UNIVERSITY OF SOUTHAMPTON

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Augmenting Archaeological Walks. Theoretical and Methodological Considerations.

by

Angeliki Chrysanthi

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ABSTRACT

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One of the most undertheorised and unimaginatively conducted aspects of Archaeological Heritage Management (AHM) is planning for on-site visitor movement. The identified under-theorisation and limitation of methodologies for assessing, conceiving and planning archaeological walks was the launching point of this research endeavour. This research aims to expand on Manovich's notion of 'augmented space' in processes of dealing with visitor movement and archaeological walk planning. More specifically, it seeks to establish an interdisciplinary dialogue in order to identify the underexplored links between the visitor-archaeological site interaction, common practices, digital interventions, as well as conceptual planning in order to investigate the main following question: What does it mean to plan for visitor movement in archaeological sites in today's technologically enhanced society? Further to this, it explores ways of how the aforementioned might work in synergy in assessing and planning interpretative archaeological walks. In order to achieve this dialogue, this research is drawing on well-established principles of AHM and interpretation *via* traditional and novel media, visitor mobility studies, architectural and media theory. In parallel, a variety of methods are explored and developed in order to support the main arguments of the thesis both on theoretical and evidence-based grounds. Based on the outcomes, this research addresses and challenges timely discussions on new theoretical directions, active engagements with heritage, informed creativity and creative solutions, for a strategic shift in dealings of research communities with cultural heritage sites and the public.

To my parents,

Thanasis and Anna

Table of Contents

List of Tables

List of Figures

DECLARATION OF AUTHORSHIP

I, Angeliki Chrysanthi.....

declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

Augmenting Archaeological Walks. Theoretical and Methodological Considerations.

I confirm that:

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3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
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Introduction

This research was initiated by a personal fascination with archaeological sites and the possible creative ways of communicating them *in situ* to the public. This fascination began soon after I started working at archaeological projects focusing mainly on prehistoric sites (as an undergraduate student at Art History and Archaeology Department, University of Athens), where I found myself particularly interested in the few offered courses focused on architecture of the past. My aspiration to study the built environments of the past was outweighed by new research directions pertinent to the different ways of communicating heritage places to the public; and rendering them relevant to the present. This interest in what built heritage had to offer to contemporary societies was not satisfied either after concluding my MSc degree on the interdepartmental programme 'Protection of Monuments, Sites and Complexes' (Architecture School, National Technical University of Athens), where I obtained my basic training in management and conservation of heritage sites. This training was characteristic of a 'Mediterranean tradition' of dealing with heritage remains (see Aygen 2013; de la Torre 1997; Jokilehto 1999; Mallouchou-Tufano 1998), where protection, enhancement of the material form (within the frame of international conventions) and other regulations are prioritised over interpretation (Cunliffe 2006; Demas 2002; Silberman and Callebaut 2006).

In a way, heritage management strategies - particularly in this region - remain true to the influences of the conservation movement (Uzzel 1998a) while the latter's objectives align well with the bureaucratic operating modes of state institutions (Smith 1994, 1996). While the once introspective and self-contained post-processual scholarship of the late 20th century was unable to influence the developments in the field of Cultural Heritage Management (CHM) (see Cleere 2000; Smith 1994), and although the latter is now concerned with broader socio/political issues of postmodernity, it is still largely conducted in a operationalised and processual manner, lacking theoretically informed approaches (Lekakis 2009; Smith 1994) and creative solutions (Ganiatsas 2015). Despite the progress that the field has shown, manifested in the international conventions, principles and the ever growing scholarship on public, community, identity and conflicting archaeologies, it has been argued that we are still in search of new paradigms for the interpretation, presentation and conservation of cultural heritage sites (Araoz 2011; Lekakis 2009; Silberman 2013).

Perhaps, one of the most undertheorised and unimaginatively conducted aspects of Archaeological Heritage Management (AHM) is planning for on-site visitor movement. The identified under-theorisation and limitation of methodologies for assessing, conceiving and planning archaeological walks was the launching point of this research endeavour. In the early stages of this research, this otherwise vast topic was associated with the idea that apart from conducting critical conservation assessments, it is important to understand the visitor-archaeological space interaction before and after planning accessibility and routing. It was also considered that the notions of movement and space are interrelated and thus the investigation of one informs the other and *vice versa*. At once, in our technologically advanced societies notions of space and movement are defined by a complex network of factors, tangible and intangible, physical and digital, which add another layer that requires consideration, when thinking about space and conduct of movement in archaeological sites. In an attempt to think critically on how we plan visitor movement within archaeological sites, build on previous relevant work and introduce new theoretical and methodological paths, this thesis is concerned with three distinctive but interconnected considerations, as I hope to demonstrate throughout this work.

