Depicting the Urban Landscape. Enhancing the Cultural Heritage of Fragile Areas with Participatory Mapping Processes

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Abstract. The contribution suggests reflecting upon participatory mapping of cultural values processes contained in everyday landscapes, particularly fragile environments such as peripheral urban areas. The theme is addressed starting from the reexamination of Politecnico di Milano research experience which focused on the involvement of younger generations in landscape education and enhancement of the widespread cultural heritage processes. From this experimental project, we developed tools and methodologies to support institutions in standardising local heritage education. Within this framework, the participatory mapping tradition becomes an important reference for its subjective and interdisciplinary aspect and ability to represent the community's spatial knowledge, because it offers cues for technological integration in processes for inexperienced users. Mapping used here is a reading, interpreting, communicating and sharing process which involves multiple players and educational frameworks. Drafting such maps combines traditional methodologies and innovative technologies and allows the development of different activities and products including learning tours, visual storytelling, sketches, mind maps, interactive digital maps, Geographic Information Systems, virtual reality environments, interactive digital tourist tours and gamification apps. The availability of these tools allows young citizens to become active players in the knowledge and communication processes, to strengthen their sense of belonging to places, to develop active citizenship, to foster intergenerational and intercultural dialogues, and to protect the cultural landscape as a common good.

Keywords: Participatory mapping · Communication of cultural heritage · Enhancement of cultural landscapes

1 Heritage Education in Fragile Areas

Training young people in the knowledge of cultural heritage and guiding them in a process of appropriation that involves the recognition of the cultural values enshrined in the area is an essential process for European and international policies [1–3] on which Italian heritage education is based. [4–6] If cultural heritage is seen as a common good, then we must conclude that it is a collective responsibility and the common objective is its transmission to future generations. This process can start from the young people's region young people live in to strengthen their sense of belonging to such

places and encourage the development of a sense of active citizenship and protect the common good. The process will be more effective if, as suggested by the European Landscape Convention, cultural heritage is broadly interpreted as a system of values in continuous transformation and extended to a region which is recognised as a cultural landscape and carries values inextricably linked to the population's perception [1].

If this is easier in situations such as urban centres, historic villages or landscapes of considerable naturalistic value, it becomes more difficult for fragile areas, such as urban and suburban peripheries which are affected by various critical issues. Young citizens are asked to value material testimony of a cultural system they are starting to understand (history, art, civilization…), and detect these values in those life contexts where contradictions and fragilities are experienced daily. It becomes paramount to involve young people in processes of local knowledge and the "dig into" its cultural values, through observation, research and comparison with multiple stakeholders - experts, witnesses, families, the elderly, peers and other citizens. This involvement will bring a twofold advantage - it will turn young people from passive users of institutional culture into local experts and holders of knowledge and bring out their interpretations of places.

This is the reason why "Scuola Attiva Risorse, ricucire il patrimonio disperso delle periferie (ScAR)" [7] was created. It is an active research project funded by Politecnico di Milano with funds of 0.5% IRPEF tax allocations and recognised as the European Year of Cultural Heritage official event in 2018 [8]. The project leader is Politecnico di Milano, but there are many partners and stakeholders: seven schools in the southern periphery of Milan, two local administrations (Municipio 4 and Municipio 5), public and private cultural institutions (MUMI, Ecomuseo Milano Sud and Fondazione Prada), technical laboratories (MOA, Laboratory of architectural modeling), local libraries and associations and school offices.

Since training citizens in cultural heritage and guiding them in an appropriation process involves all young people, it is essential that the institutions responsible for education and training and which are already strongly committed to this task, become the main players. The project starts from schools and is suggested as an experiment to develop methodologies and good practices to support institutions in the difficult task of standardising local heritage education and extending it to all regions, in an inclusive, plural, interdisciplinary manner which is open to the use of technology.

This contribution aims to discuss the mapping theme, highlighting the multiplicity of players and variety of active educational frameworks, underlining their participatory nature and the role assigned to technology and drawing.

2 Mapping as a Social, Ethical and Collective Act

A few decades ago, during the diffusion of the use of Geographic Information Systems (GIS), the scientific community considered moving away from a positivist approach to maps and the idea of objective mapping and the dangers of an uncritical compliance with advanced technologies in geographical representation. Instead many experts favoured a more ethical approach to mapping [9–11]. Those considerations highlighted that, although using geographical information technology makes large amounts of data

available, it risks benefiting the social groups that have access to these technologies and excluding and marginalising the most disadvantaged groups from the processes.

