery. Therefore, the completion of daily assignments is essential to learning the material.

4) Promote autonomous work of students.

5) Promote student self-assessment and self-regulation: to promote the ability of students to understand both learning intentions and success criteria.

6) Promote students peer-assessment: to develop their capacity to reflect on and critically evaluate their own learning and skill development; to support the development of critical thinking, interpersonal and other skills, as well as enhancing understanding within the field of knowledge of mathematics.

7) Promote the use of educational videos for learning; to provide feedback; when a student misses a math class; for flipped-classroom.

8) Train teachers in using digital technology. The OECD emphasizes in all of its reports: well-trained teachers are the main key to success. Teachers will play a key role for the success and implementation of the innovative tools and methodologies.

9) Develop Communities of Teachers Creators of Contents that are shared and open to the everyone.

10) Use Machine Learning to provide personalized learning to help all students to succeed in the learning process.

11) Develop an international framework of mathematical certifications.

The program was implemented with great success at the Primary School of Agios Tychonas during the School Year 2020 - 2021 in 5th and 6th grade children by the teacher Diana Gabriel and under the supervision of the School Principal Dr. Eleni Kyratzi.

The program will continue during next school year with 4th, 5th, and 6th grade children. All children were thrilled with the implementation of the program as they had the opportunity to learn on their own, to evaluate themselves and their classmates and to collect points by solving

exercises using the tablet they brought from home. Those children who were not able to bring tablets from home were given by the school so that no child was excluded from individualized learning and the success of the learning process.

ABOUT MILAGE LEARN+

The **MILAGE Learning+** is an application for mobile devices that has been developed at the University of Algarve, enabling students to access educational content in and outside the classroom.

This app works as a support tool for students which provides them with the opportunity to autonomously solve given exercises compiled in worksheets, while also supporting the teacher in managing classroom time, to the extent that the teacher does not have to provide solutions to exercises in the classroom which are already integrated into the MILAGE Learning+ app.

In order to stimulate and support the implementation of the various activities proposed, the MILAGE Learning+ app interface incorporates gamification features, segmenting different levels of exercise difficulty to support students with greater difficulties and also motivate more advanced students in learning mathematics.

To include all students, the app provides detailed videos with the resolution of exercises for students with more difficulties. There is also a concise video with the essential steps to guide you through the resolution of the exercise.

In addition, the MILAGE Learning+ app also includes a self-assessment scheme and peer review to stimulate the student to work independently. The review of the content and the ability to identify key steps in solving exercises allows for the better storage of knowledge in the long-term memory.

Within the project, another application was also created – the **MILAGE Learning + Teachers** – which is a back office, free for teachers and schools, who wish to join the development of content in mathematics

teaching, as well as other subjects that can be included in the MILAGE Learning+ app.

The MILAGE Learn+ app is free and is available for Android and Apple iOS and can be downloaded from: