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Laboratory as experiment in field learning: An application in a touristic city

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Abstract

In many higher education curricula, pre-structured laboratory exercises in courses in tourism geography are an important part of the training of future tourism operators. This paper explores how the collaboration between university and association can enhance practical competences and skills, while bringing innovative approaches to the teaching and learning of the Geography of Tourism. The aim is to empower students in geographical thinking and doing so by building on their latent skills and knowledge. The observations of the places of tourism must be flexible so as to encourage innovative teaching strategies with applications to reality. Experiences were generally positively received and serve to highlight the potential for new teaching opportunities to use applied geography to share geographical empathy and stories. The result identified the laboratory as a favourite learning activity opening up new possibilities in terms of practical exercises.

Keywords: Catania, Discovery Learning, Education, Geography of Tourism, Geoheritage, Urban Geosites

1. Introduction

At the basis of territorial education is the idea that the different types of education (citizenship, inter-culture, sustainable development, cultural diversities and health) find their spatial contextualisation in the territory (Dematteis and Giorda, 2013). Learning outside the classroom has long been valued in higher education, especially in geography, where territory is considered central to the discipline. Geography has also a specific role: "to connect the education knowledge, making a link between pedagogy and the territory" (Giorda and Puttilli, 2011, p. 19). Graduates are expected to exhibit greater degrees of theory and practise knowledge: that is, they are more likely to gain and maintain employment and to progress in workplaces and build careers (Arrowsmith et al., 2011). The applied learning is a kind of answer to this question.

As far as this is concerned from a didactic point of view, interesting inputs have been for example recently provided by De Vecchis (2016) with the focus of the attention on theories, methods, practices and the possible benefits which can derive from a rigorous observation and interpretation of teaching geography.

Tourism geography has gradually grown into an applied sub-discipline in many geography departments in response to the growing global tourism and recreation industry, and it also plays an important role in training tourism geographers (Han et al., 2015; Ruban, 2015).

The essay provides a model of reading and interpreting tourism places in the city through the applied study of connections between geosites, history, social aspects and tourist flows in specific urban places. The authors used the city both as a case to investigate and as a laboratory to experiment which urban geosites offer great potential to promote geotourism, with the integration of the historical and artistic aspects of the city with the petrographic nature of the stone used for construction.

A field-learning itinerary can be a powerful pedagogical tool for both directing student attention and complicating pre-existing spatial narrative (McMorran, 2015). We point out the similarities between field learning and forms of cultural tourism, concepts from tourism studies that help frame agenda negotiation in field learning (Herrick, 2010). At the same time, non-academics are encouraged to participate in the organisation, design and teaching of the formal undergraduate programme. This helps to develop a closer integration of course material and placement experience (Foster et al., 1979). It argues that participatory learning and problem-solving activities are crucial to successful outcomes, and that, as a result, interdisciplinary courses can be instrumental in motivating students to become involved in social practice (Schmelzkopf, 2002). An active laboratory was imagined with group discussions, in the study area of Catania (Sicily), alternating meetings with the community and a series of classroom lectures, starting with the direct knowledge of the tourist places of the local city.

The final aim was to involve students in promoting the geological and geomorphological heritage within the city of Catania to build a touristic tour of "Catania, City of Lava". The idea of developing a specific educational project on the knowledge of a great number of volcanic outcrops within the urban limit of Catania, the largest city in the Mt. Etna region (district), was just born in 1992-1993, from a group of members of two local tourist cooperatives[1].

Here, we expand the list of existing experiential techniques by proposing the incorporation of the innovative features of an "itinerary on the field" into a traditional tourism project in a tourism geography class. Primarily, it was student-professor-association experiences and involved a geography-fieldwork collaboration between Catania University and the "Centro Turismo Ambientale Sicilia" (CTA) Association. The 22 participants also had the opportunity to share their experiences and best practices in fields such as strategic tourism planning and implementation. The case study took place in March-June 2015. The paper draws on our reflections and students' field diaries, weekly oral brief sessions, research papers and anonymous online follow-up surveys conducted three months after the completion of activity.

