WALTRAUD KOFLER ENGL – ALEXANDRA BUDABIN – GAIA PICCAROLO

CULTURAL HERITAGE IMAGINARIES OF CONFLICT IN THE MOUNTAINS ENABLED BY DIGITAL APPS

ESTRATTO
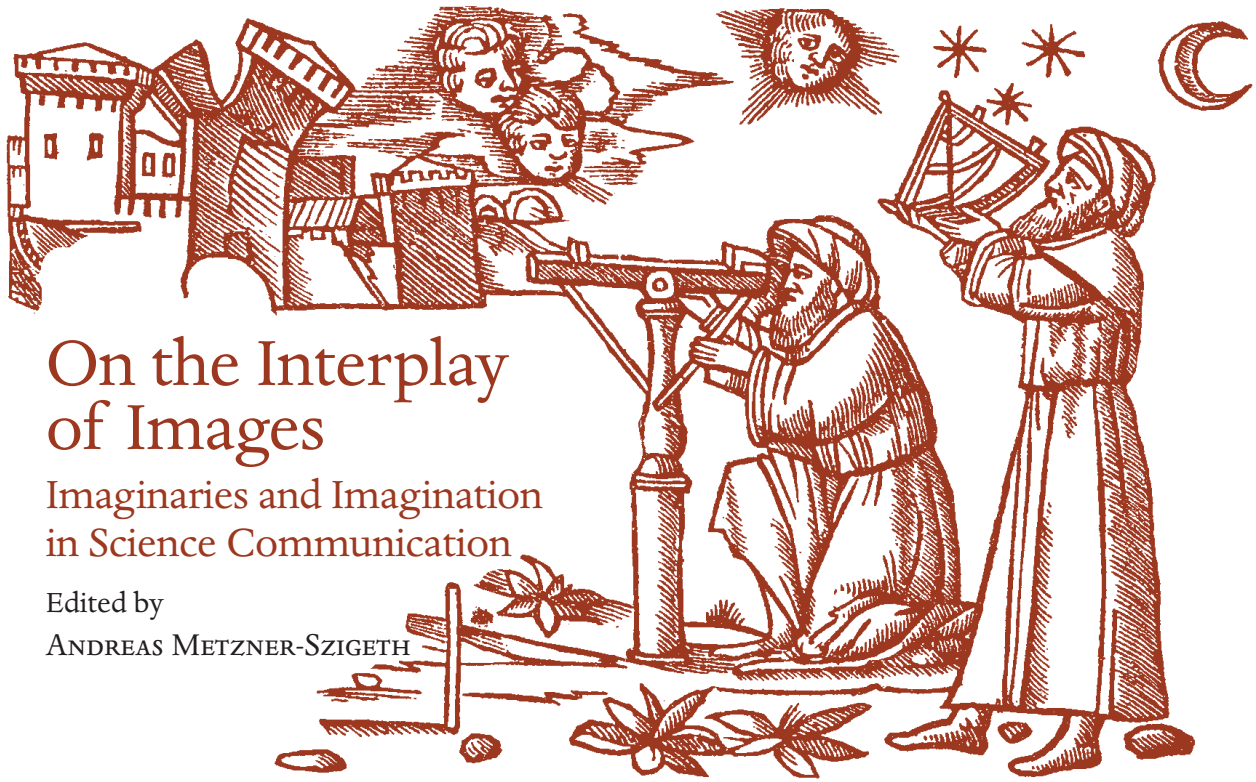
da

ON THE INTERPLAY OF IMAGES
Imaginaries and Imagination in Science Communication

Edited by Andreas Metzner-Szigeth

On the Interplay of Images

Imaginaries and Imagination in Science Communication

Edited by
Andreas Metzner-Szigeth

Leo S. Olschki
2022

scientia atQue usus

Comitato di Direzione

Claudio Baraldi, José Antonio Cordón-García,
Andreas Metzner-Szigeth, Luca Toschi (Direttore scientifico)

Comitato Scientifico

In considerazione della natura progettualmente dinamica
di questa collana, si rinvia a:
www.scientiatqueusus.org | www.olschki.it

The texts in this volume were subjected to *double blind peer review*

On the Interplay of Images
Imaginaries and Imagination
in Science Communication

Edited by
ANDREAS METZNER-SZIGETH

CONTENTS

CONTENTS

Appendix

Waltraud Kofler Engl – Alexandra Budabin – Gaia Piccarolo

CULTURAL HERITAGE IMAGINARIES OF CONFLICT IN THE MOUNTAINS ENABLED BY DIGITAL APPS

1. Introduction

The grandeur of the mountains invariably moves visitors who journey to the high plateau of the Sesto Dolomites. The natural beauty of the Dolomite landscape holds 'outstanding universal value' and status as a UNESCO World Heritage Site.[1] However, this high plateau is also marked with historical value as a former World War I battlefield, as the first military front located 3,900 meters above sea level (Labanca and Überegger 2015). Indeed, hikers' trails had a history of military routes for this glacial front. Advancements in the study of the archaeology of conflicts have made it possible to map and catalogue the traces of this historical event (Kofler Engl 2020). The complexity of the Sesto Dolomites landscape has been the subject of a research project that has captured remaining material traces of the war, uncovered historical documents, and mined intergenerational oral memories. This scientific research will be made publicly available through a digital app to enrich visitors' experience in the region and provide new knowledge to local populations about this cultural heritage site.

The use of digital apps has expanded the possibilities for mediating the public's engagement with cultural heritage. The multimedia affordances of this technology have certainly enhanced the experience of visiting physical sites with the provision of accessible and additional information. However, the proliferation of these digital apps also needs to be contextualised in light of ongoing debates on media use in cultural heritage. Researchers

---

[1] https://www.dolomitiunesco.info/?lang=en#:~:text=In%202009%20UNESCO%20listed%20the,Italian%20provinces%20and%203%20regions.

in science communication should be aware of appropriate criteria when choosing whether or not to develop and use digital apps. While providing images and stoking imaginations foster interest in cultural heritage, the process of mediation is inevitably one of curation and restraint. We draw on this volume's concept of imaginaries, defined as associative complexes (that) simultaneously shape and limit our understanding of scientific findings (cf. *Studying the Role of Visual Imaginary in Science Communication – Introduction to the Volume* by Andreas Metzner-Szigeth as published in this book) as a call to highlight and resolve those limits. Here we take on questions concerning how media shape our relationship to cultural heritage: How do digital apps help unveil and convey hidden meanings of a place, and more specifically, a landscape or natural site filled with traces, stories and memories? Which criteria do digital apps simultaneously enhance and bind our understanding of cultural heritage? What ideas can mediate the risks of presenting a mountain-based conflict / cultural heritage site?

The chapter proceeds as follows. We shall review the contemporary literature on interactive digital technology for cultural heritage sites and for mediating the visitor's experience in a landscape site. We will focus on the dynamics of cultural heritage communication concerning the conflict in the mountains, which is key to illustrating the interplay between images, imaginaries, and imagination in science communication. We will present some of the debates around the uses of digital apps and discuss how the experience of visiting a physical site of cultural heritage is enriched. Debates will consider the aesthetic, practical, and narrative aspects of using virtual images (including maps and 3D renderings), oral histories, and interactive elements. We will explore how digital apps offer new possibilities for mediating our relationship to cultural heritage that, at the same time, may also limit our understanding. In this context, we will apply lessons from these debates to the case study of the project *Written in the Landscape. Places, Traces, and Memories of World War I in the Sesto Dolomites*, which is producing a digital app-based on archaeological, sociological, and historical materials.[2] We have focused on elements concerning the landscape site, maps, imag-

––––––––––

es, narratives, and public engagement. We will conclude with thoughts on ways of moving forward with the affordances and risks of digital apps.

2. Media and cultural heritage

Cultural heritage has long implied a process of curation by which professionals mediate the experience of important heritage sites for the public. The process often involves the use of gallery educators, guides, maps, and the inclusion of placards on the walls of museums. The above media enhance the visitor experience in outdoor spaces while including billboards and other signage. Overall, this experience is unidirectional, direct, and for the most part, a 2-D experience that provides information about a cultural heritage site. Of course, some multimedia features can be incorporated, like audio and video clips, into the 'guided' tour. However, those media do not provide or scarcely provide the possibility for interacting or responding to the presentation of the cultural heritage authority. For example, think of how a guidebook can lead us through a museum or a site on a designated path, sharing additional images, providing textual contributions, but offering no outlet for commenting or responding.

2.1. *Digital heritage*

New possibilities for cultural heritage mediation have come to the fore with digital technology such as the internet, smartphones, and social media. For conservation efforts, there is pressure now for museums and heritage organisations «to digitise their holdings» (Bentkowska-Kafel 2017, p. xxxiv). Elements such as 3D scanning «play a major role in the preservation and restoration of physical, cultural assets» (Interreg Europe 2018, p. 2). However, digital media has also changed the modes and possibilities for transmitting cultural heritage and expanding the scope of public engagement. Heritage institutions use these tools as part of «opening up to diverse communities and inviting different viewpoints and interpretations of (…) sites and collections«(Economou 2016, p. 216).

First is the welcome expansion of access to cultural heritage through digital media that makes materials available online. As one EU report observed, digitisation «provides huge opportunities for improving public access to different forms of cultural assets» (Interreg Europe 2018, p.2). Cultural heritage is made available in digital media in various forms: virtual reconstructions, digital collections of artefacts, online videos, online

games, and interactive applications (ECONOMOU 2016, p. 215). These forms also engage younger generations, who, through their smartphones, can engage more with cultural heritage. Alternatively, digital media can bring in members of the public who cannot travel and visit particular institutions and sites.

