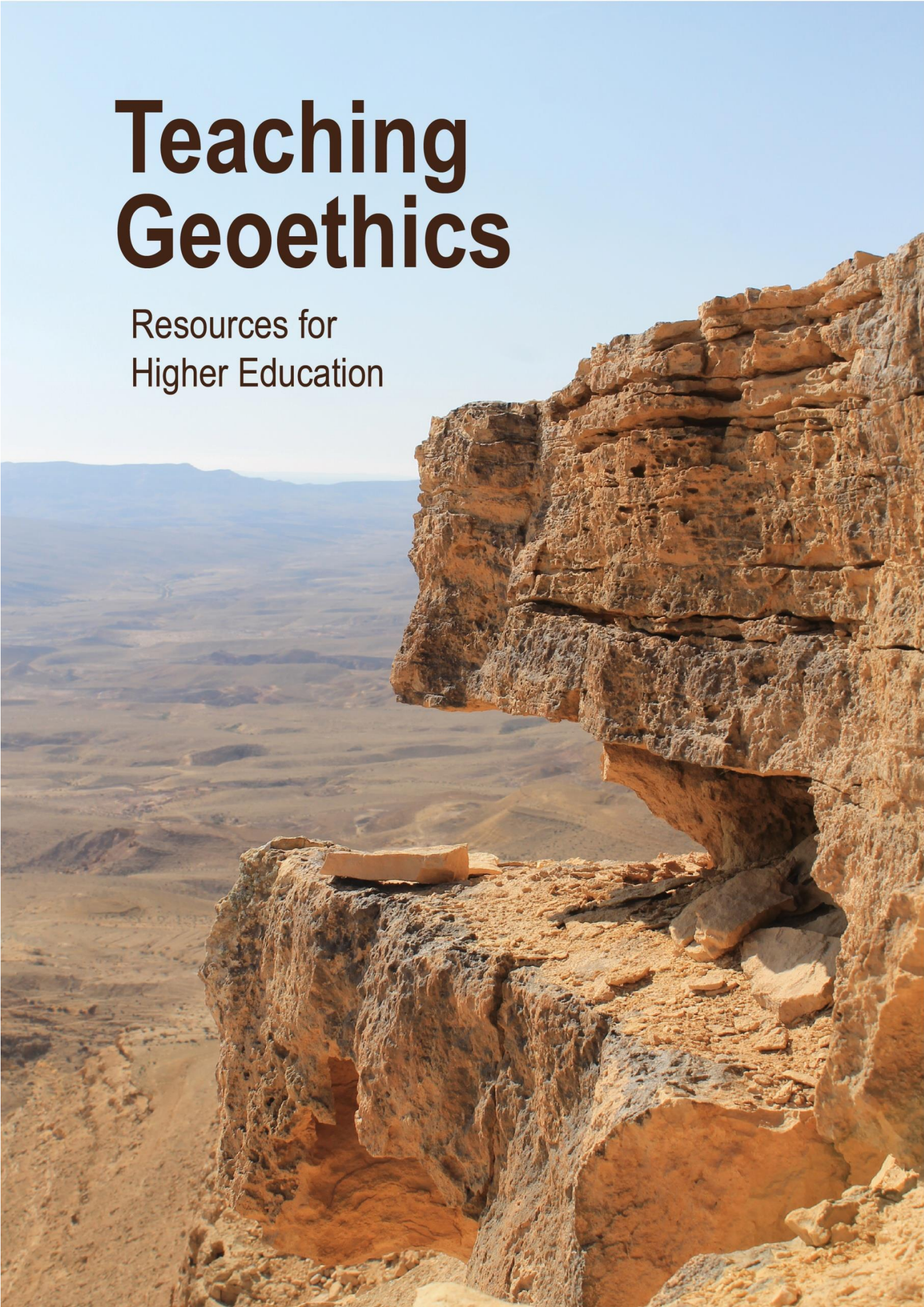
Teaching Geoethics

Resources for Higher Education



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CONTENT

APPENDIX 6: GOOD PRACTICES IN THE PROMOTION OF GEOETHICAL VALUES IN A UNESCO GLOBAL GEOPARK

Co-funded by the Erasmus+ Programme of the European Union

GOAL EDUCATIONAL RESOURCE

AUTHOR	José Brilha (University of Minho, Portugal)
TITLE OF THE CASE	Good practices in the promotion of geoethical values in a UNESCO Global Geopark
SHORT CASE DESCRIPTION	In the Arouca's UNESCO Global Geopark (Northern Portugal) mining activities and geoconservation co-exist and together promote sustainable use of geoheritage with benefits either to local communities and to the international scientific community.
KEYWORDS	Fossils; Geoheritage; Geotourism; Sustainability.
PRIOR KNOWLEDGE	Fossil; Geodiversity; Geoheritage; Geotourism; Global geopark.
AIM	Develop awareness of geoparks as key territories with innovative strategies fully engaged with geoethical principles.
OBJECTIVES	• To recognize the three main pillars of a geopark strategy - geoconservation, education, and geotourism. • To explain that the value of geoheritage is based on sound scientific knowledge produced by the geoscientific community. • To defend the need for a good balance between the exploitation of geological resources and preservation of geoheritage. • To list natural and anthropic threats that can jeopardize geoheritage. • To recognize that mining may affect negatively geoheritage and, at the same time, could be a way to reveal new important geological features. • To explain the importance to communicate geological knowledge in a way to be understood in general terms by laypeople. • To defend the need for effective management of fossils avoiding illegal selling and smuggling. • To illustrate the role of local communities in the conservation of geoheritage raising the sense of land belonging in the inhabitants due to their natural heritage. • To relate the geopark concept with specific UN Sustainable Development Goals.

CASE

A "Global Geopark" is an official label given by UNESCO since 2015 to territories that have successfully proved to comply with the geopark principles, integrating a Global Network that has already 147 members in 40 countries (data as of 2019). The Arouca Geopark in Northern Portugal, presently a UNESCO Global Geopark, was established in 2009 (Fig.1).

Fig. 1 – Location of Arouca UNESCO Global Geopark in Portugal.

The inventory of geoheritage revealed the existence of about 40 geosites in an area of 330 square kilometers. Some of these geosites have international scientific value, one of the necessary requisites for UNESCO recognition.

The Valerio's quarry is one of these geosites with high scientific relevance. It is a slate quarry operating accordingly with the Portuguese legislation and where layers of Ordovician slate offer magnificent exemplars of giant trilobites. Trilobites are fossils of extinct marine animals, usually with a few centimeters long. However, in this quarry and due to conditions not yet fully understood by paleontologists, these trilobites may reach 50 cm long (Fig.2).

Fig. 2 – Trilobites in the center's exhibition.