2. Teaching Tourism Geography: Methodological design

Geography has been recognised as an educational instrument to understand the world, with the capacity to educate the students from particularisms to the plurality of points of view, to contribute to the education of citizens and to resolve problems linked to the development of the territory and the proper use of natural resources (Dematteis and Giorda, 2013, p. 18). The geography education literature is replete with examples of numerous experiential-learning activities applied to various areas (geography principles, sustainability research, tourism, climate, maps, etc.) in the form of games, integrated-project case studies, a situation analysis, blogging and the Google online geography challenge (Fueller et al., 2014; Guinness, 2012). Every teacher thinks about how to stimulate student learning and how to make geography lessons more interesting.

The tasks undertaken by the students before, during and after the fieldwork experience reflect Harper's (2004) experience of active learning in

[1] In particular, since the early 90s of the last century, an environmental education project called "Catania, built on lava" was successfully displayed in several secondary schools within the municipality of Catania.

fieldwork. Active learning was represented in the preparation phase, which involved problem identification by consensus agreement, collection of information, analysis and synthesis, and in the in-field, presentations to student peers and staff. Furthermore, in both the oral and written post-fieldtrip evaluations, students were given an opportunity to reflect on the processes and learning that occurred, much as Harper (2004, p. 96) described.

Our didactical methodology consisted of four steps, in line with Harper but also Pasquinelli d'Allegra (2016, p. 71) advice tools of direct and indirect geography observations because a "significant learning is characterized by its authenticity as expendable in different contexts". We employed a mixed-method approach, a combination of study and face-to-face interaction with questionnaires, semi-structured interviews and focus groups, including participatory exercises. Focus group interviews were performed four times with different user groups to obtain an overview of the social and ecological history of the area.

We used mapping exercises to understand the distribution and location of natural, social and historic resources, as well as residents and infrastructure and how these were affected by events. The students conducted semi-structured interviews with tour operators and tourist guides to discuss in more detail losses and changes in livelihood strategies as effects of these historic events. Whereas university staff focused on the use of online interaction to produce shared fieldwork material, for the students who used various digital media to communicate and collaborate, the interaction moved beyond the purely academic realm. Materials were shared through Dropbox. One shared a folder in Dropbox with others so that students could collaborate on the same files and folders. Changes to the contents of a shared folder were synced with other members almost instantly. Part of the laboratory consists of conducting applied research, where students are stimulated to present their results in innovative ways. Positive inter and intra-group "learning by doing" took place among peers.

The themes explored in the laboratory were developed in four stages from a didactic point of view.

Stage I: Data collection.

The staff first developed understanding of the territory by gathering archival data from external sources. Desk research included books, historical documents, newspapers and reports from the Department of Educational Sciences and libraries of the University of Catania. Careful planning is essential, as are clear explanations of tasks and instructions for students (O'Reilly and McManus, 2015). However, each group of students also shared a more complex picture of its section, which emerged from talking with professors and persons of the Association CTA.

Stage II: Data collection (fieldtrip 1)

After all the groups had shared their findings, the discussion moved in numerous directions, including students suggesting ways for the town to make the most of its unique qualities of its cultural and natural heritage. During this stage, under the supervision of the University-CTA staff, the students conducted interviews with residents and a handful of tourists, five of which were group interviews, given with three to four people engaged in the conversation. These observations helped us to move backwards and forwards in reflexive attempts to better understand the experiences in the field. We adopted a thematic analysis as a "constructionist method, which examines the ways in which events, realities, meanings, experiences and so on are the effects of a range of discourses operating within society" (Braun and Clarke, 2006, p. 81)

Stage III: Data collection (fieldtrip 2)

Lessons were followed by an exploratory tour that students made in town and in the neighbourhood, with the aim to carry on direct observations of the lava outcrops, placing them on topographic maps and taking pictures of them, with a general and detailed description of what they found out in *situ*. An aim of this stage was also to train students to promote environmental tourism next to the purely artistic and cultural one and to give a complete picture of tourist resources of the territory. Many students turned their attention away from territory and instead focused on systematic studies concerned with the role of building routes, itineraries, excursions and suggestions for tourism development in a synthesis between historical art and

landscape aspects, with the aim to propose it both to local and external tourists and to school groups. In developing the pilot programme, the collaborating staff built on each other's strengths to enhance the learning opportunities for students.

