



Quarries as educational resources – a research with students of a secondary school of Portugal

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This work describes the results obtained in a research on science education involving 18 students of Biology and Geology of the 10th grade (15 years old) of the Secondary School of Figueiró dos Vinhos (Central Portugal). Framed on the curricular topic "Earth, a very special planet", the research included the conception, implementation and evaluation of an educational intervention aiming to answer the question: "How to stimulate meaningful and relevant learning about sustainable exploitation of geological resources, namely limestone?"

The intervention occurred along 8 classes of 90 minutes each, which included practical work developed in small groups (3 students/each), and several activities both in the field and in the classroom (prior and after the fieldtrip). From the methodological point of view, this research is qualitative in nature, a study-case type, with data resulting from direct observation and content analysis of the answers presented by students to questionnaires (diagnostic and intervention assessment) and to worksheets, expressly created for the research.

The main goal of the intervention was that the students, by developing practical activities centered upon a field trip to an abandoned limestone quarry located close to their homes, could learn to recognize the geological impacts arising from the exploitation of geological resources and acquire skills for collecting and processing relevant information about existing rules that control the operations in quarries, in order to develop critical thinking about the nature of exploitation of these types of resources, which may hinder the promotion of sustainable development. Concerning the intervention assessment, results reinforced the idea that quarries can provide an educational resource of great value for promoting substantive knowledge on geosciences, urgently needed and consistent with the development of critical and intervenient citizens, able to decide, at the right moment, how to behave responsibly and actively in the society. Moreover, the results show that the strategies adopted appear to have contributed to encourage the development of students' skills, particularly in terms of knowledge, reasoning, communication and adoption of individual and collective attitudes and behaviors consistent with the promotion of sustainable development. Both educational strategies and resources implemented for this specific project can inspire other initiatives for other classes and schools located near to quarries, thus increasing among citizens meaningful and relevant knowledge on geosciences.