As early as the 1990s, there was a focus on mapping systems that enhance the role of local communities. The debate intensified mainly in dealing with development programmes, where the need to consider the interests of groups that usually have no role in decision-making processes was particularly pressing [12], and as part of urban neighbourhood mapping practices [13]. In the meantime, Web 2.0 dynamics have made interactions between generic users and geographic information conveyed by technology, more complex and articulated. [14] Technological innovations are rapidly changing the map concept and the boundaries between map-user and map-maker, along with an increasing demand for tools available to the map-making citizen. These phenomena renew and considerations on the map concept, responsibilities related to the construction of geographical information and the importance of an ethical approach to the mapping [15] become more topical.

3 Cultural Landscape and Cultural Heritage Integrated Reading Processes

During the search for tools for complex situations such as urban peripheries, the experience of participatory mapping becomes an important reference for several reasons. It is intrinsically popular; its deliberately subjective and interdisciplinary nature; its ability to handle complex phenomena and depict the community's spatial knowledge; it offers cues for technological integration in processes conducted with inexperienced users. The representation of the landscape and cultural heritage in different forms which combine traditional methodologies with high-tech processes is at the heart of the ScAR project processes. In this sense, the project explores different uses of the map concept, giving rise to a multiplicity of interpretations of the same area. This involves the skills, knowledge, educational objectives, communication purposes of different groups of young people being trained.

Special attention was given to technology. This included GIS, the construction of Google Maps, geoblog and gaming products and tourism promotion accessible via smartphone. The processes include activities that recover the hermeneutical and educational value of the traditional design and symbolic map: urban sketching, mental maps drawing and participatory 3D modelling.

4 Digital Participatory Mappings: From Cultural Heritage GIS to the Digital Atlas of Memories

Different systems of local cultural heritage digital documentation have been developed as part of the ScAR project, producing different mapping during the various preparation phases. Based on bibliographic sources, webography and historical maps, a first mapping was useful for the development of the investigation's preliminary phases and the subsequent planning phases with the participating schools. This mapping was constructed by identifying local peculiar elements characterizing cultural heritage. This

data was stored in a GIS database accessible from the project web site (Fig. 1). Each element inserted in this mapping has been linked to detailed documentation and materials, designed as a starting point for in-depth knowledge. A mapped interactive cultural heritage dossier has been developed to present the contents. This dossier is connected to the online in-depth database. It should be noted that, among these documents, a directory of historical mapping has been provided, as a basis for work and study for schools on local transformations. This follows the project's general objectives of combining traditional tools and methodologies with the applied use of technologies. It is important to point out that this first mapping work was developed to free schools from these preliminary activities, allowing them to start the study and interpretation processes, relating to different age groups, types of education and the position of schools in the area.
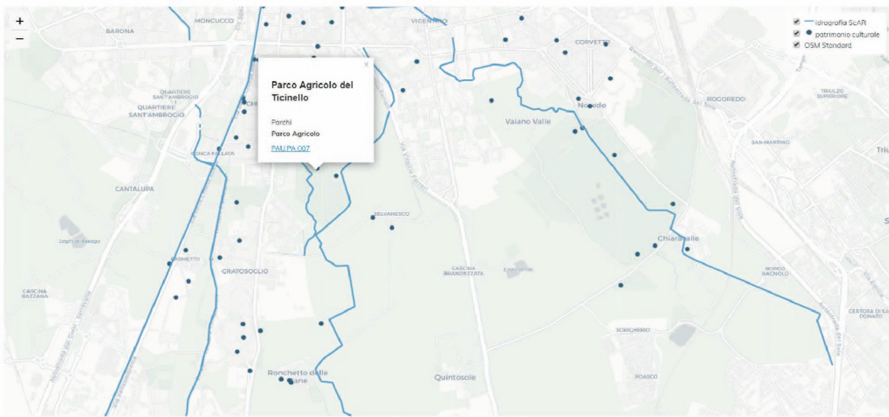

Fig. 1. WebGIS available to schools (accessible from the research project website [7]) and IT architecture used.

