GEORIDDLES, BRAINSTORMING AND CREATIVITY IN NATURAL AND CULTURAL TOURISM

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Abstract

Many tourists don't want to spend their holidays only at the beach and others arrive to their destination for cultural or natural reasons. Some are attracted by creative activities. An upcoming touristic branch which joins cultural and natural tourism is Geotourism.

A "georiddle" may increase the visitor's interest in geological and cultural themes and challenge his creativity. The following methodology is adopted to reach these objectives: The guide gives basic information in a geologically interesting site and asks the participants about details of what can be seen. By brainstorming and discussion, they may solve the problem or not; in any case the participants are encouraged to foster their creativity by interactive processes. Then, the guide explains his opinion about the solution of the "georiddle", and the discussion can begin again.

Enigmatic structures may be found in construction stones of built heritage, as well as in geological outcrops in the countryside. A "georiddle" can be posed in other fields, like vernacular cultural heritage. For instance, drystone constructions are interfaces between geological and cultural heritage. Here, the riddle's aim may be to discuss about the reason of their spatial arrangement and purpose.

As a result, it is expected to awaken the visitor's curiosity and creativity and to increase and broaden his field of knowledge.

Keywords: Geotourism, creative tourism, cultural tourism, georiddle, brainstorming, natural and cultural heritage.

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1. INTRODUCTION

In the last decades, the tourism industry was subject of various changes. The former touristic offers did not satisfy the quest for new forms of tourism, so several new areas grew in this branch. The UN World Tourism Organization (UNWTO) defines cultural tourism, ecotourism, rural, gastronomy and adventure tourism, health, medical and wellness tourism, among others (World Tourism Organization, 2019).

The UNWTO estimates that cultural tourism, i.e., enjoying cultural heritage, captures more than 39% of international tourism (World Tourism Organization, 2018). In this branch, there seems to be a change from visiting the tangible heritage like monuments, towards consumption of intangible heritage by participating actively in cultural events like, for instance, gastronomy, traditions, or "adventure trips" and various "experiences" (Richards, 2018). Cultural tourism as a former niche-market, aimed at clients with relatively high education levels and income, is becoming a mass tourism phenomenon with a much wider range of people who search entertainment in its various new branches (*ib.*). In the last years, Geotourism has been turned out as a new branch of cultural and natural tourism (Rosendahl & Gonçalves, 2019a, 2019b).

The methodology used for this article was: research of bibliography and webography, study and analysis of geologic and topographic maps, trips to the sites, discussions with colleagues and specialists, and visits to museums. A precious contribution to this work was given by the preparation and orientation of guided tours in the field, often with participating specialists who shared their experience with the grateful authors.

2. CREATIVITY AND CREATIVE TOURISM

There are many definitions of creativity. In the standard definition, creativity is based on originality and effectiveness (Runco & Jaeger, 2012). The most cited definition, however, is: *"Creativity is the ability to produce work that is both novel (i.e. original, unexpected) and appropriate (useful, adaptive concerning task constraints"* (Sternberg & Lubart, 2007, p. 3 *apud* Kolnhofer-Derecskei, 2016). The efficiency of creativity becomes higher when emotions, perceptions and motivations are positive; on the other side, practising creative work rises a large variety of psychological experiences in an individual (Amabile, 2017).

The human brain usually works in a day-by-day routine modus, based on acquired knowledge; at the same time, it seeks new, unknown experiences to break out of the conventional order (Eagleman & Brandt, 2017). To fight the routine, man must be creative and find new products, new buildings, new food, new ways of life. To be able to find solutions against monotony, the humans have an urge for innovation as a part of their biological legacy (*ib.*).

Spending the whole time of their vacancies on the beach or walking in the forests, for instance, has turned a boring routine for many tourists, so they look for new experiences. A way to escape from this routine is creative tourism. Creative tourism can be considered as a niche of cultural tourism, where the offer of creative experiences is growing. Such experiences include artistic creation (pottery, for instance), dance, gastronomy and other activities, where the participants are called to take an active and creative part in the events (Richards, 2018). Taking part in creative events, the visitor may feel himself embedded in the local community.