Secondly, digital heritage allows heritage organisations to enrich the experience of binding sites by providing additional information. It may mean creating highly immersive 3D environments through virtual and augmented reality to recreate historical contexts for storytelling possibilities. The possibility of recreating an environment is advantageous when dealing with vulnerable sites that experience erosion or decay (DI BENEDETTO *et al*. 2020). Further, the digitalisation of intangible heritage that may lie outside museums and sites – through audio and video – can be brought together fruitfully with more tangible elements (ECONOMOU 2016, p. 224).

Finally, these developments accompany efforts around democratisation in cultural heritage by enhancing capacities for sharing and enabling participation. Digital media can provide interaction platforms that engage the public and challenge the top-down configuration of previous cultural heritage practices. Particularly with social media, it is possible to «personalise this digital heritage material, share it with different communities and make it their own, blurring the boundaries between the public and personal spheres» (ECONOMOU 2016, p. 216). The use of crowdsourcing, where communities assist in heritage-making, is another way to engage the public and redefine the nature of expertise in the field.

Nevertheless, these developments in digital media come with discussions around their value, sustainability, and appropriateness that preoccupy the field of cultural heritage (KALAY 2008). Gimmicks like gaming and social media may tip such efforts into the realm of entertainment and superficial engagement. Digitalisation should not substitute for long-term presentation tools, nor should the physical experience of heritage be underestimated (ECONOMOU 2016, pp. 244-245). Professionals remain concerned about whether heritage site visitors are emotionally reached through digital media (PERRY *et al*. 2017). Moreover, while ideas around stewardship and ownership of cultural heritage may be evolving in light of digital tools, there remain concerns about who is producing/using this technology and for what purposes (ECONOMOU 2016, p. 224). Celebrations of expanded access through smartphones and social media need to continue developing ways of «supporting cultural engagement with communities at risk of marginalisation via digital tools and technologies» (GIGLITTO *et al*. 2019, Section 2.1). These are some of the debates we will keep in mind as we explore the uses of digital apps for cultural heritage.

2.2. *Mediating landscape heritage imaginaries*

An app should not diminish the effect of the landscape on visitors nor discourage visitors from physically going and experiencing the landscape in person. Feeling and perceiving the landscape in situ should be the goal of app designers and should stimulate reflection without attempting to dominate the narrative and the way heritage is presented. Tim Ingold's 'dwelling perspective' (1993), which we adopt in this paper, defines the landscape as the set of traces produced by gestures, actions and relationships that are deposited over time and remain incorporated in its physical and perceptual consistency, in a continuous process of erasure and overwriting. The landscape has a solid narrative character. It is rooted in time and memories and, as in an archaeological plan, it bears the imprinted material traces. As Ingold suggests: «the landscape tells - or rather is - a story» (INGOLD 1993, p. 152). In this sense, perceiving a landscape is an act of memory, «of engaging perceptually with an environment that is itself pregnant with the past» (INGOLD 1993, p. 153). We also know from the rich literature on the subject (ROGER 1997; JACOB 2009) that the act of perceiving a landscape is never a neutral operation but happens through the mediation of a cultural construct. The landscape is understood by visitors as a conceptual, literary, poetic, pictorial, and ethical construction formed in a specific historical context and gradually consolidated into a complete and identifiable representation. A particular landscape can become an intangible collective heritage, «a stable and long-lived entity, which acts in culture as a perceptive, aesthetic, sentimental category and sometimes translates into politics and practice» (CELLINI 2015, p. 54).

Therefore, our way of perceiving the landscape has close links with the imagery deposited on it and the historical process that has come down to us and is expected to survive us. By articulating the different narrative levels related to the landscape of the Sexten/Sesto Dolomites and introducing new representations in place of those already established, the digital app takes upon itself the responsibility of mediating imagery capable of subtly modifying the interpretation and perception of the site's cultural heritage with the conflict in the mountains.

One of the objectives pursued by the project *Written in the Landscape* is that the currently prevailing imagery – centred on the one hand on the evocation of heroic military actions and the other hand on tourist values unencumbered by any conflictual memory – can be approached by a deeper and more stratified system of imagery. In the end, the site's actual tourist values become organically integrated with the archaeological, historical, cultural and anthropological values.

3. Case study: Written in the Landscape

The broader context for cultural heritage digital media discussion is related to an international collaborative project called *Written in the Landscape. Places, Traces, and Memories of World War I in the Sesto Dolomites*, of which we are developing a digital app as part of our public engagement. The digital app will guide the leading project site: the Altopiano delle Tre Cime, a high mountain plateau, the site of the front line between Italian and Austro-Hungarian forces during World War 1. This part of the Dolomite Front (stretching from Veneto to East Tyrol and Carinthia) is several kilometers wide and contains paths, command posts, trenches, gun-crew shelters, caverns, cable-car stations and inscriptions that have not yet been thoroughly researched and documented (Kofler Engl 2020). Several conventional guides present the site's history (see Kübler and Reider 2011), and a map produced by the local historical association Bellum Aquilarum is available to visitors.[3] However, the project and digital app is aimed at expanding the case study 'imaginary'

around the Alpine frontier at war to stir the 'imagination' of locals and visitors as part of a participatory heritage-making process. A second site, which symbolises the homefront and will also be explored by the app, is the town of Sesto/Sexten, which lies below the mountains and had the role of a supply base for the mountain site during the war period.