A further mapping was produced using the Google Maps platform by recording the elements previously mapped by the academic research team, the work of trainee university students and the suggestions developed during the school design phase. This map is unique for the co-creation process that created it and also because it is made up of single elements that identify the local cultural heritage and of routes connecting

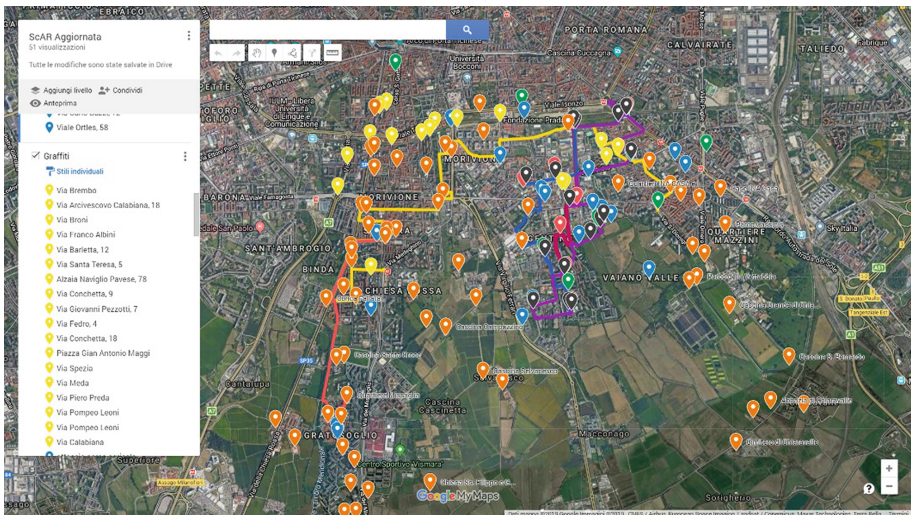these points. It has been the basis for the hypotheses for development of activities for students (Fig. 2).

Fig. 2. WebGIS mapping and analysis of the cultural heritage of the research area, developed by the project team working with the trainees.

The convergence of the work of several people in a single mapping has allowed the overlaps and differences in content to emerge, providing a platform for comparison and interaction of different data. In partnership with MUMI Ecomuseo Milano Sud a further mapping has been prepared, the Digital Atlas of Memories [16], which contains a selection of the contents of the previous mapping projects. It is constituted as an open and participative geoblog in which schools can insert their contribution with media, impressions, memories and proposals for the revaluation of the daily life landscape (Fig. 3). The construction of a participatory map, conceived as a tool for sharing cultural heritage, provided the opportunity to obtain a representation of the cultural landscape built as a subjective local narration that describes its peculiarities, strengths and critical aspects, under the European Landscape Convention. The Atlas is a system that has been used by schools to share the results using the educational activities presented as public collections within a media gallery. It offers a collection of teachers' methodologies, alongside a mapping of new emerging readings. The greatest potential of this digital structure is that it is open mapping and can be continuously increased after the end of the research project. This makes it a dynamic community service tool and a public archiving and documentation system that exists because of its local contribution.
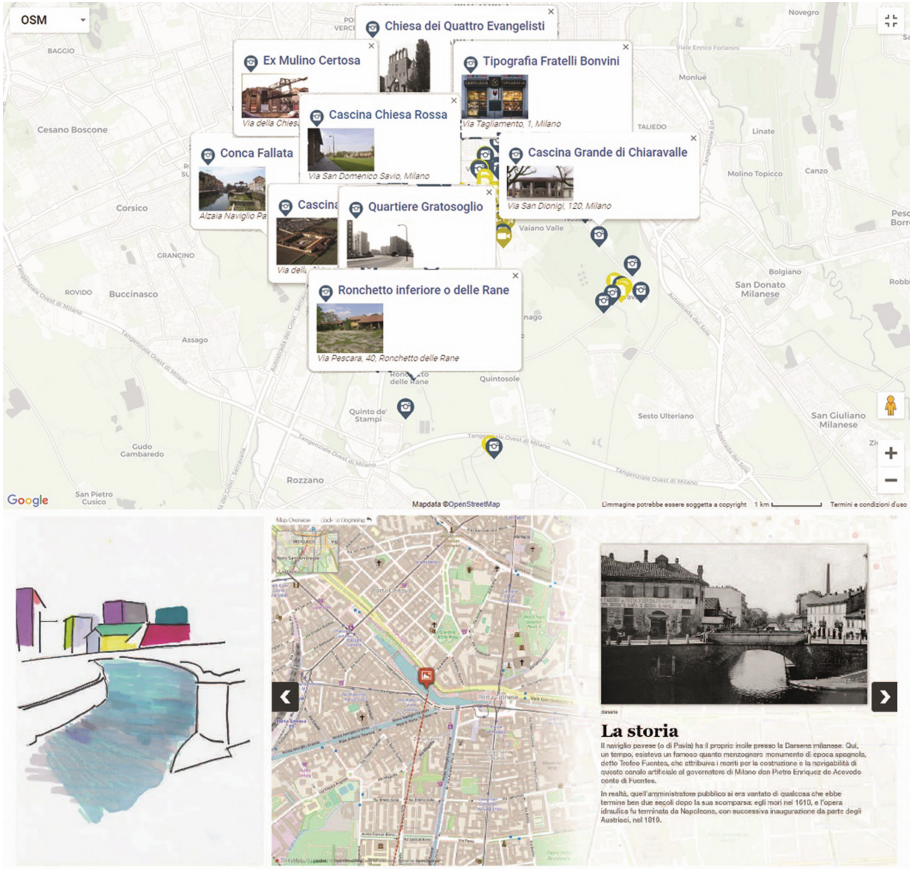
Fig. 3. The "Digital Atlas of Memories" geoblog and examples of content mapped by students.

