

***Pedagogical Approaches with AR  
to Geological Phenomena***

***(The cases of Samaria Gorge,  
Penteli Quarries and  
Flash Floods)***

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## **AR is useful in Geological Education:**

- In formal and informal educational projects, involving students of geology, professionals, representatives of public authorities or ngos and the general public -In the laboratory or in the classroom-
- In indoors or outdoors education

Why?

- For the engagement of students in “real” situations
- For elaborating the cause and effect of physical phenomena
- For engagement in Inquiry based learning as they will able to collect and analyze data using the practices of Scientists
- To analyze Geological phenomena using concepts from Physics

# *The Samaria Gorge*



## **Geological Education about the *Samaria Gorge***

- Geological History of the gorge
- Selection of specific locations to visit in a field trip
- Education about the ways local, regional, national and international authorities affect this geoheritage site
- Education about geological hazards (I.e. landslides) associated to particular locations in the gorge



## *The Penteli Quarries*



## **Geological Education about the *Penteli Quarry site***

- Geological setting of Penteli mountain (shales, limestones, marbles, stratigraphy, structural geology and geological history)
- History of the human impact on the mountain, from quarries to forest fires
- Identification of malpractices in quarrying in Penteli mountain
- Education about the socioeconomic and cultural aspects of the unsightliness that quarrying activities have brought about
- Issues of Applied Geomorphological Analysis in relation to managing derelict sites such as quarries



## *Flash Floods*



## **Geological Education about *Flash Floods***

- Engagement in Hydrological, Physical and Meteorological Mechanisms behind Flash Flood formation
- Overview of the adverse human impact on rills, streams, torrents
- Identification of malpractices in land management that contribute to the aggravation of the impact of a flood event
- Education about the social, economic and political factors (bureaucracy, obstacles in managerial structures inhibiting fast reaction to extreme events, hidden economic interests etc)
- Issues of Applied Geomorphological Analysis in relation to sound management of flood events



# ***General* Pedagogical Advantages of using AR in Geological Education**

Stimulate students' interest in AR technologies, which will become increasingly more important in the years to come

Helps students appreciate the potential of AR in Geosciences Education

Enhances collaborative learning and interaction among the students

Fosters “spatial thinking” which is one of the aims of geographical education (including physical geography of which geomorphology is a major component)

**It a real STEM interdisciplinary approach**

# ***Specific Pedagogical Advantages of using AR*** **for each one of these cases**

## **1. Samaria Gorge**

Helps trainees to better perceive the spatial dimensions of the gorge (width, depth) in connection to the geological setting

## **2. Penteli Quarries**

Helps realize the environmental and aesthetic damage made to the mountain by the (mostly unregulated) quarrying activity

## **3. Flash Floods**

Facilitates the conceptual understanding of the mechanisms behind flooding

Fosters students' positive attitudes towards science

**Thank you for your attention**