IO6

Massive Open Online Course

MaSCE³   MathCityMap   Co-funded by the Erasmus+ Programme of the European Union

Massive Open Online Course (MOOC)

...is an online course aimed at unlimited participation and open access via the web. First introduced in 2008, MOOCs emerged as a popular mode of learning by 2012. This emergence of Massive Open Online Courses, enabled by technology and social networking, has opened new educational possibilities. Despite their big success, the emergence and use of MOOCs for professional teacher development is still uncommon, especially in mathematics.

In this stream of ideas, the objective pursued by IO6 was to design, deliver and monitor a MOOC for teacher education on the MaSCE³ project issues, as an element of innovation.

MaSCE³ ✕ MathCityMap

The Modules I

The MOOC "Task Design for Math Trails" was delivered, in English, from 8 March 2021 to 30 May 2021 on the <u>DI.MA. platform</u> managed by the University of Catania.

When accessing the MOOC home page, information about its duraton and effort required are shown and a grid structure illustrates miniatures of the modules of which the MOOC is composed and a table specifies the opening date of each of them.

In detai,l the MOOC module contents can <u>accessed online</u>.

⏳ Classes Start		March 8, 2021
⏳ Classes End		May 30, 2021
📅 Length		12 weeks
⏲ Estimated Effort		2-3 hours/week
🌐 Language		English
MOOC for Mathematics Teachers		

Introduction	1. Outdoor learning and Task design	2. Task Wizard and Subtasks
Starting on Monday 8 March	I PART - Starting on Monday 15 March II PART - Starting on Monday 22March	Starting on Monday 29 March
3. Interval	**4. Trail & app**	**Final module**
Starting on Monday 12 April	Starting on Monday 26 April	Starting on Monday 10 May

The Modules II

All modules contained videos with an English narrative voice. Subtitles were added for each video in the various languages of the partnership (Estonian, French, German, Italian, Portuguese, Spanish). This choice was made to help non-English speaking participants benefit from training that was more accessible to them.
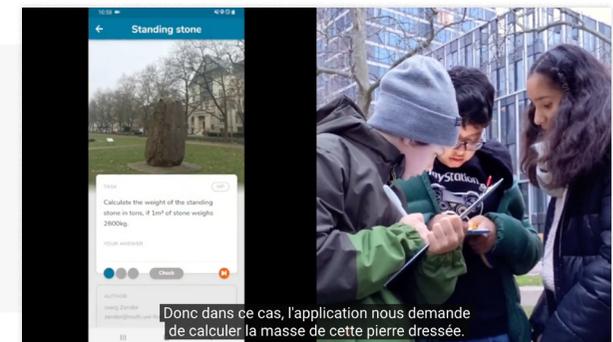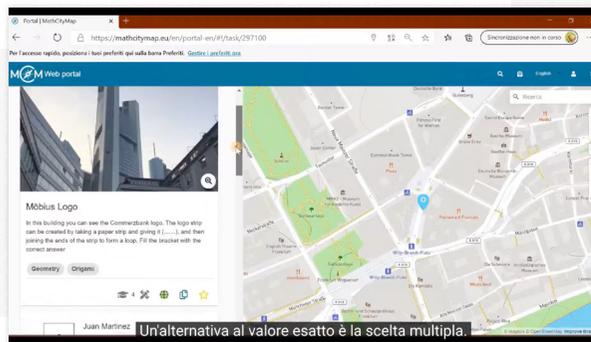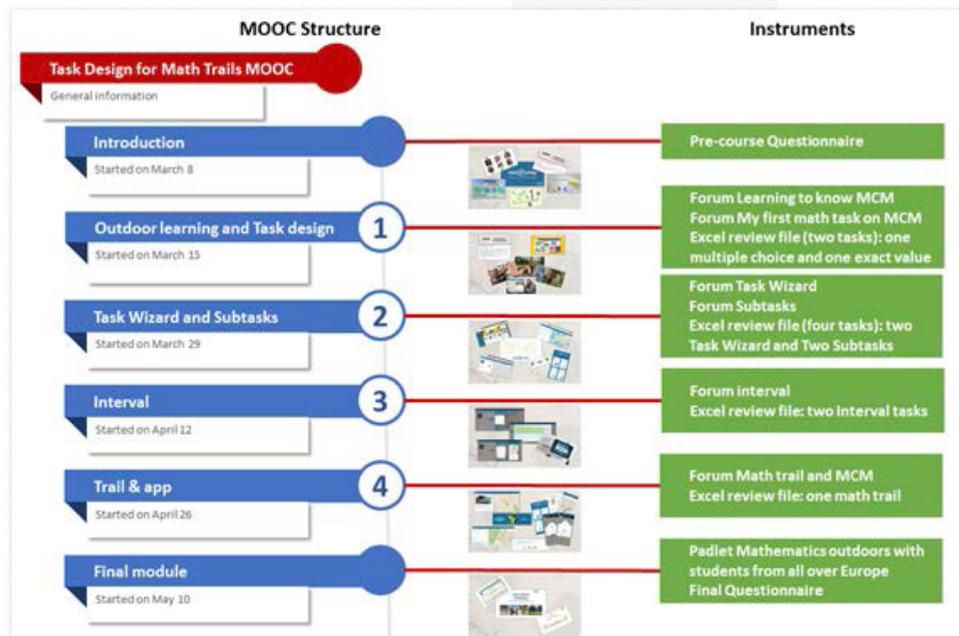
Participants Data