The first refers to a better understanding of visitor movement within such spaces by considering it as a principal expression of the interactive relationship between the visitor and the archaeological site. The relationship of human movement with the perception of physical spaces has been studied in many disciplines both on a theoretical and scientific basis. In the Cultural Heritage domain, the relationship between visitor movement and interaction with space and exhibits has been mainly explored in the museum context (Bitgood *et al.* 1988; Kaynar 2005; Peponis *et al.* 2004; Rohloff 2011; Serrell 1998; Yalowitz and Bronnenkant 2009). Visitor movement in open-air sites has also been explored heavily in tourism scholarship, where certain rigorous methodologies have been developed to investigate collected time-space data (Shoval & Isaacson 2010, Russo *et al.* 2010). Much of this work is mainly concerned with tourist mobility research questions such as decision making, movement patterns and flows and space/destination consumption within urban centres and parks. Since this research initiated, the topic has attracted some attention in the context of visitor and heritage management studies as well. The objectives of such studies vary from exploring visitor motivations during family group visits (Moussouri and Roussos 2013) to informing site-specific interpretation and conservation programmes (Wallace 2013). All the aforementioned visitor-centred approaches provide an adequate background on formal methodologies for investigating the visitor-space interaction on account of different research questions. However, as it will be demonstrated

in the course of this thesis, such approaches have not yet been explored in the context of archaeological walk planning. Can observations and assessments of the visitor-heritage space interaction provide better insights in archaeological walk planning and how?

The second consideration refers to the notion of 'augmented space' (Manovich 2006) and how an ever growing literature on mixed-reality on-site interventions may address visitor movement planning. So far, some important work has suggested that the design of digital interpretative media, ought to consider the visitor space interaction, as it provides insights about what visitors value the most (Giaccardi 2011) and how they interact with and move within heritage spaces (Ciolfi and McLoughlin 2011). Several projects and frameworks have been extensively dealing with digital applications at heritage sites, claiming their stake in the augmentation of those spaces, but there have been many concerns about their technological drive instead of more integrated approaches to interpretative heritage (Monod and Klein 2005; Silberman 2007b), while their role in visitor movement has not been given much attention.

Finally, the role of physical interventions at heritage sites has been explored in the aforementioned traditional conservation context, in which accessibility has been mainly addressed as one of the practical considerations of AHM (Ganiatsas 1996). While the twofold role of archaeological walk planning in the protection and presentation of sites has been acknowledged (Dimakopoulos 2000; Doughty and Orbasli 2007; Palyvou 1997), the conceptual and methodological aspects of planning archaeological walks have received little attention, particularly at prehistoric sites which pose serious legibility issues and challenges (Doughty and Orbasli 2007). Additionally, contemporary interventions (apart from the different forms of applied conservation) have been mainly considered for creating visitor facilities in the marketed places of heritage (Hall and McArthur 1998; Silberman 2007a), often with wrong design principles. At the same time, the actual archaeological sites very often remain illegible and inaccessible; a fact which may have a certain impact on the visitor experience. Can contemporary design approaches contribute to visitor movement and interaction with archaeological spaces and how can this be explored at a conceptual level?

With these questions in mind, this research aims to expand on the notion of 'augmented space' in processes of dealing with visitor movement and archaeological walk planning. More specifically, it seeks to establish an interdisciplinary dialogue in order to identify the underexplored links between the visitor-archaeological site interaction, common practices, digital interventions, as well as conceptual planning and demonstrate how they might work

in synergy in assessing and planning interpretative archaeological walks. In order to achieve this dialogue, this research is drawing on well-established principles of AHM and interpretation *via* traditional and novel media, visitor mobility studies, architectural and media theory, as well as on a variety of methodologies, often developed for different purposes, in order to support the main arguments of the thesis both on a theoretical and evidence-based ground. This research does not aim to support a holistic approach to either archaeological walk planning or on-site interpretation. It rather seeks to suggest new theoretical directions and experiment with novel and traditional methodologies in considering movement in archaeological sites.

The central question of this thesis is: What does it mean to plan for visitor movement in archaeological sites in today's technologically enhanced society? In this, the notion of 'augmented space' aspires to be the overarching theme in considering movement within cultural heritage sites and investigating the following (see Fig. 0.1):

- Can observations of the visitor movement-archaeological site interaction contribute to archaeological walk planning and how?
- What is the influence of physical and digital affordances in our interactions with cultural heritage sites? how can this be explored at a methodological and conceptual level?