Stage IV: A short video of a city tour

The work in the field of a vulcanological city tour, or a "grey way", was followed by a stage of reworking of the information obtained with a short video, which was presented by different groups of students and then shown and discussed in the classroom. The aims of the final round of analysis were to confirm and/or disconfirm previous findings in the field.

From this educational experience was born the idea of offering a vulcanological city tour as a "grey way", not only to allow them to tackle the enhancement of Roman, Medieval and Baroque monuments in town but also to discover the geoheritage and the geological and vulcanological history of Catania.

3. Presentation of results

3.1 Mt. Etna and Catania volcanic outcrops

Mt. Etna is the largest active basaltic stratovolcano in Europe with an elevation of 3345 m a.s.l. The edifice is located on the Ionian coast of Sicily covering an area of 1600 km^2, with a diameter of about 40 km and four main vents, in the summit region: the Central, Northeast, Southwest and Southeast Craters (Giacomelli and Scandone, 2007). After being established as a Regional Nature Park in 1987, since 2013 it has been included by UNESCO in the World Heritage List with the "Statement of Outstanding Universal Value affirming that the Mount Etna's notoriety, scientific importance, cultural and educational value are of global significance".

Following the recent geochronological and stratigraphic data (Branca et al., 2008) its volcanic activity began in the Middle Pleistocene about 500,000 years ago and the most ancient magmatic rocks of the Etnean area consist of submarine pillow lavas and shallow level subvolcanic masses, mostly tholeiitic basalts in composition, sparsely outcropping in the lower south-eastern slope of Mt. Etna in the coastal area between the villages of Acicastello, Ficarazzi and Acitrezza (Corsaro and Cristofolini, 2000).

The present day volcanism belongs to the "Stratovolcano Phase, Mongibello Volcano Unit" (Branca et al. 2011a) whose volcanic products, erupted during the past 15,000 years, have covered about 85% of the whole Etna surface. The current eruptive behavior can be distinguished by a "persistent summit cone" and "flank or radial" activity: the first one is almost continuous, at or in the summit region, from the open vents over the central conduit and it is mainly Strombolian accompanied sometimes by low rate effusion subterminal eruptions lasting generally, days, months or years. Instead, flank eruptions occur frequently, from fissures situated on the different slopes, mainly clustered along the NE, S and W rift zones (Rittmann, 1973) and are of much greater concern to the local inhabitants (Chester et al., 1985).

In the last millennia, radial activity has originated several eruptive monogenic apparatus, represented by both cinder cones and ramparts, widely distributed along the volcano slopes in its three major alignments (Favalli et al., 1999).

For its almost continuous activity, the "Incendi etnei" (or "Etna's fires") have been the subject of interesting accounts written by many scholars and travellers who, from the beginning of 16th century onwards, have been able to describe the volcanic phenomena that were linked to more recent historical, geological and archeometric studies (Tanguy, 1981; Romano and Sturiale, 1982; Chester et al., 1985; Tanguy et al., 2007; Guidoboni et al., 2014; Branca et al., 2015) allowing us to know the age of the flow fields that are cropping out in the area where the present day town of Catania is[2].

[2] Interesting analysis of images in false colours and radar images of Sicily and volcanoes, useful both at educational level and for a professional future, since it was possible to obtain additional information and data which stimulate interdisciplinary collaboration between students, are viewed in Fea et al., 2013.

Catania is a coastal town on the lower south-eastern slope of the Mt. Etna volcanic complex, about 40 km from the summit craters; it is the second largest metropolitan town in Sicily. The city subsoil on which most of the building foundations rest mainly consists of lava-flow levels of basaltic origin. In fact, during the last thousands of years, in pre-historical and historical times, different lava branches, flowing from NNW to SSE during flank eruption activity, have repeatedly invaded the area that is nowadays occupied by the town and its suburbs.