The number of participants in activities of creative tourism may still be small, but the visitors are usually highly motivated (Richards, 2019). As creative tourism is based on personal contacts between tourists and locals, as well as on experiences with intangible heritage, this kind of touristic offer may be an advantageous strategy for smaller places, like small towns, villages or farms (*ib.*). As these places, particularly in the interior of the region, suffer from the emigration of the young and adult people and the ageing of the remaining population, creative touristic activities may be a contribution to retain people or to attract new residents.

In Portugal, for instance, CREATOUR was an investigation initiative from 2016 to 2019, which studied creative tourism in small cities and rural areas in the whole country by the implementation of projects (Pilots and IdeaLabs). The key dimensions of this program were to build up knowledge and capacity, to support the development of contents, to connect creativity to the place, and to reinforce the creation of networks and clusters (CREATOUR, 2017).

3. GEOTOURISM

Geotourism is an emerging branch of natural and cultural tourism. Dowling, 2009, p. 16, considers that *"geotourism is sustainable tourism with a primary focus on experiencing the earth's geological features in a way that fosters environmental and cultural understanding, appreciation and conservation, and is locally beneficial"*. In his opinion, geotourism is a tool which joins natural and cultural features in tourism, and which contributes to nature conservation and to local and regional development.

The aims of geotourism in the field are the observation and interpretation of geological and geomorphological features of a region, the landscape and its history, as well as fauna, flora and rural heritage, tangible or intangible (Rosendahl & Gonçalves, 2019b). The knowledge of a site may contribute to its conservation, so when the local residents know about the site and its value, they may develop a sense of belonging and will be prepared and able to defend it (Gonçalves, 2016; Gonçalves, Cano, & Rosendahl, 2019; Gonçalves & Pérez Cano, 2012; Rosendahl, 2014).

Remarkable geological features can be found not only in the field, but also in the cities, in the construction stones of buildings (heritage and not heritage), pavements or urban equipment (Rosendahl & Gonçalves, 2019a). Although the construction stones are no more located in their original places, the built heritage may be seen as an outdoor geological museum, which shows geological, artistical and historic features, as well as conservation measures (Perez-Monserrat, Buergo, Gomez-Heras, Muriel, & Gonzalez, 2013). The architectonic, artistic and historic dimension of a building is complemented by a natural dimension, bringing together the cultural and natural heritage (Rodrigues & Agostinho, 2016).

In an urban environment, a lot of construction stones of buildings are accessible and may be observed during the whole year, at nearly any weather. There is no need of the use of a pollutant cross-country vehicle or long walking-tours (Rosendahl & Gonçalves, 2019a). In the cities, the attention during a visit should not be focused on the building stones and their geological feature alone, but also on the historical, urbanistic, artistical and conservation features of the building and its environment (*ib.*). Usually, heritage buildings have access possibilities for disabled persons or seniors with reduced mobility, so they can participate in geological tours without having to enter a quarry. So, urban geotourism is a contribute to inclusive tourism (Kéroul, n.d.).

Geotourism may be considered as an interface between cultural and natural tourism. In a field trip, besides geologically and geomorphologically interesting places, vernacular cultural heritage like drystone walls or wells should be included, as these are links between geology and agriculture (Gonçalves, Perez-Cano, Rosendahl, & Prates, 2018; Rosendahl & Gonçalves, 2019b).

The realization of workshops, for instance, about the techniques of how to repair and to build a drystone wall, may preserve ancient skills. Such activities or others can hold the population in rural areas, avoiding emigration, as was the case of the PATTER project, which was realized in the Tramuntana mountains (Mallorca, Spain). This project encouraged, amongst other things, the education and training of young people as masters for the construction with the drystone technique. At the beginning, there were only a few participants, but after about 10 years, the interest was so great that a waiting list had to be established for those who wanted to learn about the subject and to embrace this profession (AA.VV., 2002).

