

ESTEAM

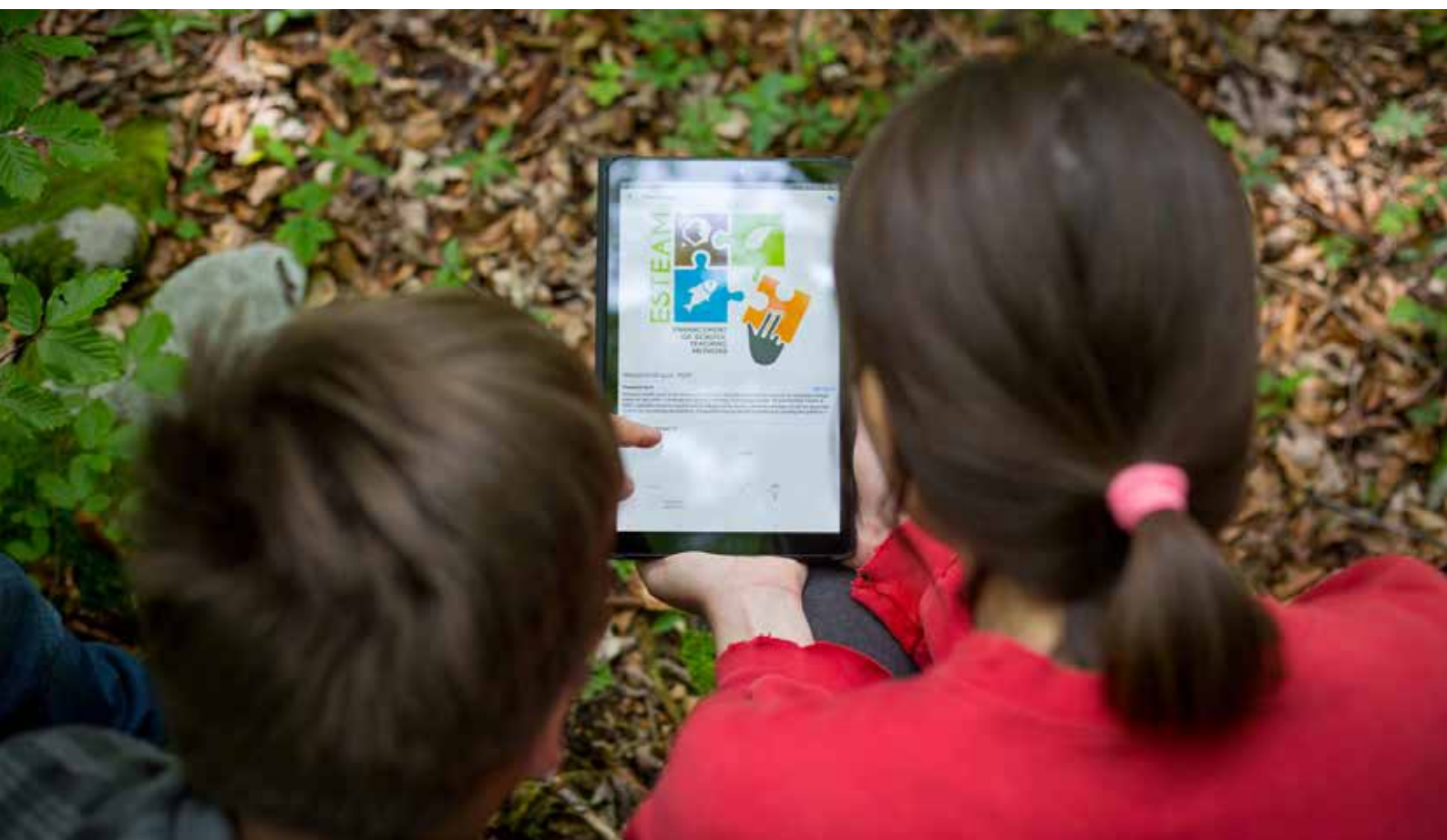
LEARNING ABOUT NATURAL SCIENCES WITH THE USE OF MODERN TECHNOLOGIES

In order to improve the quality of science teaching in schools with the assistance of more exciting, innovative methods that combine interactive learning and activities in nature, teachers, experts and Geoparks from Slovenia, Portugal and Norway have joined forces in the **ESTEAM** project.

Within the **ESTEAM** project (Enhancement of School TEaching Methods by linking between schools, experts and geoparks in the combination with outdoor activities and ICT technologies) three main outputs were foreseen:

- OUTPUT 1** Research of national curricula in natural sciences teaching in Portugal, Norway and Slovenia,
- OUTPUT 2** Development of teaching methodology: mobile teaching/users experience platform TeachOUT and
- OUTPUT 3** Guide for teachers in natural science education – ESTEAM methodology Step by step guide.

Through these three consecutive steps, the project partners firstly researched the needs of teachers and pupils in the field of natural science teaching (NST) and according to the findings of the research the TeachOUT application has been created and finally a Step by step Guide for teachers (final users) has been prepared.