The digital app will incorporate the data collected over two years through archaeological, historical, and sociological methods. Today, it is possible to see the remains of fortifications, trenches, and tunnels and find artefacts of the fighting, such as tin cans, wooden ladders, barbed wire, and even bullet casings (cf. Pic. VII). At the site of the Tre Cime, conflict archaeologists from the company Arc-Team[4] and a project researcher conducted and documented an archaeological survey of the material traces and structures using differential GPS, drones, and panoramic cameras. This was followed by a 3D elaboration of the data collected during the fieldwork and integration with GIS. This included studying locations like tunnels, underground environments, and strategic military installations perched on rocks.

Pic. VII (in the Appendix). Tre Cime, Summer 2021.

---

[3] http://www.bellumaquilarum.it/englisch/.
[4] https://www.arc-team.com/team.php.

In the case of the barely visible war traces imprinted in the Dolomites of Sesto, the co-presence and the dialogue of different media in the digital app will allow for the composition of different narrative levels. These will offer a much more complex representation than that provided by the Dolomites as a simple physical and topographical substance. Mediation through the digital app – through visual and oral means – will stimulate participation both on an emotional and intellectual level.

A second project researcher visited archives in Italy and Austria to locate documents, photographs, and sketches of military campaigns, buildings and sites in the Tre Cime area to complement the research and develop an understanding of the site at additional levels. She also visited local associations and archives to gather soldiers' diaries, letters, photographs, and other private records of everyday life on the front and at the rear. A third project researcher made contact with the inhabitants of Sesto / Sexten and their descendants, conducted audio and video interviews and focus groups on exploring the impact this site had on their lives in order to capture the memory and culture surrounding World War I.

This additional documentation, oral histories, and accounts deepen knowledge of the Tre Cime as a battlefield and expand our understanding of what the Tre Cime symbolises as a site of cultural heritage for locals. Further, participatory initiatives among the public have engaged and will continue to engage the larger community of visitors and mountaineers who visit the area. This cultural memory, which elicits the rituals and values surrounding the Tre Cime site both before and after the war, belongs to the intangible heritage of the place.

Studying the tangible and intangible heritage of a conflict in a mountain area presents unique challenges in devising a digital app, which needs to offer integrity to the research and enable meaningful public participation in the present and the future. Challenges include facing practical obstacles in relation to the mountainous terrain and local community's engagement and more technical issues such as the ability of the app to elicit historical evidence of the battlefield without glorifying militarism and 'fossilising' this particular event and time in the history of the landscape. As a digital app that draws visitors to a war site or an area scarred by conflict, there is concern that such an app should not promote 'disaster tourism' (Kelman and Dodds 2009). At the same time, the app needs to respect the fact that the events of World War 1 were a catastrophe: on the front, in Sesto / Sexten, on the home front, and for the countries involved in the war. A digital app must be structured with sensitivity to the tensions related to mediating the tangible and intangible heritage of a conflict in the mountain. In the next section, we will look at some of the specific affordances for digital

apps and establish aesthetic, ethical, and practical criteria concerning their use in mediating cultural heritage for the public. This includes discussing the opportunities and pitfalls of the digital mediation of cultural heritage that can inform the scientific research community.

4. Digital apps for cultural heritage

Digital apps are programs available on smartphones, enabling visitors to enjoy a guided tour through their surroundings. These have usually been employed in bounded interior spaces with enclosed WiFi connections, for example, in traditional museum settings. Using mobile devices outdoors opens up novel opportunities to perceive new landscape areas through a heritage interpretation medium. On a practical note, a printable leaflet and hiking map may accompany an app that might be downloaded before beginning the itinerary in areas where WiFi may be spotty.

4.1. *A multilayered experience of many landscapes*

Above all, the digital app should mediate how users experience cultural heritage while immersed in the landscape. The device offers a different experience from the one offered by an 'open-air museum'. The physical and topographical substance of the landscape remains an inescapable fact, which the app does not claim to replace. The app offers a tool capable of revealing meanings and stories that are embedded in the landscape. It does not affect the public's direct, irreplaceable, perceived experience of the place. With the app, the experience of the landscape in all its spatial and sensory dimensions enables the public to approach its layers of meaning emotionally. In contrast to a museum itinerary marked by physical elements, the digital app introduces a less passive relationship between the user and the site and avoids the risk of guiding an experience of the place that is too rigid and controlled. The superimposition of messages that add depth to the landscape reading must not replace the main message, which is and must remain the landscape itself.