	These are the longest trilobite fossils in the world, which makes these fossils a geoheritage with international scientific value. Usually, quarrying is considered a major threat to geoheritage. However, Valerio's quarry geosite is a good example to show that mining and geoconservation are not impossible to co-exist. The owner of the quarry has developed a deep knowledge and fascination about trilobites, and he collects all fossils that appear during the normal quarrying operation. These fossils are properly collected and stored, studied by paleontologists and the main exemplars are available to be appreciated by the general public and students in the interpretative center that was built specifically for this aim by the quarry company. This interpretative center is, quite obviously, a certified partner of the Arouca UNESCO Global Geopark. Valerio's quarry geosite constitutes a best- practice case showing that with proper management it is possible to have quarrying and geoconservation in the same place. This is particularly relevant because not only the exploitation of a mineral resource is important for the local economy but also because the scientific, educative and touristic use of geoheritage is assured, also bringing benefits for the local community.
QUESTIONS	**1.** What is a geopark? **2.** How many geoparks exist in the world? **3.** Why geoparks are innovative land-use planning tools? **4.** Why mining is usually considered a threat to geoheritage? **5.** How can geoconservation be assured if society needs to exploit tons of geological resources every day? **6.** How is it possible to have mining inside a geopark? **7.** How can mining contribute positively to geoconservation? **8.** What is the consequence for the local community to have a mining and geoconservation in the same place? **9.** Describe the impacts of illegal selling and smuggling of fossils and minerals. **10.** Relate the best-practices identified in the Arouca UNESCO Global Geopark with specific UN Sustainable Development Goals. **11.** Explain how geoparks can be considered a showcase of geoethical values in practice.
PROCEDURE	**1.** Setup work groups of students and hand out one paper mentioned in the references to each group. After some minutes, each group has to present the main ideas of the paper to the classmates. **2.** Presentation of the PowerPoint' slides by the teacher: https://goalerasmus.eu/wp-content/uploads/2019/12/PP_Arouca.pdf **3.** The teacher should promote questioning and write in the board the main questions raised. **4.** The same work groups have to search for relevant information in order to be able to present possible answers to the questions. **5.** Final discussion promoted by the teacher in order to clarify the main topics presented as aims.

Important links:

- Arouca UNESCO Global Geopark: http://www.aroucageopark.pt/en/
- UNESCO Global Geoparks: http://www.unesco.org/new/en/natural-sciences/environment/earth-sciences/unesco-global-geoparks/
- UNESCO Global Geoparks: celebrating earth heritage, sustaining local communities: https://unesdoc.unesco.org/ark:/48223/pf0000243650
- UN Sustainable Development Goals: https://www.un.org/sustainabledevelopment

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