5　Drawing and Mapping the Landscape as an Enhancement of Daily Life Places

Among the many activities carried out within the ScAR project, three in particular highlight the design role as a vehicle of knowledge and critical exercise of interpretation of the cultural landscape, its historical, current and natural landmarks, values and changes.

The first activity involved learning tours within the research area which was defined together with teachers. Students mapped the route taken pictures and wrote their impressions, memories and stories of the places visited. This resulted in written-graphic representations within which the information (I recognise the place seen in the photograph, I note what the teacher or expert tells me so I can remember) has been integrated with the subjective and interpretative aspects linked to the critical exercise and personal memory which has been written on the topographic drawing (Fig. 4).

Fig. 4. Learning tour and cultural heritage mapping with secondary school students.

The second activity consisted of workshops on the reading and the interpretation of the urban landscape. The workshops were held at the Prada Foundation headquarters on the eighth floor of the "Torre" (tower) building of the complex designed by OMA studio near the Porta Romana station. The building is a unique observation point over the city - the outskirts, the centre and the surrounding landscape. This interesting area can be interpreted as an abacus of the local changes that took place in the last century. The early twentieth century clash between the place's agricultural vocation and the industrial push and the subsequent processes of deindustrialisation, abandonment and readaptation. From this privileged position, students were invited to read maps and panoramic photographs to recognise historical and recent landmarks in the landscape. Subsequently they were involved in a collective sketching which led to the creation of a combined work representing the urban landscape (Fig. 5).
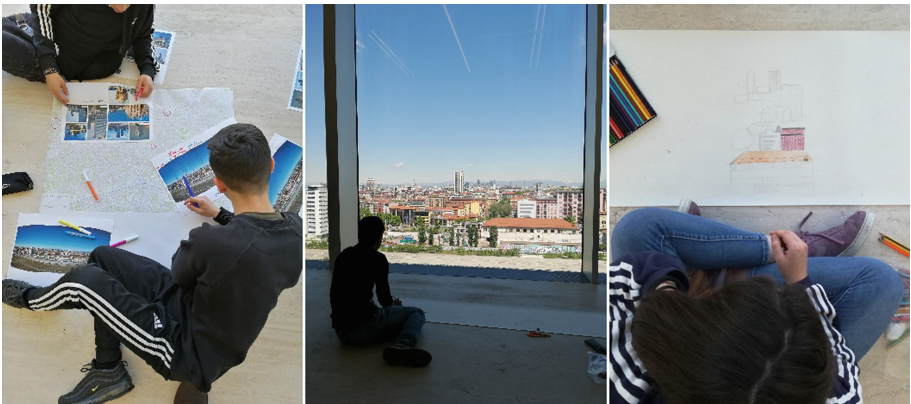

Fig. 5. Workshops on reading and interpreting the urban landscape from the Fondazione Prada "Torre" building with secondary school students.

The third activity involved students of different ages (from 12 to 19 years) mind mapping their home-school route. In this way, the ScAR project tested a graphic

storytelling activity that schematises points and topical elements of the everyday landscape as a tool to tell their place's experience (Fig. 6). Later, they were asked to share readings, memories and impressions through classroom discussions, building new, more conscious and collective interpretations of the cultural landscape.