To this end, the app's design for the project *Written in the Landscape* will begin in the valley, particularly in the village of Sesto. This starting point will offer a more evident connection between Sesto/Sexten as a place of war and the scenarios of fighting at high altitudes. It brings to the forefront the too often ignored relationships, exchanges and influences between the internal front and the actual front, which were not only logistical and strategic but also emotional and personal.

The landscape experience is presented in two fundamental moments: the direct on-site experience conceived as a walk of free exploration and an individual approach to the Tre Cime Plateau. This is followed by the third moment when the images preserved in the memory of the Sesto / Sexten inhabitants are presented as historical images, archaeological reconstructions of war structures, interactive maps, and intergenerational stories. This will open a window for interested users on the various manifestations of the 'culture of memory' linked to the site.

4.2. *Maps and itineraries*

One method for enhancing the visitor's experience is to create maps that establish «a contextual relationship between users, their physical surroundings (museums and heritage sites) and the virtual environment (cultural content)» (Bekele 2019, p. 2). There are different ways of doing this. The simplest way is to provide the user with a static map. Another popular technique is to engage the public while setting up small plaques with quick response (QR) codes, which indicate that mobile interpretation is available for a site (Galani and Kidd 2019, p. 5). Nevertheless, the latter option involves a material intervention of conservationists in a location, something that may not always be in their interest.

A new model offers an engaging and less intrusive method: the use of Geospatial Augmented Reality (GAR) which can achieve the «overlaying graphical elements over the real world or merging them with georeferenced virtual environments» (Bekele 2019, p. 3). GPS-enabled maps that operate on geospatial information can «enrich visiting experience with immersive, engaging, informative and interactive virtual elements» (Bekele 2019, p. 3). For example, in the geolocation app *Sicily Histories* (see Pic. VIII), the visitor is made aware of dozens of points of interest corresponding to sites of historical and cultural significance.[5] Then, visitors can gather additional information and follow itineraries to find other sites of interest.

Pic. VIII (in the Appendix). Screenshot of *Sicily Histories* app.

Nevertheless, to map is to mediate cultural heritage in ways dictated not only by the maneuverability of a site but also out of concern for protecting vulnerable parts of the environment from human encounters. For our project on World War I in the Sesto Dolomites, geospatial technolo-

---

[5] http://www.histories.it/index_eng.html.

gy and an itinerary for guiding visitors offer clear advantages. Putting up signage or even small plaques with QR codes in the natural setting would disturb the environment nor is the display of new paths or routes possible in a UNESCO World Heritage Site. Thus, guiding visitors along safe paths helps them avoid unstable areas and protects the material traces in the environment (ladders, barracks) from unwanted intervention.

However, by providing information about a battlefield in the open natural landscape, there is no authority to stop visitors from going 'off the path' and attempting to reach vulnerable sites and collect artefacts (which is illegal). Hence, alongside these advantages of guiding and offering safe itineraries, there are serious risks associated with this technology: a map may act as a guide and an enticement. Taking visitors to this sensitive, delicate environment with an app could be a threat, opening the site to both exploration and abuse. It will be imperative to stress the fragility of the site at the beginning of the itinerary to instill in visitors a sense of collective responsibility for the cultural heritage.

4.3. *Images*

In addition to guided maps, the media provided by digital apps can consist of a mix of virtual images, archival photos, satellite imagery, and aerial photography. A digital app can provide geospatial location technology and site-specific visuals. The possibilities for enhancing the experience are straightforward. In the built environment or even a popular natural site, as Galani and Kidd write, apps encourage «participants to imagine absence where there was a presence and to make (an) familiar place unfamiliar» (2019, p. 3). There is also the opportunity to work between 'the digital and the analogue' as items in the landscape may still be present (Galani and Kidd 2019, p. 3).

This technological affordance is helpful for sites where history is not readily apparent or even known. For example, the *In Loco* app explores abandoned buildings in the Italian region of Romagna, providing a mix of historical and current images to explain a particular site's architecture, usage, and transformation (see also Figs. 1 and 2 on the next page).[6] The above-abandoned site is brought alive by the memory of people who used the building in the past in a commonly used then/now presentation. Nevertheless, combining these elements must be understood as conveying a particular landscape reading.

---

[6] https://inloco.eu/lavori-in-trascorso/.

Our digital app for *Written in the Landscape* will include imagery from field research based on photographic and graphic documentation of the still-existing traces and structures of the militarized landscape and its topography. The research provides satellite geodesy and photogrammetry that have produced precise and even three-dimensional images of the extensive installations in the landscape. The app risks dictating a specific interpretation of the heritage environment. Indeed, photos of this battlefield are overwhelmingly placid - the barracks life, sentinels on high ridges, and soldiers surviving the harsh winters. The use of apps could complicate this

Fig. 1 and 2. Screenshot of *In Loco* app. Credit Alexandra C. Budabin.

dominant narrative by providing imagery that challenges some assumptions about the battlefield – the presence of women and other civilians, the horrors of the fighting, and a closer reading of how people experience war emotionally (WEGNER 2021).