4. BRAINSTORMING, GEOTOURISM AND GEORIDDLES

Among the various tools for creativity, brainstorming revealed itself as a quite adequate one in geotouristic activities. Brainstorming is a creativity tool, which is used by teams to generate new ideas by each member and to present them to the rest of the team in an orderly way (U.S. Department of the Navy, 2008).

To resolve problems or to create new projects or ideas, in a group meeting all members are asked to think and to reveal immediately all their thoughts about the theme. The main rules for brainstorming are: there is no judicial judgement of apparently unlikely suggestions; the participants are encouraged to communicate all their ideas, even the apparently most absurd ones; the quantity of ideas is as important as their quality; the combination and improvement of ideas ("piggyback ideas") will be fostered (Salman & Aydemir, 2015). At the end of the session, the results will be discussed and the most promising proposals will be further analyzed. Because of their direct involvement in the process and having contributed with own ideas, the members of the group gain a sense of ownership and pride, which are positive emotions (U.S. Department of the Navy, 2008).

How brainstorming will fit in a geotourism activity? Here, the "georiddle" joins the game. During a geological visit, in the field or in a city, the guide shows a site with a remarkable and strange geological, geomorphological, rural or other feature to the participants. This feature should be well visible, accessible for the group, and difficult to be identified and to be explained by people without deeper geological knowledge (and sometimes even by professional geologists!).

Once arrived at the place, the guide transmits to the group only some basic information about the site, the age, the type of rock, etc., so the site remains quite enigmatic. To solve this "georiddle" and to make the visit interactive, he asks all the members of the group to develop ideas about the origin of the feature by the brainstorming method. After collecting the suggestions, the results are discussed and the guide presents his own opinion about the place. Then, the discussion may begin again.

5. EXAMPLES

In the following part of this article, some examples of "georiddles" from Spain and Portugal are presented. All of them are characterized by easy access, scientific and pedagogic interest and show quite suggestive features which may help to conceive ideas and to stimulate a lively discussion between the participants.

5.1 Limestone deposits in the Sierra de Cazorla (province of Jaén, Spain)

The Sierra de Cazorla mountains, located in the north eastern part of Andalusia, are a part of the external Prebetic zone of the Betic mountain range (Vera & Martín-Algarra, 2004). They are constituted mainly by carbonate sediments, which were deposited in a warm and shallow water of a continental shelf during Upper Jurassic to Lower Cretaceous periods (Rosendahl, 1982). This corresponds to an age of about 150 to 135 million years (International Commission on Stratigraphy, 2018).

At a place on the wayside of the road between the Guadalquivir River source and Puerto Llano, a bright limestone layer with approximately polygonal cracks and small holes at the surface is exposed (figure 1). The question which could be asked to the group is: What was the origin of these structures in the sediment?

Figure 1. Surface of a limestone layer with polygonal cracks and small holes.

Source: Authors.

There might arise answers like: "a shockwave of an earthquake shattered the rock and originated the cracks" or "the holes were generated by tap-dancing geologists with stilettos", and so on.

In the authors' opinion, the limestone layer was deposited as a mud in an environment where the sea water level was extremely shallow, often drying out because of the lack of water covering. The cracks were the result of the contraction of the mud during the drying. The small holes might be the relics of the impacts of raindrops in the mud, which were covered and preserved by a new layer of sediment. This layer was eroded in the meantime, bringing the hypothetical traces of an ancient rainfall to light again.

5.2 Lagoa dos Cavalos/Cerro Grande (Algarve, Portugal)

In the southwest of Santa Catarina da Fonte do Bispo, at a distance of about 3 km from this place, a limestone layer of Kimmeridgian (Upper Jurassic) age, which was deposited about 155 million years before (International Commission on Stratigraphy, 2018), shows some strange structures (figure 2). They seem to be rests of bushes, which have been cut at their upper part in a nearly straight level. Would it be possible that these "bushes" were grazed by dinosaurs, which caused this line?

Figure 2. Limestone with fossil "bushes" at Lagoa dos Cavalos/Cerro Grande.

Source: Authors.