These types of workshops enabled the discovery of younger citizens local perceptions, and triggered shared collective reflection on the city, while carrying out a cultural landscape educational exercise.
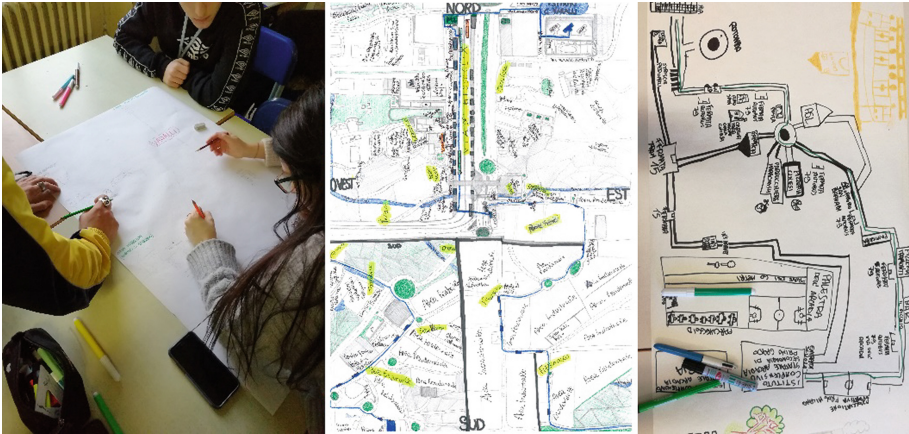

Fig. 6. Mind maps of the home-school route produced by secondary school students.

6   ICTs for Cultural Landscape Mapping and Storytelling

The ScAR project explored ICTs potential as storytelling tools, experimenting with them as vehicles to build a complex, subjective and interactive participatory mapping. [17, 18] The use of the latest hardware and software technologies permits an engaging and immersive story of the landscape to increase the participants' interest. In recent years we have seen the spread of social networks as possible tools for the dissemination of cultural heritage, and applications that permit the development of complex and geo-referenced storytelling. There are online suites of Free Open Source and not Free Open Source Software dedicated to dissemination, which allow to develop interactive tours, online maps and virtual reality applications without the need for expensive equipment or technical skills. These tools can be introduced in schools and offer the opportunity to develop collective mappings used to undertake a twofold cultural heritage training process - content production and application development for those who participate directly and peer learning between students for product end users.

6.1   Map Storytelling

The development of digital and geo-referenced storytelling can be a heritage education activity and an interpretation of the everyday landscape for any school. The creation of

local digital stories offers the opportunity to work with young citizens to build an observation process and a landscape critical representation to reveal its complexity and its less visible or invisible peculiarities. The ScAR project suggested the Knightlab educational software suite (https://knightlab.northwestern.edu/) to the involved schools. The following applications were used: StoryMapJS, to build geo-referenced routes on historical or latest maps including points of interest that can be enriched with images and textual content and JuxtaposeJS, to develop frame comparison applications between images that can be shared on the web. The educational suite has been successful especially with secondary schools, thanks to its ease of use, and has allowed students to develop storytelling dedicated to the place or individual elements of tangible and intangible cultural heritage. Subsequently, teachers mapped the activities within the "Digital Atlas of Memories."

6.2   Gamification

The project suggested gamification processes as engagement tools for local exploration and sharing cultural landscape's complex narratives. The participatory mapping of learning tours enriched by questions and treasure hunts which disseminate the cultural and natural heritage value, allows the user, including adults, to re-discover the region. The user is guided through the area by historical and current maps and images, to know stories, traces and invisible elements of the cultural heritage and recognise their value, through young authors' eyes. The ScAR team in partnership with GaiaSmart - an application supplier dedicated to gaming methods has activated two tours within the research area with two secondary school classes: "Vigentour - discover your future in the Vigentino district" and "Discovering the Stadera district with a mysterious guide" (Fig. 7). The two tours include stops where users must interact with the location to complete the game, such as answering a question, finding an object, or photographing an item. The route layout, contents and activities for each stage were developed independently by students and teachers of the participating classes. The research team was involved in revising the content, while GaiaSmart technical team developed the IT architecture.
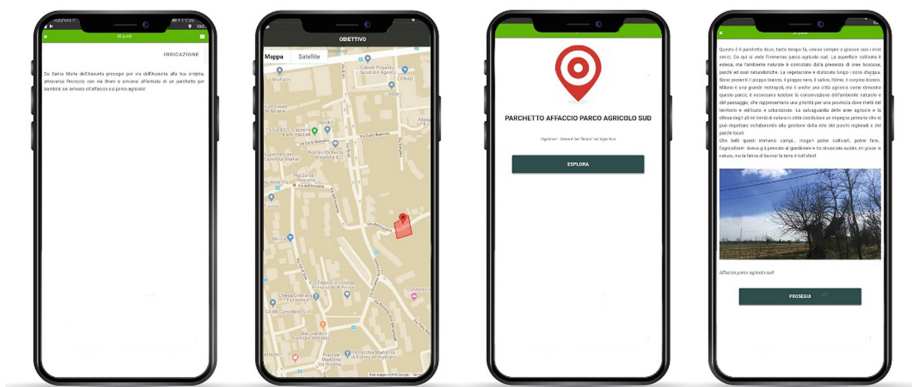

Fig. 7. A stop on the "Vigentour - discover your future in the Vigentino district" tour.