The enhancement afforded by layering visuals also runs the risk of locking the story of a site into two sets of visuals – then and now – that produces a limiting effect for cultural heritage, particularly around conflict as described above. Indeed, there is plenty missing when images become icons and stand-in for a site that has a decades-long history. Before World War I, the Tre Cime had a history and now plays a symbolic role in post-war recollection and rituals and anti-war activism around Ukraine, as we have seen.[7] For some, the militarised history of the Tre Cime is not worth remembering at all. However, the potential distortion effects of then/now can be mitigated by including multi-vocal narratives and connecting a wide range of artefacts to personal stories, as described in the next section.

4.4. Narratives

With their multimedia capabilities, such as audio and video, digital apps can provide a richer narrative of a cultural site. Oral testimonies and written histories can be included as audio files to give characters that enliven a site. This means hearing from people directly connected to the cultural heritage or from others who reflect on what an artefact or site means to them. For example, the Museo Archeologico Nazionale delle Marche allows individuals to download a tour with QR codes that provides vignettes and games about the objects on display.[8] In another example, the *Gettysburg AR Experience* app lets users interact with soldiers and civilians who participated in this historic U.S. battle during the Civil War.[9]

Digital apps can thus incorporate different narratives and perspectives on historical events, the landscape, and cultural heritage. They might include factual statements and information of the time, such as quotes from soldiers, but not only; narratives from everyday war life and the home front supported by photos and plans can offer a suitable counterpoint to the war zone. The inclusion of alternate perspectives conveys to today's

---

[7] On March 14, 2022, an Instagram user ('dolomiti_passione') posted a picture of the Tre Cime with the hashtag #stopwar about the war in Ukraine.

[8] https://izi.travel/it/b0b9-le-storie-del-museo-archeologico-nazionale-delle-marche/it#a7d2-brocca-con-bocca-obliqua-da-conelle-di-arcevia/it.

[9] *Gettysburg AR Experience* | American Battlefield Trust, https://www.battlefields.org/visit/mobile-apps/gettysburg-ar-experience.

recipients what it meant to humanly, emotionally, and logistically experience the frontlines and civilian life in wartime. The inclusion of alternative viewpoints and voices can prevent some of the sensationalism often linked to war and other catastrophes.

Indeed, the app should primarily appeal to local audiences and the local population and explicitly aim at teaching/communicating/engaging young people. A product that focuses on this target group can also attract tourists from within the country and abroad. In other words, the digital app does not have to be a product that is primarily tourist-oriented and reduces local-related content or even conceals local stories because they are not appealing. Digital apps created and used for marketing reasons as part of tourist activities may risk diluting the content and narrowly presenting historical events. The ability of the app to carry multiple narratives - from different sources, including locals' interviews and texts - with multimedia affordances can valorise local expertise and mediate a more complex approach to cultural heritage.

4.5. *Public engagement*

Digital tools offer new possibilities for making heritage come alive and for what has been called the 'co-production of a heritage'. This practice takes heritage-making (BENDIX 2008) out of the hands of national institutes and international organisations to challenge 'authorised heritage discourse' (SMITH 2006). Here, digital apps enable local communities to weigh in and offer interpretations based on different types of expertise and alternative narratives (KALAY 2008, p. 5), a right granted in 2005 as part of the Faro Convention.[10] Digital apps facilitate this 'bottom-up' approach to heritage through various interactive features born of Web 3.0 that move beyond connecting people to connecting knowledge (POCE *et al.* 2019, p. 289). Options include the following: Users can add their photos, comment, and even see each other's comments and photographs (VRETTAKIS *et al.* 2019, p. 8).

Opening up the dominant narrative to perspectives from locals and other users may lead to contention for any cultural heritage site. Debates on heritage knowledge in the age of social media reflect the many challenges of fostering dialogue and inclusive spaces in heritage making (see GIACCARDI 2012). Digital apps thus demand responsible monitoring to sustain these critical conversations and support contrary views. The prospects for increasing participation are an advantage for digital apps but maintaining this space will require rules for behaviour and exchange. Further, privacy

---

[10] https://www.coe.int/en/web/culture-and-heritage/faro-convention.

concerns may become paramount with voices at the margins or even those from the local community requiring anonymity.

This aspect is critical for a project on World War I in the Dolomites, where there is no consensus on the cultural heritage value of a battlefield where so many people lost their lives as part of a war that indelibly altered the course of European history. Places, traces of buildings and intergenerational oral memories of WWI continue to constitute a "hurtful" and "dark" heritage for some people living in the Dolomites (see Uzzell and Ballantyne 1998; Foley and Lennon 1996). Scholars now speak of dissonant heritage, the existence of diverse viewpoints and opinions on cultural heritage, particularly in connection to aspects of European history and today's political landscape (Lähdesmäki *et al*. 2019). Public engagement in such a project must prepare for possible contention and find a means to respect and include diverse opinions.