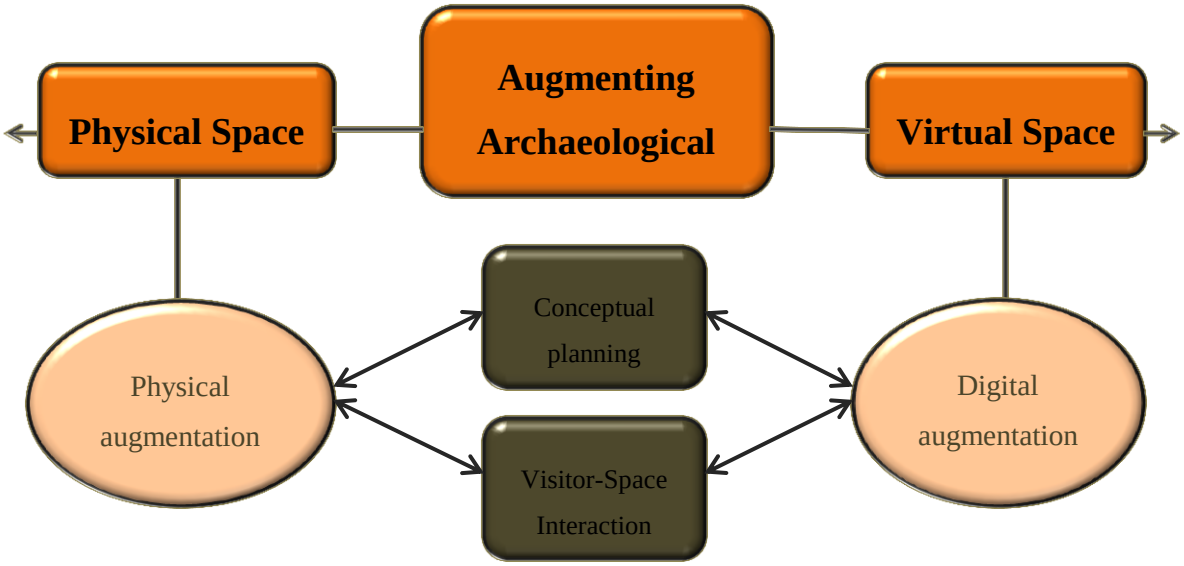


Figure 0.1 Conceptual schema of research topic

This thesis consists of seven chapters. Chapter 1 offers an introduction of ascertained practices in interpretative archaeological walks drawing from studies in the fields of AHM conservation and heritage management, visitor management and heritage media, as well as specific case studies. The literature review ascertained a significant lack of literature resources on the topic of dealing with visitor movement within rural heritage sites. This lack is accredited to the site specificity and the complexity involved in such undertakings. This chapter starts with an introduction about archaeological walks as part of the broader conservation planning of heritage sites and continues with a top down approach concerning how movement of cultural heritage visitors is dealt with and the implication of interpretative media. In addition, it introduces the three prehistoric rural archaeological sites, namely Gournia, Knossos and Çatalhöyük, that will serve as the case studies in order to unfold the argument of this thesis. The choice of those particular archaeological sites is argued on the basis that they present different challenges and current state of on-site visitation.

The purpose of Chapter 2 is to provide a theoretical discussion and background on linking the notion of space and human movement in cultural heritage sites and interpretation spaces in general. The chapter follows a circular pattern of narration to achieve this. Starting from the definition of 'heritage interpretation space' it continues with compartmentalising the notion of space to point out that the configurational properties of such spaces are reflected on human spatial movement. Apart from providing a broad theoretical background on the links between perception of space and movement as it has been identified in a variety of disciplines, this chapter turns once more the lenses to heritage spaces and presents the state of the art in methodologies used to observe visitor movement in contemporary interpretation spaces (i.e., museums) as well as open-air sites. Essentially, what is argued in the second chapter is that understanding the visitor-archaeological site interaction is an essential process of revealing the properties of such spaces and how movement is conducted; thus, providing an effective approach of informing accessibility and interpretative planning.

Chapter 3 describes the methodology developed for the purpose of studying movement and interactions taking place in archaeological sites as a tool for informing archaeological walk planning. While a visit in an archaeological site is in progress, people express their on-going interpretation with different decisions of movement. The main idea here is that observing people while interacting with the site, and capturing certain traces of this interaction is an act of revealing visitors' 'realities' about the site in the eyes of the

interpreter. The methodology was developed and fully applied at Gournia. The methodology was also partly applied at Knossos and Çatalhöyük in order to be assessed, since the cases pose different challenges and provide varied insights to be unfolded in the next chapters. Apart from recognised forms of observation and the collection of qualitative data *via* questionnaires, technologies such as Geographical Positioning System (GPS) body tracking, geo-tagging and applications of Geographical Information Systems (GIS) were employed. Additionally, the methodology extends to a visitor-sourced approach to reveal the site's 'hot spots' by combining hotspot analysis with a thematic analysis of the geo-tagged images captured by visitors.

