

ELEMENTARY AND SECONDARY SCHOOL GEOSCIENCES HANDS ON LEARNING AT RIA FORMOSA (SOUTH PORTUGAL)

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Abstract

Elementary and secondary school hands on learning on geosciences is promoted by the project EDUCCOAST (EEAGrants) at the field station of the Portuguese Institute of Sea and Atmosphere (IPMA, I.P.) in the area of Geosciences. This facility, located at Ria Formosa (Algarve, southern Portugal), is located in a unique coastal environmental setting, that includes dunes, saltmarshes, lagoon, sand barriers and beaches. The activities set is plentiful and is usually constituted by a field trip for sampling or data collection followed by a lab component and it falls under the priority theme of preserving and protecting the environment and, in particular, the importance and sustainability of coastal systems. In a one-year, the project has already engaged *circa* 438 students from different regional schools, with a very positive reception of this experimental learning.

Keywords: *Hands on, Geosciences, Ria Formosa, visits on demand.*

1. Introduction

Learning outside the classroom leads to motivation, creativity and critical thinking, which contributes to a better understanding of the natural world. With this in mind, the EDUCCOAST project (funded by the EEAGRANTS – Blue Growth Programme - PT-INNOVATION-0067) promotes “hands on” learning for every grade level, in the area of Geosciences, using the Ria Formosa – a unique coastal environmental setting, that includes dunes, saltmarshes, lagoon, sand barriers and beaches - as an experimental classroom. The project is based at the facilities of the Portuguese Institute of Sea and Atmosphere (IPMA, I.P.) field Station in Tavira, located in southern Portugal. Besides its location, close to the Ria Formosa lagoon, the station has well equipped labs (funded by the EMSO-PT project). The schools’ visits are on demand and targets primary and high schools, as well as local associations and it usually correspond to half-day activities. They have fully begun after the lifting of major restrictions due to COVID-19 pandemic, i.e., after March 2022.

2. Objectives

The educational offer focuses on learning experiences outside the classroom, promoting forms of experimental learning that cannot be achieved elsewhere. The aim of this work is that students become familiar with the different types of coastal environments, learn about their importance and how to preserve them. With the experimental learning, students have the opportunity to experience first-hand, the process of data collection and analysis, in the field and on lab setting, and learn how to interpret the data. Also, they become more aware of the importance of preserving and protecting the environment, in particular these fragile coastal systems.

3. Activities

To achieve these goals, the students usually study in-loco the coastal processes, make observations and perform analysis to characterize sediments, water parameters, beach profiles, etc., by employing different technologies (GPS, sediment sampling, water probes, among others).

These activities usually begin with an initial introduction, followed by practical sessions, in the field (land and/or sea) and/or at the laboratory. The “schools’ visits on demand” schedule is usually made by the Tavira Ciência Viva Science Centre, one of the project partners and with the collaboration of Tavira City Council that supports the student’s transportation.

The project offers several activities, adapted to the student's grades. In every "school visit" the activity to perform is previously agreed with the teacher, based on the EDUCAST "Pedagogical offer". The offer is wide and the main activities include themes such as:

- "What are the differences between beaches and saltmarsh sediments?"- This activity is focused on the sedimentological characterization of these different environments. The students collect sediment samples of each area and then characterize them at the lab, regarding the colour and grain size. In this analysis, they use the sieving method and weight each size fraction to compute the respective percentages (Figure 1).

- "What is the sand made of?" In this activity, students analyse the mineralogical composition of various sands from different beaches around the world. The sediment source of each is discussed. Each sand sample is observed using a binocular microscope, photographed and sent to each student mobile phone by Bluetooth using an application (Figure 2).

Figure 1. "What are the differences between beaches and saltmarsh sediments?". 2th May 7th year.



Figure 2. "What is the sand made of?" activity. 13th October 2022, secondary - 11th year.



- "Let's get to know the saltmarsh" - In this activity students collect sediment samples and plants/algae in order to better define the saltmarsh zones (low, medium, and high marsh). At the lab, they perform the grain size analysis as well as identify the sediment colour with the aid of a standard chart. They identify the plants as well by making an herbarium (Figure 3).

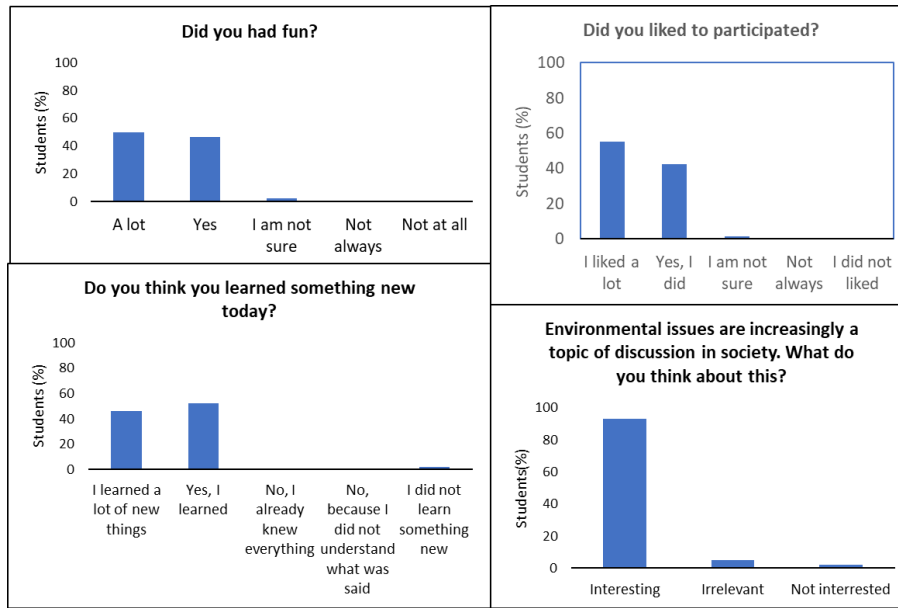
Figure 3. "Let's get to know the saltmarsh" activity- 12th December 2022. 5th year.



4. Conclusions

This hands-on learning experience with the basic and secondary grades has received a positive answer from the students and professors according to the survey's results, registered at the end of each activity. In a universe of around 438 students, 55% and 46% found the activities very fun and fun, respectively; 55% enjoyed very much and 42% liked to participate; 46% learned a lot of new things and 93% were interested by environmental issues. (Figure 4). These are rewarding results that motivate us to continue this effort among the school population and in the end of the project (April 2024) we will present all the results and the final evaluation.

Figure 4. Activities student survey's results.



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