

# Environmental Education Fieldtrip on the left bank of the river Minho (Portugal)

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**ABSTRACT** An Environmental Education Fieldtrip has been carried out on River Minho's left bank (Portugal). Didactical materials were elaborated and evaluation instruments were applied. A mixed method research was applied, where different types of data were collected and triangulated. The results indicates that the Fieldtrip was effective in facilitating the development of conceptual knowledge, motivation and competences among the participating science students.

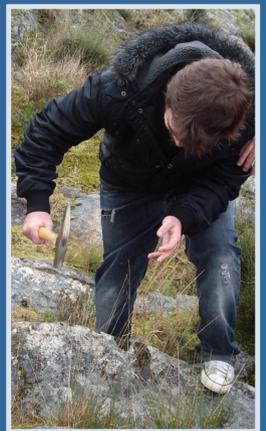
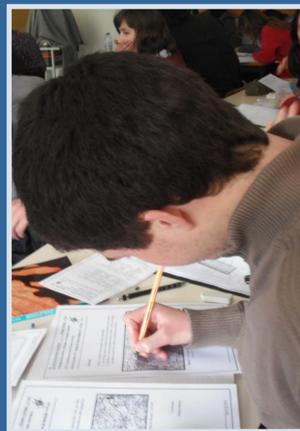
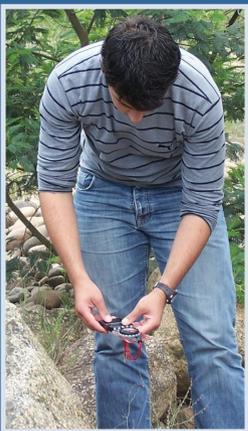


## SUBJECT/PROBLEM

The implementation of Sustainable Development strategies is a pressing issue and the role of Environmental Education (EE) in this is crucial, where EE can be optimized through the Teaching of Geology. A set of Fieldtrip (FT) activities were used in order to achieve the objectives. (i) to educate for the environment by developing citizenship competences, geological knowledge and an appreciation for the conservation of geodiversity; (ii) to motivate the learning of geology and of environmental issues; (iii) to build didactic materials and apply strategies for the learning of geology and the internalization of environmental ethics; (iv) to assess the efficiency of the FT carried out in accordance with the Orion's organizational model (1993).

## STUDY DESIGN

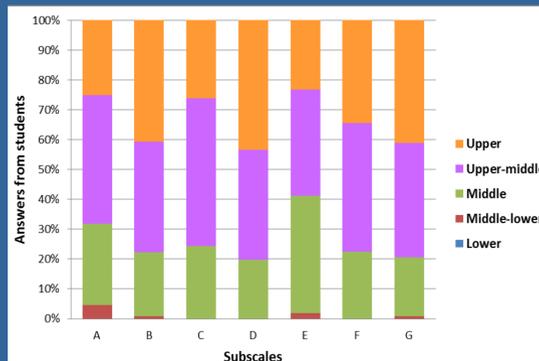
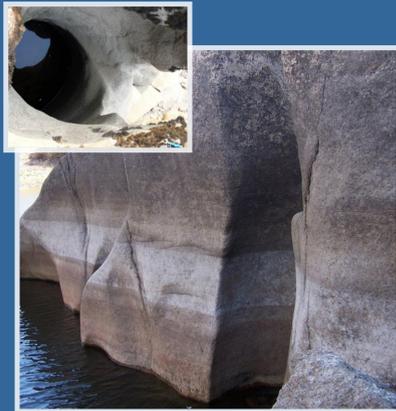
The study had the participation of 115 Secondary School Geology students (mean age of 16.4 years) of a public school (11<sup>th</sup> grade). After inventorying the didactic potential of the left margin of River Minho (Monção, Portugal), some possible itineraries were outlined, considering the curricular implementation of the thematic issues of *anthropic occupation and territorial planning problems, and land geological processes and materials*. The FT activities were planned and implemented, in accordance with Orion's organizational model (1993). The teacher, also the researcher, acted as a catalyst. An observer of moderate involvement was present for the evaluation. Several data collection instruments were applied: an evaluation test, oriented classroom reports from the researcher and observer and *snapshots* of students. Moreover, the adaptation of the SOLEI Inventory (Orion *et al.*, 1997) for the Portuguese population was then implemented, which encompassed 62 items distributed by seven subscales, with respective Cronbach's alpha values as follows. (A) *environment interaction* – 0.65 (7 items); (B) *integration of fieldtrip and regular classes* – 0.71 (10 items); (C) *student cohesiveness* – 0.69 (9 items); (D) *teacher support* – 0.77 (10 items); (E) *open-endedness* – 0.60 (7 items); (F) *preparation and organization of the fieldtrip* – 0.70 (10 items); and (G) *material environment* – 0.69 (9 items).



## FINDINGS AND DISCUSSION

Over the five study stations of the FT, students carried out tasks related to curricular content: rock types; faults and discontinuities; forms of erosion; waterway transport and deposition; evidence of anthropic intervention (fisheries); of natural hazards and others. In the evaluation tests, 75.5% of students reached ratings of over 10 values (scale from 0 to 20). Thus, it was found that students developed the requisite competences in a satisfactory fashion. The results of data of the adaptation of the SOLEI inventory showed that the subscales of higher average value were. (B), (D) and (F). After categorizing the scores for students' answers, it was found that they scored preferentially in the *upper-middle* and *upper* categories (graph). The data from closed-ended answer items of *snapshots* showed that students displayed shortcomings in asking questions and/or in participating in the debate, but they also displayed an interested attitude in class and in the

active performance of tasks, expressing their enjoyment towards the classes attended. The open-ended answers were subjected to content analysis and it was found that students demonstrated a large number of facilities and positive aspects in the categories of *work development* and *learning* of Geology contents. Students listed many issues they grasped and a few which they would have liked to have understood better, besides having valued the *mediation* of the teacher within the classroom, as well as the *motivation* in the field. The observers and the teacher pointed facilities of young people in their *learning* and in the *development of work*. Students' *motivation* and *learning* were the main categories mentioned in the positive aspects. The FT model was considered adequate, allowing timely and dynamic adjustments without changing the overall structure, in addition to the integration of theory and practice and the systematization of knowledge.



**CONCLUSION.** The evaluation of the efficiency of the Fieldtrip, carried out in line with Orion's (1993) organizational model, as a strategy for the Teaching of Geology in an EE framework, made clear the latter's advantages in educating for the environment and for Sustainable Development. The results clearly demonstrated that the FT was not only an effective means of imparting knowledge to the students but also that it motivated them to learn about Geology and environmental issues. Thus, the students developed citizenship competences and an awareness of the need for the conservation of geodiversity.