Chapter 4 discusses the results of the applied methodology at Gournia while it provides comparative examples from the other case studies as well. The interpretation of the processed data provides a better insight and an overview of the site's properties that enable movement as well as the weaknesses in the current visitor movement patterns and interpretation schemes. The versatile body of the obtained data provide different views on the engagements of visitors with the site and their movement in it. These views often appear to be complementary or contradicting. In the course of this chapter, I explore the potential of the methodology itself to argue that such mixed-method approaches provide an insightful view for assessing and informing on-site archaeological walk planning and interpretation.

The archaeological remains, the designated walkways and other physical interventions which are implemented for the presentation of a site augment or diminish qualities and interpretative properties of such spaces. Today, apart from physical, novel media are increasingly used to provide interpretation in archaeological sites. Chapter 5 introduces the paradigm of 'augmented space' in cultural heritage sites. This paradigm is created by the advancements of technologically enabled media to add another parameter in the discussion of planning archaeological walks. The purpose of this chapter is to review the most significant literature concerning the augmentation of physical spaces with novel technologies. Keeping in mind the aims of this research, this chapter does not intend to exhaust the technological issues concerned but rather to frame this relatively new paradigm by summarising and bringing together a plethora of related work from different fields such as Human-Computer Interaction, Information and Communication, Architecture, Philosophy and Cultural Heritage Studies. Emphasis will be given on literature referring to the advancements in mobile and outdoor mixed-reality systems with a particular focus on implementations in cultural heritage sites. This will provide a substantial background for

the conceptual framing and formation of a hybrid model for linking the ‘augmented space’ paradigm with on-site presentation strategies for visitor movement in the case of Gournia. The latter issue is explored through a small-scale prototyping study, a scenario based on data obtained from a real visitor of Gournia and a hypothetical scenario drawing from the real scenario and existing novel technologies. The hypothetical scenario explores future affective, effective and sustainable directions in enhancing the visitor interaction with archaeological sites and refocusing the attention on such places rather than on media.

Apart from the technologically enabled ‘augmented space’ in the investigation of archaeological walk planning, in Chapter 6, I discuss the significance of a physically ‘augmented space’ and conceptual design in archaeological walk planning. The argument is unfolded with a critical review of three examples from architectural interventions in the heritage context. The first two refer to Dimitris Pikionis’ (1994, 2000) landscaping on the Acropolis's west side, connecting the Philopappos Hill to the Propylaia on the Sacred Rock of Athens and Robert Venturi’s (2002) reconstruction of Benjamin Franklin’s house in Philadelphia. Both provide different insights on how informed planning and design address a number of conflicting values pertinent to rendering heritage sites accessible and experienced. Knossos is the third example which offers a more in-depth discussion of conceptual planning and contemporary interventions for regulating visitor movement in a popular and often crowded archaeological site (Palyvou 1997; Zanon 2008). Finally, certain considerations deriving from the aforementioned critical reviews are addressed in the conceptual planning of accessibility in the case of Çatalhöyük, as an archaeological site presenting serious legibility and accessibility issues. The conclusions drawn in Chapter 7 include a brief review of broader developments influencing the fields of management and conservation of archaeological sites and reflections pertinent to the methodological approaches used and the common emerging themes linking the different angles of this research.

Chapter 1: An Introduction to Archaeological Walks

1.1 Archaeological Walks in Archaeological Heritage Management

The contemporary field of AHM demonstrates an increased interest in integrated approaches to heritage planning and on-site interpretation, particularly in regard to the sustainability of the sites and the enhancement of the visitors' experience (Hall and McArthur 1998). Planning for the interpretation and presentation of an archaeological site is a multilayered and multidisciplinary process (Assche and Duineveld 2013; Carvalho *et al.* 2013), and due to the unique characteristics and requirements of each site this aspect of AHM is dealt with individually. The interpretation and presentation of cultural heritage sites entails a series of steps involving on-going research, publications and assessments. It also involves a series of interventions; from physical enhancements of the site itself, such as restoration and conservation works, designating paths, designing contemporary structures and interpretation centres; to graphical representations and the employment of a range of media for its presentation to the public. Intervening at a site - whatever the state of its preservation - is 'an unavoidable reality' (Ganiatsas 1996, p. 101) according to the established Western view of heritage site management (Lekakis 2008; Settis 2004); a view closely associated to the demands of cultural tourism, since heritage is appreciated both as a cultural and economic commodity (Boniface and Fowler 1993; Graham *et al.* 2000).