Catania is privileged for its great geological heritage, where the presence of basalt largely outcropping in town, with its typical dark-grey color, can be considered an essential element of the character of the city (Cirelli et al., 2004). Since the XIX century onwards, different authors surveying the geology of the urban territory have tried to correlate historical accounts with lava flow fields outcropping on the volcano slopes by publishing geological maps (Sartorius Von Waltershausen, 1843-1861; Monaco et al., 1999, 2000; Branca et al., 2011a). Moreover, recent studies carried out using radioisotopes (Branca et al., 2015; Tanguy et al., 2007, 2012) and also based on petrographical, geological and archaeological investigations (Branca et al., 2016) allow us to know in detail the age to which the different lava outcrops belong (Giacomelli and Scandone, 2007).

In particular, researchers have been able to identify the prehistoric lava fields from the historical ones; it is possible to affirm that, after the 729 BC Greek foundation, the old town has been reached by lava flows only once during the disastrous 1669 AD eruption; according to recent studies**,** it can be excluded, as it was believed by former authors, that during the 122 BC and 252-3 AD eruptions, the lava flows destroyed the urban district.

It was affirmed by Coltelli et al. (1998), that in 122 BC the old town was never reached by lava flows because in that year a strong Plinian eruption took place on Mt. Etna, that is still considered as one of the most powerful explosive eruptions of this volcano in historical times. The chronicles reported a lapilli fallout over the ancient town of Catania that caused fires and roofs to collapse and hid the sun behind an ash cloud for days. Damage to the inhabitants was so severe that they were exempted from paying taxes to Rome for 10 years. In particular, the old town of Catania is built upon two lava flows named Barriera del Bosco and Larmisi (Branca et al., 2011b).

Other basaltic outcrops previously dated back to the 252-3 AD eruption and named “Larmisi” by Romano and Sturiale (1981), have been dated back also to Prehistoric time after the archeomagnetic studies. Tanguy et al. (2007, 2012) highlighted that, following the Greek founding of Catania, no lava flows impacted the city and surrounding area up to the 12th century.

During the Medieval Age, only the lava flow that was attributed previously to the 1381 volcanic event, and now dated by means of archaeometric methods to the 1160 AD eruption (Tanguy et al., 2007) reached the sea. In spite of the lava flow of Mount Arsi of St. Mary and the Cavòlo fracture, located on the lower southern slope between 460 and 360 m a.s.l., after reaching a total length of about 8 km, it did not directly impact on the town but spilled out into sea about 2 km NE of Catania, erasing the mouth of the river Longane and filling the ancient Roman port described by Pliny the Elder as the port of Ulysses.

One of the largest and most destructive flank eruptions that occurred in historical time was that of 1669 AD. This famous eruption began on the lower southern slope near the old village of Nicolosi, at 800 m a.s.l., and a large and very long lava flow reached and destroyed the Catania west end after traveling for more than 17 km down to the sea.

In particular, this eruption began on 11 March 1669 (Tedeschi Paternò, 1669), seriously damaging the lower southern slope, where lava flows caused the destruction of 9 small villages, the burial of large portions of the Spanish walls and the advancement of the coastline by over one km to the south, southeast, in the stretch between the Ursino Castle promontory (15 m a.s.l.) and the old port. The eruption lasted just 122 days and was characterised by an effusive activity with a very high emission rate. The size of the lava-flow field was very impressive, with a surface of 40 sq km and a thickness of 15-20 m, with a lava front width that varied between two

and four km (Branca et al., 2013). The intense explosive activity formed the pyroclastic cones, called "Craters of the Ruin", actually Monti Rossi, clearly visible from the Catania plain. Close to them is the famous Mompilieri Sanctuary, which is an important destination for pilgrims who want to pray before the statue of Our Lady of Grace, which was miraculously found intact under a thick blanket of lava.

The engravings published to illustrate the tales of the *Grand Tour* travellers that visited Catania and Mt. Etna during the XVIII and XIX centuries clearly show the lava flows cropping out around the old town and coastline, where the modern town has been developed in the last century (Figure 1).