5. Conclusion

The curation of cultural heritage embodies the interplay between images, imaginations, and imaginaries as a mediated experience. This chapter explored how institutions use digital media to communicate new information related to cultural heritage. Specifically, we looked at digital apps that offer new ways to shape our understanding of the world and can mediate artistic, graphic, linguistic design and narrative content. We reflected on the challenges of using such digital apps to communicate cultural heritage related to past conflicts in the mountains. We offered ways to mitigate risks around making cultural heritage sensational by paying attention to images, narratives, and uses of public engagement. We also acknowledged the need to balance the app with maps of the terrain to entice visitors while at the same time protecting the fragile landscape. Above all, we find that an appropriate and respectful app should recognize that history needs to be presented through multiple narratives, a mix of texts and images, and through memories from the past in order to foster a lively and responsible public engagement. The app user thus becomes an active (co-)creator of this heritage and users, through their experiences and visits to cultural heritage sites, can motivate others to participate (through their own travels/hiking/research/retelling). Above all, in thinking about digital media, both the maker and the user of cultural heritage are responsible. This intentionality must be present in all uses of digital media to communicate cultural heritage in ways that do not reinforce poor practices around stewardship, institutional authority, and elitist control.

Literature

Bekele 2019 = Bekele, M.K., *Walkable Mixed Reality Map as interaction interface for Virtual Heritage*, «Digital Applications in Archaeology and Cultural Heritage», 15, e00127, 2019, pp. 1-11.

Bendix 2008 = Bendix, R., *Heritage between economy and politics*, in L. Smith – N. Nakagawa (eds.), *Intangible Heritage*, London / New York, Routledge, 2008, pp. 253-269.

Bentkowska-Kafel 2017 = Bentkowska-Kafel, A., *Introduction*, in A. Bentkowska-Kafel – L. Macdonald (eds.), *Digital Techniques for Documenting and Preserving Cultural Heritage, Yorkshire, ARC Humanities Press*, 2017, pp. xxxiv-xliv.

Bezzi – Bezzi – Ducke 2010 = Bezzi, A. – Bezzi, L. – Ducke, B., *Computer Vision e Structure from Motion*, nuove metodologie per la documentazione archeologica tridimensionale: un approccio aperto, in G. De Felice – M.G. Sibilano (eds.), *Archeofoss. Open source, Free Software e Open Format nei processi di ricerca archaeologica*, Bari, Edipuglia, 2010, pp. 103-111.

Cellini 2015 = Cellini, F., *Roma: la costruzione del paesaggio delle rovine*, in L. Franciosini – C. Casadei (eds.), *Architettura e Patrimonio: progettare in un paese antico*, Roma, Mancosu Editore, 2015, pp. 54-67.

Di Benedetto *et al.* 2020 = Di Benedetto, C., Gautier, A., Guarino, V., Allocca, P., De Vita, P., Morra, V., Cappelletti, P., Calcaterra, D., *Knowledge-Based Model for Geomaterials in the Ancient Centre of Naples (Italy): Towards an Integrated Approach to Cultural Heritage – ScienceDirect*, «Digital Applications in Archaeology and Cultural Heritage», 18, 2020.

Economou 2016 = Economou, M., *Heritage in the Digital Age*, in W. Logan – M.N. Craith – U. Kockel (eds.), *A Companion to Heritage Studies*, Edison / NJ, John Wiley & Sons, 2016, pp. 215-228.

Foley – Lennon 1996 = Foley, M. – Lennon, J., *Editorial: Heart of Darkness*, «International Journal of Heritage Studies», 2(4), 1996, pp. 195-197.

Galina – Kidd 2019 = Galina, A. – Kidd, J., *Evaluating Digital Cultural Heritage 'in the Wild': The Case for Reflexivity*, «ACM Journal on Computing and Cultural Heritage», 12(1), 2019, pp. 1-15.

Giaccardi 2019 = Giaccardi, E. (ed.), *Heritage and Social Media: Understanding Heritage in a Participatory Culture*, New York, Routledge, 2019.

Giglitto *et al.* 2019 = Giglitto, D., Ciolfi, L., Classe, C., Lockley, E., *Bridging cultural heritage and communities through digital technologies: Understanding perspectives and challenges*, «C&T» June 3-7, Vienna / Austria, 2019.

Lähdesmäki, Passerini, Kaasik-Krogerus, Van Huis 2019 = Lähdesmäki, T., Passerini, L., Kaasik-Krogerus, S., Van Huis, I. (eds.), *Dissonant Heritage and Memories in Contemporary Europe*, New York, Springer, 2019.

Interreg Europe 2018 = Interreg Europe, *Digital solutions in cultural heritage: A policy brief from the policy learning platform on environment and resource efficiency*, European Union, European Regional Development Fund, August 2018.

Ingold 1993 = Ingold, T., *The temporality of the landscape*, «World Archaeology», 25(2), 1993, pp. 152-174.

Jacob 2009 = Jacob, M., *Il paesaggio*, Bologna, il Mulino, 2009.