RESEARCH OF NATIONAL CURRICULA IN NATURAL SCIENCES TEACHING IN PORTUGAL, NORWAY AND SLOVENIA

Activities for preparation of the **OUTPUT 1** document, held in three UNESCO Global Geoparks in three countries involved in the project (Slovenia, Portugal and Norway), embraced the on-line survey with the questionnaires addressed to pupils, teachers, future natural sciences teachers and personal interview for teachers. For the research of national curricula on Natural Sciences Teaching in participating countries, the subjects where natural sciences are taught were: Natural Sciences, Biology, Geology, Physics, Chemistry and Geography. How many subjects and how the natural sciences are spread among the subjects depended on each country. There has been 792 participants who solved the online questionnaire and 4 personal interviews were carried out with teachers in each Geopark.

MAIN FINDINGS:

1. Teachers mostly use standard teaching methods and are reluctant to use the modern ones.

2. Teachers and pupils rarely or almost never use tablets or mobile phones in class.

62% OF TEACHERS **NEVER USE TABLETS OR TELEPHONES IN CLASS.**

71% OF PUPILS **NEVER USE TABLETS OR TELEPHONES IN CLASS.**

3. Pupils prefer the following teaching methods during their educational activities in nature:



OF ALL PUPILS AND TEACHERS HAVE
EDUCATIONAL ACTIVITIES IN NATURE
LESS THAN 5 TIMES PER YEAR.

**THE NUMBER OF EDUCATIONAL
ACTIVITIES IN NATURE IS VERY LOW.**

4. Pupils would like to have educational activities in nature because:

- **learning is more fun**
- **they feel better and have more energy**
- **it is easier to communicate with classmates and teachers**

5. The majority of teachers would not use payable apps. However, they are prepared to pay for the app if it is simple, interdisciplinary and features training material for the teacher and results collection.

All the findings about learning objectives, current skills and competencies of educational methods in the natural science teaching, the opinions of pupils on the methods of science teaching and suggestions for improvement were presented in the E-book with the title »Research of National curricula in natural science teaching in Portugal, Norway and Slovenia – Results of analysis with guidelines«. The E-book that was finalised in April 2017 is available on ESTEAM project website (www.esteemproject.eu/intellectual-outputs).

DEVELOPMENT OF TEACHING METHODOLOGY: MOBILE TEACHING/USERS EXPERIENCE PLATFORM

The results of the analysis within the Output 1 were the basis for the creation and developing the material and the mobile platform itself, as the second Output 2 in the ESTEAM project – »Development of teaching methodology: mobile teaching/users experience platform«. The project partners developed the contents for the mobile application in three selected topics: 1 – Impact of the Human on Earth; 2 - Ecosystems; 3 – Geology that were also selected according to the priorities of teachers and pupils in all three countries.

The result of the activities within the Output 2 was the application with the name TeachOUT – Outdoor Science Game that is a comprehensive educational application for natural science teaching (NST).

TeachOUT - An educational application for learning in nature

WHAT IS TeachOUT?

TeachOUT is a comprehensive educational application for natural science teaching, based on an analysis of national curricula, the needs of teachers and students within the ESTEAM project.

The TeachOUT app allows teachers to create their own exercises, add a number of multi-sensory contents (e.g. treasure hunts, questionnaires, observation, listening, recording short films, work with maps) and to enrich their usual classroom work with a classroom in nature.

When I use TeachOUT game, I learn:

- about nature in nature,
- how to reach my own decisions,
- how to observe my surroundings,
- how to act responsibly in nature,
- how to communicate with classmates,
- how to work in a group,
- how to be creative in thinking,
- how to use modern technologies in learning.

Just as our nature and the processes within it are so diverse, so the teaching should be so diverse to enhance this.



PILOT TESTING OF TEACHOUT

From May to December 2018 the TeachOUT application on mobile phones and the paper version were tested. The testing took place in all three participating countries in the ESTEAM project. In Slovenia, the testing took place in Črni Vrh nad Idrijo, where the contents of the application were tested on students of the Črni Vrh Primary School, and on future science teachers coming from the University of Ljubljana. In Norway, the students of the Husabø Ungdomsskole Elementary School participated in the testing, which took place in the vicinity of Egersund, which is a part of the Magma UNESCO Global Geopark. In Portugal, the testing was done by pupils from the Agrupamento de Escolas Jose Silvestre Ribeiro Primary School. It was held in Monsanto, which is part of the Naturtejo UNESCO Global Geopark.

The aim of the testing was to gain as much feedback as possible on how students and future teachers were able to tackle the tasks in the TeachOUT application (both electronic and paper version).

Interesting findings from pilot testing:

- when using the TeachOUT application on mobile phones, students had much less trouble finding a single point or location as compared to the paper version of the questionnaire
- the students were more likely to solve problems via the TeachOUT application on mobile phones than via the questionnaire
- students loved using the TeachOUT app on mobile phones and they were highly motivated to use it

TEACHERS IMPRESSIONS



“The application, developed within the ESTEAM project, seems to be an excellent upgrade of the school curriculum, as it combines elements that, in my opinion, are perfectly complementary, and each for itself and at the same time all together promote and bring positive effects to successful learning.”

(Lidija Kacin, teacher at Primary School Idrija)

“The TeachOut application is designed specifically to transfer teaching outside the classroom to places in the nature where the “material” for learning is located. Apps, however, have certain limitations, but they largely depend on our creativity. The main restriction is our mind.”

(Goran Bezjak, National Education Institute Slovenia, RU Nova Gorica)