Figure 1. XIX century engraving of Catania's cathedral, with the foreground basaltic 1669 lava outcrops, which today are no longer visible, because they are completely buried by the docks of the Catania harbour. Source: Emile Rouargue, Engraving, Paris 1880.

3.2 The creation of a "Grey way" for the promotion of urban tourism

The Etnean town allows visitors not only to enjoy the richness of its architectural late-baroque UNESCO heritage but also to discover the natural patrimony constituted by exposed lava flows of protohistoric and historical epoch cropping out within the city limits. These outcrops are sited at the southern edge of what is fully considered the "Etnean Region", where the nature of the physical chemistry of soils and their morphologies are natural features that allow its true discovery. The use of basalt stone is the individuality and the "genius loci" that characterises the cultural identity and the Etnean capital city-scape (Cirelli et al., 2004).

In general, these rocky basalt outcrops can be classified as important geomorphosites (Panizza, 2001) or, in this particular case, as urban geosites that can increase the interest in urban geotourism (Bertacchini et al., 2007; Del Lama et al., 2015) and are a geoheritage (Brocx and Semeniuk, 2007) of inestimable scientific, historical and geographical value. In fact, urban geosites, when enhanced, are of great geological and geomorphological interest, also for any kind of tourists. They can be a means to preserve the local geoheritage and to promote its appreciation based on their scientific value, exemplarity, rarity and potential for both education and tourism (Palacio-Prieto, 2015). Many new other examples of urban geotourism have been recently referred to other cities, such as Salvador de Bahía (Liccardo et al., 2012) and Rio de Janeiro (Mansur and Soares da Silva, 2011) in Brazil, and the cities of Segovia (Díez-Herrero and Vegas-Salamanca, 2011) and Burgos (Fernández-Martínez and Castaño-de-Luis, 2013) in Spain, among others. All these works aim to promote the geoheritage within cities from the educational and geoconservation points of view, based on the sites located along specific geological paths. This can be considered a new philosophy for an alternative way to develop and integrate both the cultural tourism and the geotourism in Catania along the Etnean shoreline and on the lower Mt. Etna slope, nowadays densely urbanized.

The itinerary with a specific idea of a "grey way" followed by the students is formulated in such a way as to allow:

(a) the disclosure of the history of eruptions that, in last the two millennia, have ravaged the city, the southern Etna slope and its inhabitants' lives;

(b) the enhancement of geomorphosites, as well as monuments and/or architectural heritage, to be considered as "natural monuments of lava" with their specific original tourist value;

(c) through knowledge of the curious facts that link the town directly to the volcano's activity, such as the local specific relationship between the cult of Saint Agatha and the histor-

ical Mt. Etna eruptions, like in 1669 AD.

The proposed vulcanological city tour developed mainly in the heart of the monumental city centre (Figure 2), between the Norman-Baroque Saint Agatha's cathedral, the IV century AD Roman baths of "Indirizzo", the medieval Ursino castle and the Baroque Benedictine monastery, with an extension that unfolds in the most modern area of the city. Instead, the coastal tour develops along the Catania sea-front and northward along the Ionian shoreline, with a short stop in Acicastello to observe the submarine pillow-lava outcropping below the Norman Castle and another one in Acitrezza where to discover the Cyclops Islands, with their impressive sea stacks and columnar jointing similar to the columnar basalt rock formations outcropping along the course of the Alcantara and Simeto Rivers; at the end the last stop is in the town of Acireale.

The ideal starting point of the tour is at Catania's Cathedral, dedicated to Saint Agatha, whose veil, which according to the hagiographic tradition, was wrapped at the time of the burial the body of the paleo-Christian Virgin and martyr, regarded by her fellow devotees as a bulwark against the devastating fury of the Mt. Etna eruptions.

Inside the sacristy, it is possible to admire the great fresco by the Sicilian painter, Giacinto Platania (1612-1691), who, as an eyewitness with a bird's eye perspective, was able to represent in great detail the most dramatic phase of the terrifying eruption of 1669 AD, when, between the 13th and 29th of April (Branca et al., 2013), a huge lava flow hit Catania's west end by destroying the walls of Charles V, invading the area close to the Benedictine monastery and encircling the Ursino Castle, situated at that time in front of the Ionian Sea.