The demand to justify public funding for archaeological research and the notion that appreciating cultural heritage sites as well as participating in their management is a universal right (International Council for Monuments and Sites [ICOMOS] 2007, principle 1; Council of Europe [CE] 2005), feature in the recognition that visitable sites are more likely to suffer deterioration and damage (Doughty and Orbasli 2007, p. 44; Hall and McArthur 1998, p. 107; Russo 2002). Often on-site interventions involve problematic solutions, such as large scale spatial arrangements, reconstructions and reconfigurations of sites and their surrounding landscapes (Marchetti 2008; Seeher 2007). There is also a widely acknowledged demand and paradox as far as cultural landscapes is concerned. This refers to protecting landscapes from developments attracted by the commercialization of heritage and at the same time to develop them for their sustainability, interpretation and protection (Bloemers *et al.* 2010). Hence, whether we consider cultural landscapes in the context AHM or they constitute the main subject of attention in heritage studies they ought

to be included in heritage site management plans (Doughty and Orbasli 2007; Mosler 2009). At the same time, heritage interpreters argue that the integration of sophisticated interpretative programmes at heritage sites offers a better understanding and appreciation of the visited cultural places (Pearson and Sullivan 1995; Tilden 1977). Such existing tensions and conflicts in heritage site management is what makes interventions an unavoidable reality today, and challenges heritage site specialists to mitigate the impact of on-site visitation in order to satisfy both the preservation requirements of heritage sites and visitors' accessibility rights (Kinghorn and Willis 2008). Nevertheless, this research aspires to move beyond the seemingly conflicting values of conservation and interpretative development of heritage sites and to consider them as 'mutually dependent' and 'in congruence' (Ganiatsas 2015, p. 31) in order to enrich in a dialectic manner the creative possibilities of dealing with heritage sites.

One of the critical modes for intervening at cultural heritage sites is planning for on-site accessibility and circulation of visitors (Ganiatsas 1996, p. 102). Despite its importance, this topic remains underexplored, perhaps due to the fact that it is still considered as an empirical or technical aspect of heritage management. While writing on the theoretical aspects of heritage management have flourished for almost two decades, published management plans of archaeological sites open to the public are relatively scarce (Schuster 2008). Among the existing resources there are some general principles set by a series of international conventions (i.e. ICOMOS charters, the United Nations Educational, Scientific and Cultural Organization [UNESCO] and the European Commission [EC] reports), heritage management and conservation[1] scholarship, and a few publications related to site-specific visitor management plans (Doughty and Orbasli 2007; Killebrew and Lehmann 1999). Like all on-site interventions, accessibility and path routing are usually planned as site specific tasks appropriate to the individual agendas of the interpretation specialists, planners and stakeholders in each case. In the existing literature there seems to be some variation in terminology when speaking about arranging accessibility and movement around archaeological sites. Similar words and phrases are encountered, such as: *archaeological* or *interpretative walk, archaeological promenade, pathway, walkway* or *route, itinerary design, path routing, routing network* and

[1] It has been ascertained that the definition of conservation is interpreted differently by the international scholarship and institutions and thus, there appears to be no consensus (Aygen 2013, pp. 2-3). In this thesis, I will use the term conservation as an encompassing term as per the definition given in the Burra Charter, referring to all processes of 'retention or reintroduction of a use; retention of associations and meanings' (Australia ICOMOS 2013, Article 14). Other definitions pertaining to the various processes of intervening to a cultural heritage site will also be used were appropriate.

accessibility planning; all referring to the processes or end products of regulating movement and accessibility to archaeological sites.

1.1.1 From policies to practical implementations

From the limited literature available, and drawing from specific case studies, an overview of how accessibility and visitor movement is commonly dealt with will be attempted. Initiating from the relevant international articles and principles, the discussion will continue with identifying the current state of accessibility and itinerary planning. Without having the intention to provide a firm typology of how movement in archaeological sites is practically dealt with, certain typical examples will also be presented in order to obtain a better understanding of the current state. Emphasis will be placed on examples mainly from Greece as they are characteristic of the Mediterranean tradition of dealing with heritage site remains (see Aygen 2013; de la Torre 1997; Jokilehto 1999; Mallouchou-Tufano 1998).