In reality, the fossil "bushes" are colonies of fossil corals which formed branches with a length of up to 0,5 meters, and which grew in a marine environment with shallow water (Rosendahl, 1985). The growth of these branches is very dense, probably to protect themselves against a presumed strong water movement of the sea. The nearly straight cut of the upper part of the branches may have been caused by cutting the colonies by a storm or a tsunami; a simpler (and more probable) solution may be that this level corresponded to the lowest tide level, as the corals did not grow higher because of their need of a constant water covering.

5.3 Telheiro Beach and Pirineo (Algarve, Portugal)

In the locality of Telheiro Beach, at about 7 km southwest of Vila do Bispo, steeply standing and folded layers of black shales and greywackes, which were deposited during the Carboniferous period (Reis & Pimentel, 2012) and have an age of about 360 million years (International Commission on Stratigraphy, 2018), are overlaid with a sharp angle by red Triassic sandstones (figure 3), whose age is about 220 million years (*ib.*). What processes might have been capable to produce the deformation of the shales, the long interruption of sedimentation, the sharp separation line and the different disposition of the Triassic sandstones?

Figure 3. Telheiro Beach. Folded **s**hales from the Carboniferous period and overlaying red Triassic sandstones.

Source: Authors.

In this place, an angular discordance can be seen. The geological history of this site is long and very interesting (Reis & Pimentel, 2012): About 360 million years ago, marine clays and sands were deposited in a marine trough. During the Variscan orogenesis, about 310 million years ago, the continents of Gondwana, Laurentia and Armorica collided, building up the super-continent of Pangea. During the collision, the rock formations were deformed and an enormous mountain chain was folded up, which ranged from the actual North America to Central Europe, passing through Portugal, Spain, France, Switzerland, Germany, Austria,

Czech Republic and Poland. Then, about 260 million years before, the area of this so-called Variscan mountain chain was uplifted and thousands of meters of rock material were eroded, resulting a large plain. Later, about 220 million years ago, this Pangean plain, whose remains can be seen in the figure 3 as a straight line between the folded vertical and the not folded horizontal formations, was covered by fluvial-aeolian gravel and sand, which transformed into sandstone and conglomerates.

In another place, at Pirineo (north of Querença, in the county of Loulé), the same structure appears at a distance of about 90 km from Telheiro Beach in a road embankment. Here, one's hand can be put onto the division line that corresponds to the Pangean plain as it existed before the deposition of the sandy material, covering a gap in sedimentation of several tens of million years (figure 4).

Figure 4. Pirineo. Putting the hand onto the Pangean plain.

Source: Authors.

5.4 Ramparts of Faro (Algarve, Portugal)

An example of a "georiddle" in an urban environment can be found in the ramparts of Faro (figure 5), capital of the Portuguese district with the same name. The first traces of Faro date from the 4th century B.C., when the Phoenician settlement had the name Ossónoba. Since then, the place had a turbulent history, having been occupied by Romans (2nd century B.C.), Visigoths (5th century A.D.), Arabs (713), and Christians (1249). The ramparts of the old

town of Faro ("Vila Adentro") emerged in the 9th century under the rule of the Bakr family (Câmara Municipal de Faro, 2018; Paula & Paula, 1993).

As Faro prospered in the following centuries, the city was target of raids by pirates and plundered and pillaged by English troops (1596), in which the ramparts were severely damaged. During the Restoration War (1640/1668), the ramparts used for the city's defensive were renewed and expanded. In 1755, the biggest part of Faro, including the ramparts, was destroyed by the earthquake known as the "Lisbon Earthquake". In the 19th century, the ramparts of Faro lost their military significance (*ib.*).

As materials for the construction of the ramparts, mainly stones with their origin in the area of Faro were used. In some places, building stones from other places can be found, which had to be transported over long distance, or arrived as ballast stones of ships which docked in Faro. But there are some quite perfectly round stones made of marble in the ramparts (figure 5) and in the gate of Arco da Vila, whose shape seems not to have a natural origin. What might have been the cause of these stone's form? Were they fragments of a Viking's football? Or cannonballs which got stuck in the stone wall and broke afterwards?