Back on the large Federico II square, built in the era of Frederick II, stands the great mass of the Ursino Castle, totally surrounded and isolated by the sea by the lava flows of 23 April 1669. Today, all along the western side of the wall, a remnant strip of basaltic lava that stretches to the south tower is outcropping. Here, an excavation was recently carried out, removing a large portion of the flow, which allows a clear view of a lava cross section that has a thickness of about ten metres.

The tour continues towards the Benedictine monastery, where impressive lava outcroppings can be seen; they are clearly visible outside the monastery but, unexpectedly, even inside, in the famous Vaccarini kitchens, built directly on top of the flow after the 1693 earthquake.

On 30 April 1669, after burying the garden of the Benedictine monastery, the lava surrounded the building to the West and North but did not destroy it.

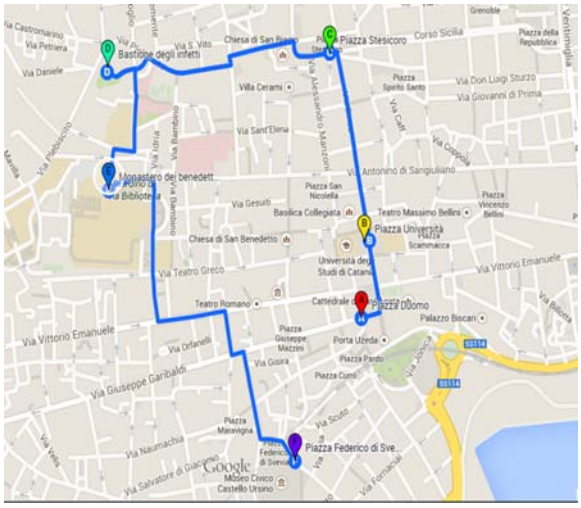

Figure 2. Studied itinerary in historic centre of Catania. Source: photo by the students from Google Map, 2015.

The baroque monastery is unique worldwide. In fact, while visiting the kitchens and the subsequent descent into the dungeons, following a special itinerary, tourists can surprisingly admire a magnificent example of a Hawaiian surface morphology lava outcrop, still perfectly preserved, and also a small pressure-ridge in the heart of one of the most important monuments of the city.

The second part of the city tour developed outside the old town, along the modern sea-front in the stretch of coast between Europe's square and Ulysses' Harbour, where a spectacular rocky cliff of black basalt mainly constitutes a priceless urban geosite, where the relicts of interesting Hawaiian flow field morphology outcrops make up a volcanic coastal scenery of great and incomparable value that could be considered as a great geotouristic attraction, a sort of *Open Museum of Volcanology* in town, that could contribute to raising awareness to preserve by con-

crete the remains of hanging arches, pressure ridges, smooth, billowy, undulating or ropy surface lavas, that are still miraculously visible.

The proposed vulcanological tour is to be continued in the small village of Ognina, where outcrop lavas of the 1160 AD eruption that filled the ancient Roman port.

Two other locations were visited during the field trip. The first was in the immediate surroundings of Acireale, a pretty coastal town 13 km north of Catania and its high rocky shore, locally known as the "Timpa" (a Sicilian word that means cliff), seven km long.

The Timpa is an outstanding geosite, with tectonic escarpments that cut an ancient volcanic succession, formed during the Timpe Phase, dating back 220,000 years, (Branca et al., 2011a) formed of interbedded levels of lava and pyroclastic rocks, overlooking the Ionian Sea, with variable height from 100 to 125 metres above sea level, covered by a mantle of exuberant Mediterranean maquis. From the centre of the baroque town of Acireale, it is possible to walk to the path of the "Chiazzette" in a few minutes, a zig-zag stone walkway built to connect Acireale to the sea during the seventeenth-century, in 1687. It leads downhill to the picturesque fishing village of Santa Maria La Scala. The Timpa is one of the most beautiful scenic stretches of basaltic rocky shore of the whole Ionian coast, and the Chiazzette path represents a great attraction for the development of local tourism. In fact, its natural features and volcanic landscape can be included among the routes of the local, sustainable tourism (Figure 3).