503 participants registered – among them **87** have never entered the MOOC.
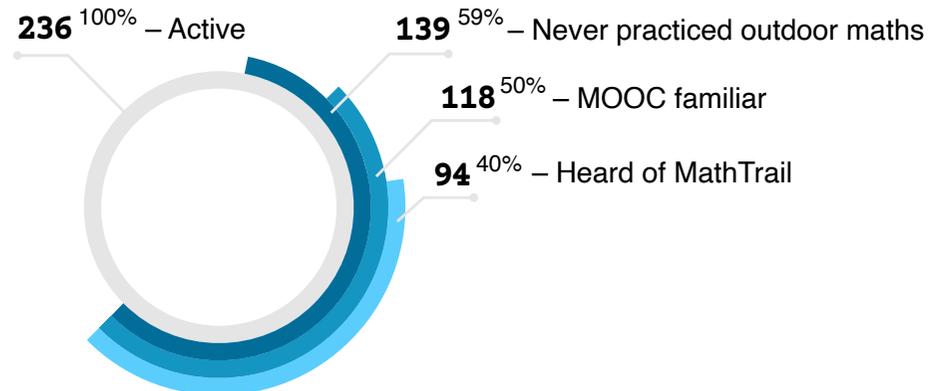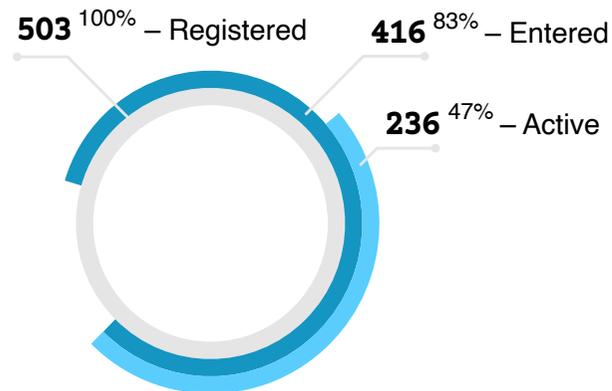
We can therefore say that the learners' population is reduced from **503 to 416**.

Of these, only **236** were active and participated in the pre-course questionnaire.
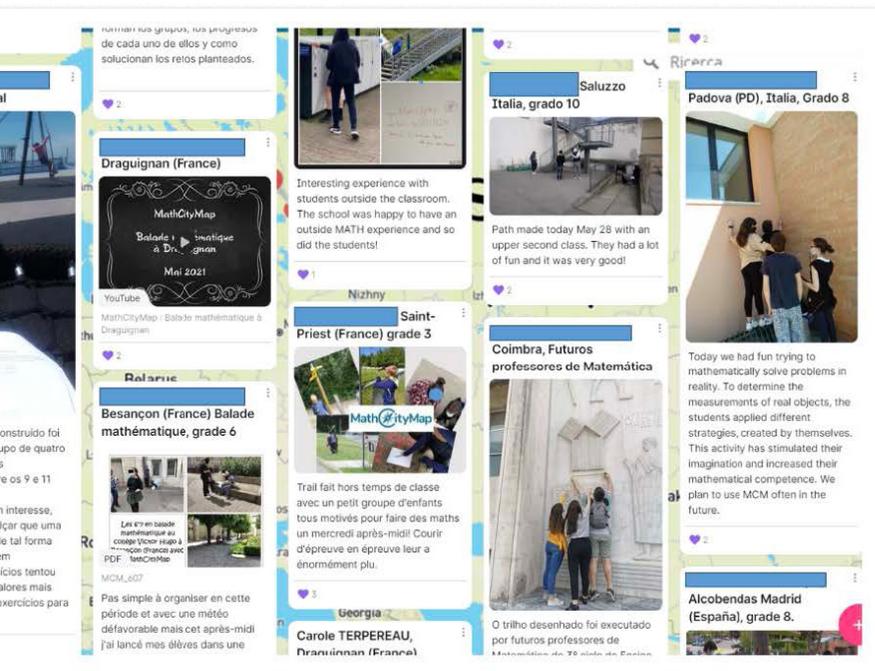
Half of them (**50%**) had never attended a MOOC before.