Figure 5. Left: Part of the ramparts of Faro. Right: Round marble stone incorporated in the ramparts of Faro.

Source: Authors.

In the authors' opinion, this construction stone was a part of a pillar, which made part of a former building with an uncertain age. Probably it was necessary to rebuild the wall in a hurry, because it may have been damaged during an assault or an earthquake, so any available rock material was used to fill up the gap.

5.5. Drystone Walls in Algarve

Drystone walls can be interpreted as an interface between vernacular architectonic, which is cultural heritage, and natural heritage (Rosendahl & Gonçalves, 2019b). The walls made of stones without the use of mortar were made by man to improve agriculture in slopes, creating areas with a lower gradient, and to retain and control the drainage of the hillside (Gonçalves et al., 2018; Gonçalves, Prates, & Rosendahl, 2017).

They are natural heritage, because they create habitats and ecological niches for fauna and flora, and are made mainly of local stones, but they are also cultural heritage because they mold the landscape as a result of human activity. Therefore, an area with drystone walls may serve as an example for a "georiddle".

The figure 6 displays a part of an area in the west of the São Miguel Hill in Algarve, where drystone walls dominate the landscape. However, their spatial distribution does not follow continuously the height lines as in many other areas (Balsells et al., 2019; Gonçalves, Pérez Cano, & Prates, 2019), it shows interruptions and several courses which are oblique to the slope, in an apparently disordered way. Why did the rural worker choose this design for their drystone walls?

Figure 6. Drystone Walls in the west of São Miguel Hill (Algarve).

Source: Authors.

The authors think that this arrangement of the drystone walls was applied to control the water drainage in times of heavy rainfall reducing the flow's velocity, to increase percolation time, to minimize soil erosion, and to create easy access to the terraces installing ramps between them (Balsells et al., 2019; Gonçalves, Pérez Cano, et al., 2019).

6. CONCLUSIONS

The offer of creative touristic activities is growing. They may be found in artistic work, like pottery, painting or dance, in lifestyle like gastronomy, and in other fields, where the participants are asked to take an active part. There is also the possibility of a challenge of creativity in scientific visits, like solving "georiddles" during a geotouristical tour, for example.

A field visit with an interactive guidance, where the guide does not only present the description of a place, but also asks the visitors to contribute with their own ideas, may have the result that the participants maintain a positive memory of the visit, because they found explanations by themselves. As the brainstorming method does not allow negative critics of even the most absurd ideas, everybody is encouraged to talk and nobody will have bad feelings when an out-of-the-box thought is released. On the contrary, a member may be proud for having shared an original idea.

By taking an active part in the trip and creating own ideas, the members will remind the visit for a long time. As their active participation may be considered to be a contribution to the guidance, the visitors will develop a feeling of pride and belonging ("I had the right idea, I helped the guide!"), as it often occurs during brainstorming sessions (Salman & Aydemir, 2015). By watching, observing and interpreting geological and other features of the site, their sense for protection of natural and cultural heritage will be sharpened (Hose, 2012).

The local residents who live in the neighborhood of a visited site may have economic benefits which surge from the creative activities (Richards, 2019). On the other hand, they play an important role in the conservation of the sites: once they know their value, they develop a sense of belonging and will defend the place's integrity (Gonçalves, 2016; Gonçalves, Cano, et al., 2019; Gonçalves & Pérez Cano, 2012; Rosendahl, 2014).

The examples presented in this article, which are only a small part of the really existing ones, show that there is a great diversity of sites and themes which may be used as "georiddles", and underline the potential of the use of creative methods like brainstorming in natural and cultural tourism.

So, creative activities in geotourism are capable to induce a quadruple win-win-situation: The participants gain positive feelings and knowledge about the place and its neighborhood; the residents may have business with the visitors and the pride because of an interesting place in the proximity; the guide leaves satisfied customers who might advertise his offerings to

family members, friends and colleagues; and the environment, as well as the natural and cultural heritage, gain more defenders.

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