SECONDARY SCHOOL STUDENTS' FIELD TRIP IN COASTAL ZONES OF VILA DO CONDE (PORTUGAL)

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ABSTRACT

The use of field trips as outdoor learning environments is not sufficiently emphasised in the curricula of Secondary Schools in Portugal. Due to the difficulty in organising field trips and in evaluating learning outcomes teachers are reluctant to use them as a teaching strategy. The present study presents some activities carried out in order to organise a field trip with students of the secondary school subject of "Biology and Geology", from a school in the north of Portugal. The authors highlight the importance of didactic materials and instruments in evaluate learning outcomes during these educational activities. The relevance to the success of the field trips in coastal zones of Portugal, of defining study stations and elaborating posters and field guides is also emphasized. The field trip was organized according to Orion's model which facilitated its construction, implementation and evaluation.

SUBJECT/PROBLEM

As field trips are not generally part of the educational strategy of Portuguese schools, the present study discusses the value of these activities as educational strategies. When these are integrated into a school's curriculum, and supported by various didactic materials , figure 1, for example, which enable the development of competences, they ease the understanding of processes, phenomena and geological structures (Ferreira, 2011).

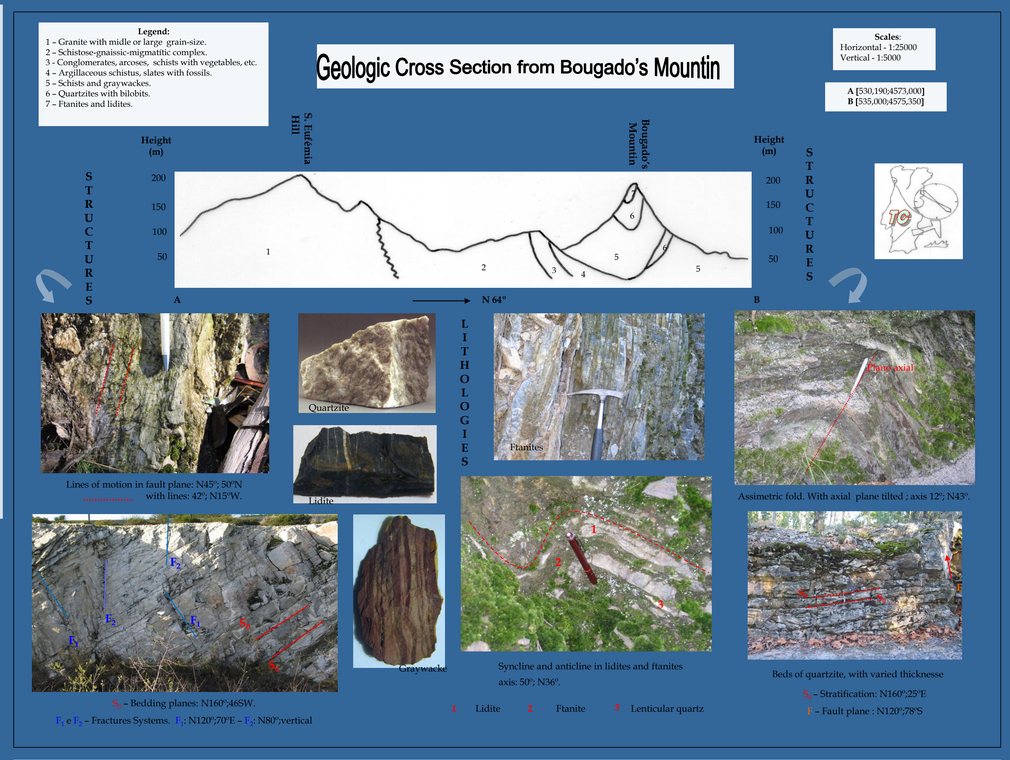

Figure 1 – Short poster to helping students to find the main geological structures and lithologies, in the first study station of the geological itinerary.

DEVELOPMENT OF THE STUDY

Approximately 30 km north of the city of Oporto (Portugal) the coastal zone of Vila do Conde, figure 2, is characterized by large and well exposed outcrops of metamorphic and magmatic rocks, figure 3. This is a privileged place for field trips and fieldwork activities. A geological itinerary was set, on the basis of a previous geological investigation, which made possible the elaboration of a field guide in support of the field trip.

Six field trips were made, in three stages, according to the model proposed by Orion (Orion, 1993), with eight classes from the eleventh grade classes, figure 4, from two secondary schools, totalizing one hundred seventy one students.

An evaluation scale of field science learning was created in order to evaluate each field trip, by adapting the SOLEI (Orion *et al.*, 1997) to the Portuguese student population. This inventory is divided into seven subscales, all presented in table 1 with their respective number of items and Cronback alpha values.