International conventions and principles

The term interpretation, according to the Ename Charter (ICOMOS 2007) 'refers to the full range of potential activities intended to heighten public awareness and enhance understanding of and engagement with a heritage site', which implies two-way communication for its success (Silberman 2013). On the other hand, presentation 'refers to the carefully planned communication of interpretative content through the arrangement of interpretative information, physical access, and interpretative infrastructure at a heritage site'. It could be argued that catering for movement and accessibility in archaeological sites involves both those processes, and constitutes the corner stone upon which the rest of the interpretative media are built. In essence, the process of planning and implementing archaeological walks involves the physical, as much as the conceptual and digital aspects, of such an undertaking (Bath 1996), a notion that appears to be inconspicuous in the relevant literature and the actual implementations at sites. There also seems to be a tendency to deal with heritage in a fragmentary manner, dividing its tangible and intangible properties, which has been identified as yet another dualistic approach to the discourse (Smith 2006), and addressed at The Charter on Cultural Routes (ICOMOS 2008) and The

Australia Charter for Places of Cultural Significance (i.e., the Burra Charter) (Australia ICOMOS 2013).

In terms of enhancing the interpretation of a site, the Ename Charter contains a principle with regards to the subtlety that needs to characterise contemporary interventions:

> All visible interpretative infrastructures (such as kiosks, walking paths, and information panels) must be sensitive to the character, setting and the cultural and natural significance of the site, while remaining easily identifiable. (ICOMOS 2007, principle 4.3)

It could be argued that although the above principle delineates a sensible stance towards the use of contemporary interpretative infrastructures it is at once quite equivocal and general. The antithetic phrases 'must be sensitive to the character' and 'remaining easily identifiable' encompass the age old problem in restoration studies of finding the balance between the 'old' and the 'new', the authentic and the addition. For instance, the Venice Charter, which refers to adding new material in restoration interventions, has significant similarities with principle 4.3 in the way it is expressed:

> Replacements of missing parts must integrate harmoniously with the whole, but at the same time must be distinguishable from the original so that restoration does not falsify the artistic or historic evidence. (ICOMOS 1964, article 12)

The way in which ICOMOS principles and articles are phrased purposefully leave room for interpretation and experimentation. In the recent example of the *Propylaea* restoration in the Athenian Acropolis, the use of new material for restoring the monument's ceiling exceeded the suggested 'one third of the authentic' of the ICOMOS guidelines (ICOMOS 1964). However, the restoration proposal was approved on the basis that the aesthetic and didactic gains of this restoration were of significant social value, and the structural integrity of the monument itself (Tanoulas and Ioannidou 2002). This example shows that principles are established to provide a common place in our professional interactions with monuments and sites, and not to necessarily restrict the way we envisage and implement novel ideas and interventions.

Accessibility planning

Accessibility planning is an important part of the policy-based and practical considerations in constituting a heritage site master plan. Doughty and Orbasli (2007), drawing from Hall and McArthur's visitor management techniques, provide a valuable insight on policy-based approaches, identifying levels and forms of regulations concerning site accessibility.

Leaving aside the rare case of employing non-accessibility regulations for a site in order to preserve fragile environmental and archaeological assemblages, or when certain annual events increase the numbers of a site's visitors (Doughty and Orbasli 2007), planning for on-site accessibility is one of the main considerations in heritage site management. Considering that accessibility restrictions are not the answer to sustainability and protection of archaeological sites (Pedersen 2002), regulating access to certain areas of the site is a multifaceted task which ought to be frequently revisited. Common factors influencing this process are the landscape setting, the size or popularity of the site, the preservation state and the assessment of fragile areas and the configuration of the site itself. Additionally, visitor flow tendencies and behaviour patterns to certain attractions, feasibility of designating interpretative paths and ensuring connectivity of different areas, as well as on-going works such as excavations and conservations are also considered.

An assessment of the above factors leads to accessibility 'zoning' models for archaeological sites and their extended setting, where certain development restrictions apply (Aplin 2002, pp. 76-77). The intra-site accessibility assessment provides the basis for designating itineraries. This process identifies the areas of movement within and around the exposed archaeological remains. Three different types of accessibility planning for rural archaeological sites can be identified based on the type of the monument/s dealing with:

a. Around an area which is defined spatially – and not necessarily culturally and historically- by associated assemblages, as is the case with heritage site parks.

b. Around or within a heritage site with culturally and historically associated monuments.

c. Around or within a single monument.

Often, archaeological sites share more than one of the above features, but it is necessary to bear in mind these categories while exploring this topic. Concerning intra site accessibility, popular archaeological sites with large numbers of visitors usually have more accessibility restrictions imposed for the protection of the site. Restricting access to certain areas of the site should be balanced with providing alternative points of interest, 'gateways' and 'activities to ensure the visitor experience remains satisfactory' (Doughty and Orbasli 2007, p. 47; Lithgow *et al.* 2014). This brings up the intimate relationship of accessibility and interpretation, and the notion of manipulating interpretative tools for balancing restrictions and enabling information accessibility where physical access cannot apply

(Diaz-Pedregal and Diekmann 2004; Lithgow *et al.* 2014). An assessment toolkit was developed by the National Trust (2011) for enabling decision making in balancing accessibility and conservation requirements of heritage sites. The 'Conservation for Access' (C4A) toolkit, as it is called, is conducted in three stages: decision making flow chart of assessing relevant existing data, gathering additional data for the assessment and reporting of the assessment and the future directions based on multidisciplinary inputs (Lithgow *et al.* 2014).