The second location visited was the Sanctuary of Mompilieri, situated near the Etnean town of Nicolosi on the southern Etna slope. This place has been chosen because it can be considered one of the most significant sites of the last centuries, which, as symbols of the relationship between eruptions and faith, are very dear to the local Christian tradition (Figure 4). The "Madonna of the Sciara" shrine is a place of worship for the inhabitants of Etna. Despite being buried by the massive lava flow of the tremendous eruption of 1669, it miraculously escaped destruction. After countless efforts and thanks to a miraculous dream, the inhabitants found the exact site where the church was located in 1704. A new church was then rebuilt 12 m over the former one; it rose in the exact place where the still incredibly intact statue of Our Lady of Grace was found. For this reason, this site can also be considered an attractive place for religious tourism, where the curiosity of the pilgrims is strongly linked to natural phenomena and cultural heritage.

Figure 3. Panoramic view of the Timpa from south to the north. Source: photo by the Authors, 2015.

Figure 4. Panoramic view of the Mompilieri Sanctuary. Source: photo by the Authors, 2015.

4. Discussion and Conclusions

All the participants considered the pilot project a great success, and all recommended that the programme be continued and further enhanced in future years. Overall, student collaboration obliged them to collect, create, compare and discuss data and issues representing national and regional cultural identities, while using digital media. Students were asked what their expectations had been at the start of the pilot, when they were told what the project involved. They were then asked to evaluate what their experience had been. In the anonymous online feedback three months after the course finished, students identified the laboratories as their favourite learning activity. Without exception, every student said that they found the project worthwhile and valuable and that they were glad they had been involved. A 100% positive response rate was thus achieved.

Students stated that they had learned a lot and gained insights into their "… own sense of local identity, landscape and different modes of learning". Regarding overall positivity, students commented: "rewarding and insightful experience… very stimulating and enjoyable" and "I was surprised that I enjoyed the process so much, as at the beginning I hated the thought of undergoing this project". Regarding the nature of the activity: "something different to conventional assignments… its educational value was extensive" and "I was surprised at the high level of engagement in the collaboration and the interest my own posts generated". Another student hinted in the following comment: "I liked that the students at certain points were able to think of new ideas and connections through the interactions, the tours and their own observations. I think this is what makes the field studies special, as students are able to give their personal opinions and critical analysis in the entire learning journey".

A final student focused on the itinerary, mentioning the importance of having to "try" on the territory: it really gave a different perspective having stayed one day instead of just passing through, which allowed the group to enjoy the atmosphere. While the impact of this exercise seemed obvious to me, both at the time and upon reflection, other factors could have led to improved student learning.

The exercise introduced here provides one example of student-led research that empowers students to encounter a destination and develop their own spatial narrative, admittedly with certain limitations. Engaging in research activity in fieldwork is perceived strongly to add value to study for a degree, as well as to stimulate interest in the subject and improve understanding of the methodologies employed. Moreover, the mixing of possibilities provided by methods as focus group and applications for evaluating the modifications recorded in the territory use classes can give considerable didactic and research stimuli, opening up new possibilities in terms of practical exercises and laboratory. Nevertheless, the use of geospatial and geotechnologies is also a relevant tool to connect theoretical content with practical aspects, creating an opportunity for personal hypothesis, reflecting on possible guidelines to support decision-making (Pesaresi, 2016).

The project of a vulcanological city tour could be the, *conditio sine qua non,* required to develop a new original tourist brand that allows tourists and visitors to learn about the geological history and the succession of past eruptions that have buried the area, where today's city of Catania is situated by changing the urban and geographical aspect of the territory.

The proposed vulcanological city tour also aims to stimulate the local ruling class and main public institutions involved in the control of local territory, and to provide them with a new interpretation of existing geological assets within the urban area, to get all the necessary tools to protect the last patches of lava flows still visible downtown and enhance them through a specific geological path or a "grey way", using a series of special educational signs to be placed in front of or near them.

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