Other evaluation tools were used, figure 5, which allowed conclusions to be drawn as to the students' expectations and opinions of their field trip.

Figure 2 – Localization of study area (Google Earth image).

Table 1 – Results of the validation of Portuguese version of the SOLEI

	Subscale A	Subscale B	Subscale C	Subscale D	Subscale E	Subscale F	Subscale G
Nº of items	7	10	9	10	7	10	9
α from Cronback	0.65	0.71	0.69	0.77	0.60	0.70	0.69

Figure 3 – (A) – Aplitic-pegmatitic dykes; (B) – Calco-silicate boudin, asymmetrically folded, with SE flank cut for granitic dyke, and the NW flank contacting with a gneisse with parallel foliation to the flank of fold; (C) – Pegmatitic dyke cutting migmatites and calco-silicate boudins; (D) – Metasedimentary rocks showing folders with vertical axis and some boudins structures.

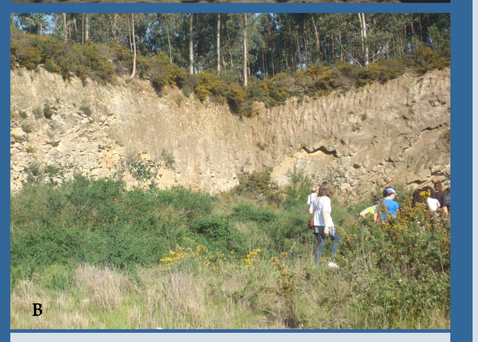

Figure 4 – Students during the field trip: (A) in the sixth study station; (B) in the forth study station.

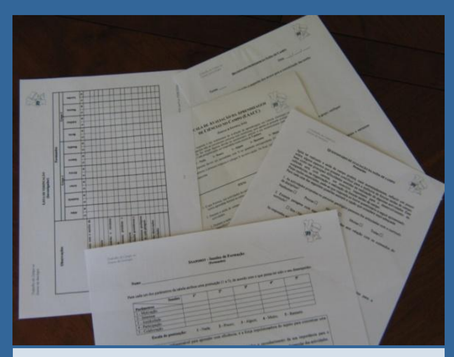

Figure 5 – Portuguese version of SOLEI and another evaluation instruments used.

Work done with the students

Each class had at least two preparation lessons (preparatory unit), figure 6, during which they got acquainted with the itinerary that they would follow, the lithological units and geological structures to be found on each stop of the itinerary, and the activities that they would carry out, following the field guide.

Each field trip lasted about eight consecutive hours, and followed the six study station of geological itinerary. A questionnaire was administered at each stop, covering the different observations and tasks to be carried out. Four study stations were specifically focused on the development of geological competences, and two remaining covered environmental and socioeconomic issues such as the importance of the exploration of mineral resources, its environmental impact and the use of those resources in different areas of human activity.

Two lessons in the summary unit were given after the field trip. Simple summary unit questionnaires were administered to assess how effectively, if at all, the field trip increased their motivation, interest and willingness to learn Geology. Finally, the field guide exercises were corrected and all questions raised by the students were answered.

DISCUSSION

The field guide was the most useful of all didactic materials created in support of the field trip, allowing the students to manage their progression through the different activities planned for them, and directing their attention to the relevant phenomena to be observed. The vast majority of students displayed curiosity and enthusiasm, and were collaboratively engaged in the various activities available at the different stages of each field trip.

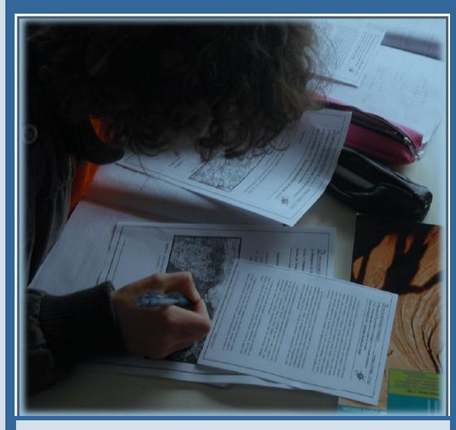

Figure 6 – Students during preparation unit activities.

References:

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Orion, N. (1993). Model for the Development and Implementation of Field Trip as an Integral Part of Science Curriculum. School Science and Mathematics. 93 (6), pp. 325 - 331.

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CONCLUSION

The students were able to explain content presented to them in lessons after the field trip, by drawing comparisons to the related phenomena observed in the field. This demonstrates the development the students' conceptual competences reinforcing the importance of field trips and fieldwork in teaching and learning Geology.