6.3   Interactive Tourist Guides

Typical tourism tools such as interactive guides usable via smartphones, introduced in educational contexts, can become tools of cultural landscape knowledge and communication. The local narration, in this case for an older target, takes place through interactive tourist routes that involve the user with a cultural landscape guide and map. With a group of students from the C. Varalli High School, (which trains also tour operators), ScAR has developed two tourist tours in the area that offer the opportunity for anyone to know its uniqueness, history and the tangible and intangible cultural heritage. With Izi.travel, a Content Management System (CMS) for the production of professional tour guides, the group of students defined the routes and attractions to be included. The students, together with teachers, have carried out research on the involved sites, collecting the historical documentation and testimonies necessary for the production of contents into Italian and English (Fig. 8). Please note that the two guides are freely available in the Izi.travel catalogue and can be shared and used free of charge.
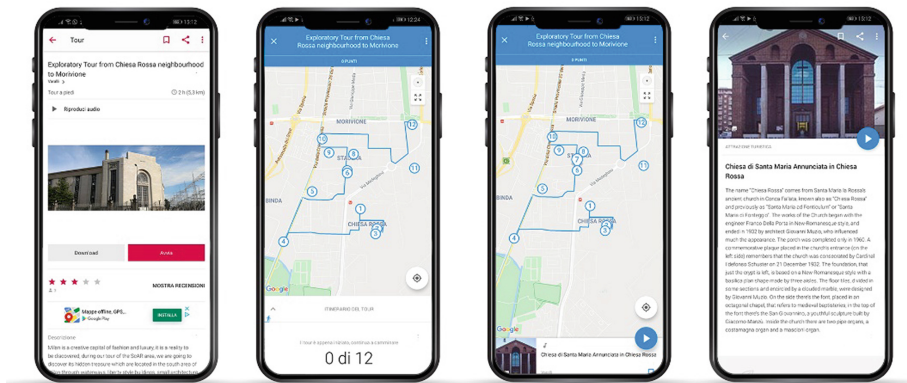

Fig. 8. Maps of the two tourist routes developed with Izi.travel.

6.4   VR Tours in the Cultural Landscape

The development of applications in virtual and augmented reality can be an innovative tool for the cultural landscape participatory storytelling. The immersive and interactive experience offered by these tools is useful for local storytelling as it is enriched by environmental sounds, an audio storytelling, and the possibility to interact with surroundings. There is online software, including free applications such as Google Tour Creator, that give the ability to develop complex virtual routes without needing expensive tools or advanced computer skills. These applications allow young users to create and develop virtual tours. The "Experience tour del quartiere Stadera" [Stadera district experience tour] application was created during the activities with C. Varalli High School. An augmented reality tour was developed using photographs and

spherical 360 videos collected during the learning tours at the beginning of the project, and the contents produced by students. Here the user is guided by an audio narration to discover the local landmarks. He can also interact with the surroundings and obtain more information about the sites and superimpose historical images on the current view to know how the cultural landscape has changed over the years (Fig. 9).

Fig. 9. A stop on the augmented reality "Stadera district experience tour" where it is possible to interact with the environment and superimpose historical images over the current environment.

7   Conclusion

The ScAR project experimentations contribute to our thoughts on the potential of mapping and its multiple uses, landscape knowledge and enhancement processes involving non-expert users, particularly teachers and students.

As part of the participatory mapping practices, the experience revealed some features:

– it is aimed at cultural heritage education;
– it involves local citizens (students and teachers) from the initial planning phases;
– it aims to develop transmissible working methods which benefit those uninvolved in this phase;
– it interprets the map in different ways by making traditional techniques and innovative methods interact, exploring the potential of ICTs in this area;
– it adopts diversified and unconventional teaching methodologies, such as informal, peer and authentic learning.

Field activity during the research project has shown how the processes developed and tools used are a valid support to a direct, active and involving knowledge of the cultural values in a fragile area. This enhances the perceptions of those involved and offers them the opportunity to communicate the experience and results to a real audience.

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