Often, the main archaeological site is fenced off and isolated from its surrounding landscape or urban setting, for reasons control of access and protection from deliberate or unconscious actions of human behaviour. This common practice is today more than ever debatable, particularly amongst local residents and the Antiquities departments, since local residents feel neglected, and that the enclosed antiquities and their interpretative scheme are intended for the visitors alone (Doughty and Orbasli 2007; Odermatt 1996; Solomon 2007).

Archaeological walk planning

The accessibility assessment stage is usually followed by regulating the mode and the pace of the visit. Designing and implementing archaeological walks constitutes a critical part of broader visitor and site management strategies, complementing the preventive conservation and enhancement of archaeological sites (Dimakopoulos 2000). In other words, this intervention aims to protect the site and enhance its values and the visitor experience (McArthur and Hall 1993, p. 242, ICOMOS 2007). In combination with other interpretative methodologies, paths constitute the main vehicle through which archaeological remains are presented to the public. The introduction of paths or walkways provides an essential interpretative tool, particularly in the case of sites with poor architectural remains, where limited interventions for enhancing monuments' legibility can be applied, highlighting their importance for on-site interpretation. Consequently, heritage sites lacking visually impressive and legible architecture are challenging in terms of on-site presentation, and offer a fertile ground for new integrated approaches (Hodder and Doughty 2007).

Apart from existing general principles, such as those mentioned above, the lack of a satisfactory framework with regards to formal methodologies and design approaches of how movement around archaeological sites is dealt with, and more importantly of the way

actual implementations occur, is evident in the existing literature of heritage management. However, there are enough resources from individual case studies and more broad theoretical frameworks to draw an overview of the different aspects of dealing with archaeological walks, and the design methodologies and interventions commonly involved.

Typically, the first step heritage specialists employ in this process is to visit each site themselves and conduct an assessment of the current state of the site. At this stage, all the main issues and advantages of the site are noted down, while these observational notes are accompanied by rich photographic documentation. Archival material, excavation reports, and maps of the area and different resolution plans of the site are also assembled. Heritage specialists rarely conduct visitor observation studies to perform more holistic assessments on the current state of such sites (see Chapter 2, section 2.3.2).

Having gathered both archival and current state assessment material, the specialists usually conduct interviews with different stakeholders, have a few brainstorming meetings, where the conceptual plan is initially conceived, and several other meetings until the initial concepts develop into draft plans, and finally into a crystallised management plan of the archaeological walks and design. This management plan could be part of a broader plan for the conservation and presentation of the site (Aplin 2002, pp. 75-76), or it could be submitted to official Antiquities Departments for approval as a separate project. In reality, there are many occasions where a few discussions between the main stakeholders of the site are considered sufficient to result in a draft planning document, which is incorporated into broader proposals. This way the official approval timeframe is also minimised. Taking into account of the different types of archaeological sites, the heritage specialists direct their management plans and decide on the practicalities.

It should be noted that the invasion of marketing strategies and economic motivations in contemporary AHM has dictated the implementation of visitor facilities and unified visitor itineraries (Matero 2000; Silberman 2007), which include main entrances and exits, as well as vantage points and vista terraces (Mosler 2005, p. 123). There are two ways of designing and implementing paths and walkways. The first is to re-establish an existing ancient street network and the second to design new routes over the archaeological remains (Doughty and Orbasli 2007; Mosler 2005). Such considerations are of prime importance for implementing archaeological walks as they affect the overall experience and understanding of the monument as it will be emphasised in the following examples.