59% had never practised outdoors mathematics.

40% had heard of Math Trail, but **39%** of these had never created one.

503 100% – Registered   **416** 83% – Entered

236 47% – Active

236 100% – Active   **139** 59% – Never practiced outdoor maths

118 50% – MOOC familiar

94 40% – Heard of MathTrail

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Tasks & Communication

In each MOOC module, the participants were called to accomplish some „homework".

Some of them consist of filling some questionnaires, while others consist of designing some outdoor math tasks in specific task formats (e.g. exact value, multiple choice, task wizard, sub-tasks (IO2), interval).

For each participant, all the produced tasks formed a math trail that they experimented, using the Digital Classroom (IO1), with their students. In a padlet, the teachers shared with the MOOC community their experiences.

93 participants completed the MOOC in all its phases – an excellent rate for MOOC standards!
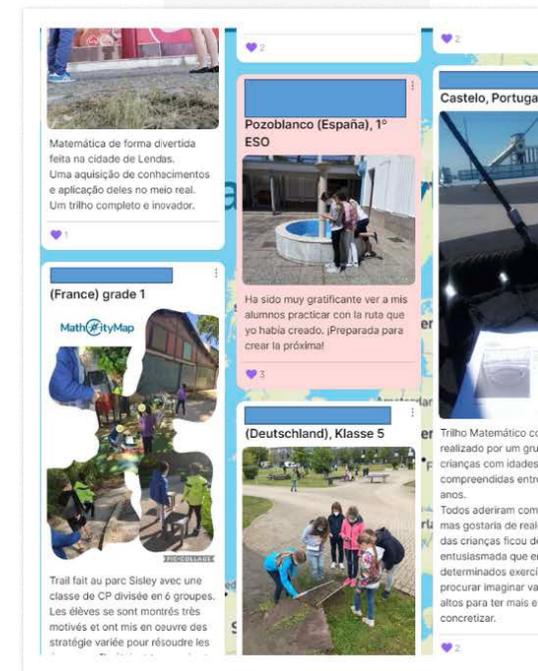
Motivation

MOOC teachers have created **911 tasks** and **105 trails**. Tasks could be created in one of the five partners' project languages (Estonian, German, Italian, Portuguese, Spanish) or in English.

In each module, a badge was to be issued to a participant if and only if all the homework foreseen in that module was fulfilled. Moreover, the badge backpack has also been created through badgr.com, so as to allow MOOC participants not only to obtain the badges but to be able to collect them in an international space, in which to add others already owned or that will be possessed in future.

Digital badges are a validated indicator of accomplishment, skill, quality or interest that can be earned in various learning environments (Carey, 2012). In the case of our MOOC, they are created by a course administrator and then they can be issued automatically by the platform each time the user accomplish the tasks required within the module.

Appreciation

We also organized a final award ceremony for the best math tasks according to specific design criteria. The winners were announced both on the platform, the last week of the MOOC, and during the webinar of the closing ceremony event. The prize was a digital badge.

The high number and the quality of produced material, i.e. tasks and trails, is significant: not only it is an indication that MOOC teachers have benefited from a holistic view of outdoor mathematics and learned how to design math trail tasks with MathCityMap, but also that teachers not enrolled in the MOOC can also benefit of these productions, as these productions are public on the MathCityMap web portal.

Through the international working space, the MOOC underlined the idea of MathCityMap as an international tool for mathematics education immensely.

Outcome & Follow-Up

The professional development of teachers that have participated in the MOOC was investigated and results are contained in the following paper.

Taranto, E., Jablonski, S., Recio, T., Mercat, C., Cunha, E., Làzaro, C., Ludwig, M., & Mammana, M.F. (2021). Professional Development in Mathematics Education - Evaluation of a MOOC on Outdoor Mathematics. Mathematics, 2021(9), 2975. DOI: https://doi.org/10.3390/math9222975

One year after the end of the MOOC, a questionnaire was administered to all 503 MOOC registrants. The detailed information on the questionnaire and on the obtained results can be accessed online.

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