KALAY 2008 = KALAY, Y.E., *Introduction: Preserving cultural heritage through digital media*, in Y.E. KALAY – T. KVAN – J. AFFLECK, *New Heritage: New Media and Cultural Heritage*, London/New York, Routledge, 2008, pp. 1-10.

KELLMAN – DODDS 2009 = KELLMAN, I. – DODDS, R., *Developing a Code of Ethics for Disaster Tourism*, «International Journal of Mass Emergencies and Disasters», 27 (3), 2009, pp. 272-296.

KOFLER ENGL 2020 = KOFLER ENGL, W., *Archaeology of World War I in the Alpine Region. Locations and Traces of the High Mountain Front of the First World War in the Dolomites and Ortler Glacier*, «ICOMOS – Hefte des Deutschen Nationalkomitees», 73, 2020, pp. 33-39.

KÜBLER – REIDER 2011 = KÜBLER, P. – REIDER, H., *Kampf um die Drei Zinnen*, Sexten, Reider Touristik K.G, 2011.

LABANCA – ÜBEREGGER 2015 = LABANCA, N. – ÜBEREGGER, O. (eds.), *Krieg in den Alpen. Österreich-Ungarn und Italien im Ersten Weltkrieg (1914–1918)*, Wien, Köln, Weimar, Bohlau, 2015.

PERRY *et al.* 2017 = PERRY, S., ROUSSEAU, M., ECONOMOU, M., YOUNG, H., PUJOL, L., *Moving Beyond the Virtual Museum: Engaging Visitors Emotionally*, 23rd International Conference on Virtual Systems & Multimedia (VSMM), Dublin, 2017, pp. 1-8.

POCE *et al.* 2019 = POCE, A. – AMENDUNI, F. – AGRUSTI, F., *Rethinking high-tech tools for cultural heritage education. In-training reflections on Musetech web app*, «Form@re», 19 (1), 2019, pp. 287-300.

ROGER 1997 = ROGER, A., *Court traité du paysage*, Paris, Gallimard, 1997.

SMITH 2006 = SMITH, L., *Uses of Heritage*, New York, Routledge, 2006.

UZZELL – BALLANTYNE 1998 = UZZELL, D.L. – BALLANTYNE, R., *Heritage that hurts: Interpretation in a post-modern world*, in D.L. UZZELL – R. BALLANTYNE (eds.), *Contemporary Issues in Heritage and Environmental Interpretation: Problems and Prospects*, London, The Stationery Office, 1998, pp. 152-171.

VRETTAKIS *et al.* 2019 = VRETTAKIS, E., KURTIS V., KATIFORI A., KARVOUNIS M., LOUGIAKIS C., IOANNADIS Y., *Narrative – Creating and Experiencing Mobile Digital Storytelling in Cultural Heritage*, «Digital Applications in Archaeology and Cultural Heritage», 15, 2019, pp. 1-17.

WEGNER 2021 = WEGNER, N., *Ritual, Rhythms, and the Discomforting Endurance of Militarism: Affective Methodologies and Ethico-Political Challenges*, «Global Studies Quarterly», 1, 2021, pp. 1-10.
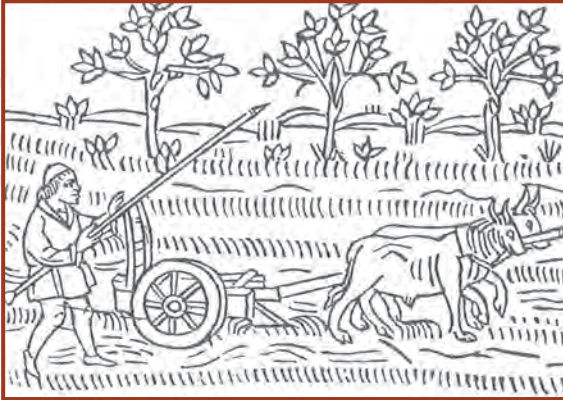
VII

VIII

Pic. VII (Chapter 18). Tre Cime, Summer 2021. Photo by Gaia Piccarolo.
Pic. VIII (Chapter 18). Screenshot of *Sicily Histories* app. Credit Alexandra C. Budabin.

The dynamics of images, imaginaries and imagination play a crucial role – in academic as well as in public discourses! What kind of essential relations exist between different expressive forms and patterns of thought? How can we understand the principles determining the ways in which their dynamics take effect – in the practice of scientists and engineers, and at their interfaces with politics, economy, culture and the public? Which options do we have to make good use of our insights?

Despite of the diversity of topics – treated with either more interest in theoretical reflections, programmatic considerations or practice-oriented descriptions – all contributions to this volume share a common interest: to raise our awareness and understanding of the generative capacities of these processes.

Exploring this prolific interplay is of utmost importance for expanding our ability to identify emerging opportunities, to create future perspectives, and to assess the societal consequences of scientific and technological developments. This expansion is indispensable if we really want to be clear about our preferences whilst shaping the ongoing stream of inventions and innovations according to our values.

€ 45,00