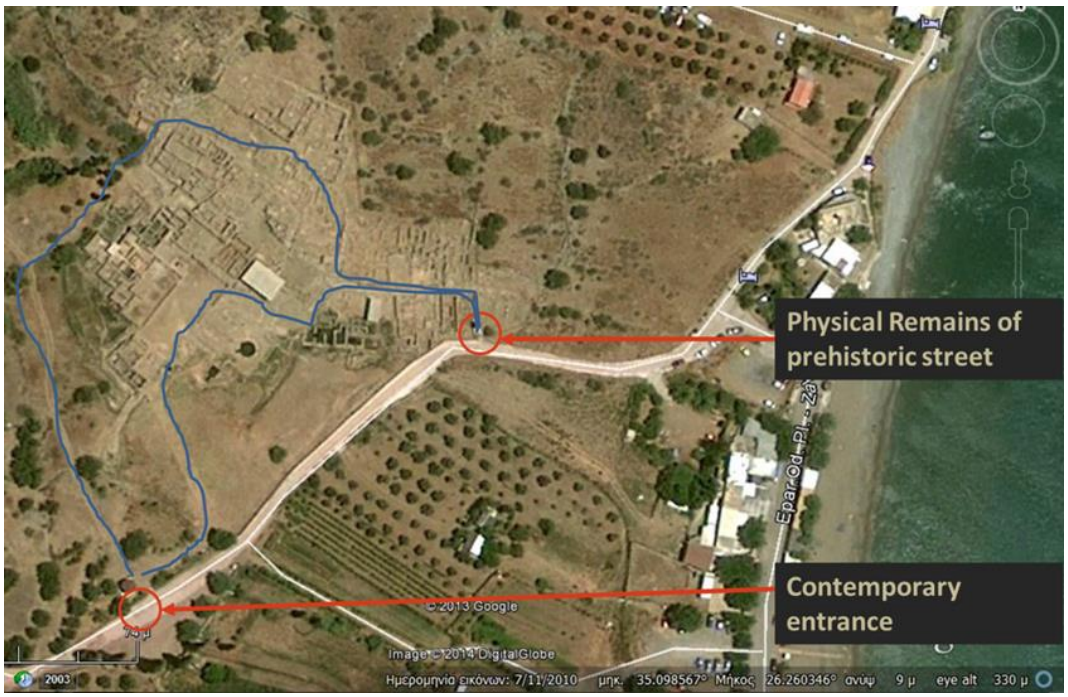


Figure 1.1 Satellite image of the archaeological site of Zakros indicating a usual visitor itinerary, the contemporary entrance and the Minoan pathway remains. Background image © Google Earth.

The orientation of the monuments, the main axes and ancient entrances are often ignored in such implementations. To provide an example, in the case of the Minoan archaeological site, Zakros, the modern entrance to the archaeological site is different from the ancient entrance to the town and the *Palace* for practical reasons (Fig. 1.1). The small parking area and the ticket house are situated on the SE of the archaeological site, so that the visitor enters the site from the lower level where the *Court* is located. From there, one of the alternative itineraries follows the ancient path to the NE ancient entrance which leads to a dead end, since the archaeological site is fenced off at this location. This has a certain impact on the spatial perception of the monument and confuses visitors.

Antiquities located within a vast landscape setting, whether they constitute an assemblage of contemporaneous or succeeding monuments, also benefit from designated pathways. In such cases, paths organise and unify space by connecting its spatially and/or visually disconnected parts (i.e., free-standing structures). In the cases where movement is planned through the monuments, ancient roads, streets and paths can be used to guide visitors, but this decision needs to consider the preservation state as well as the average visitor numbers of the site to avoid further erosion and damage to the ancient materials. The construction of paths from new materials form three distinctive categories which are often encountered in combinations: roping and using other barriers, applying natural material on the ground or

landscaping, constructing walking decks on the ground and flat or stepped raised walking boards.

Roping is perhaps the most common intervention used to both define movement in designated paths from prohibited areas and protect the monuments from 'trespassing' (Fig. 1.2). However, such solutions seem to be condescending visitor's ability to appreciate, and thus be cautious, when moving around the site. Also, too much use of roping in combination with other interpretative media and structures clutter views of the site, without necessarily providing a better understanding of it. It could be argued that a poor interpretative management plan is implicated at a site presenting too many roping and barrier interventions.

In terms of applying natural material on the ground, the idea is that the difference in colour and texture of the new materials differentiates the areas or paths of movement from the areas that contain fragile archaeological remains. In reality, the visitor is provided with a ground-level enhancement of the layout of the site/monument and colour and texture-based indications of the areas s/he can access or are excluded from. An example of this approach is the presentation of the archaeological site of classical Messene, in Greece. In Messene, apart from the restoration and conservation works, the project used the contrast of colour and texture of materials applied on the ground to indicate the areas where visitors can walk, which brings out the shapes of buildings in two dimensions. The materials used were light grey gravel in the interior of the monuments and red bitten soil on the paths, whereas lawn was planted to cover the exterior of the monuments (Fig. 1.3).

Figure 1.2 An example of extensive use of roping from the archaeological site of Knossos.

So, even in areas where the preservation level of remains is low, or where it is difficult to distinguish the shape of the monuments or their interior from exterior, the visitor can get a sense of the configuration of the buildings and move accordingly. In other cases, such as at Stone Age Orkney, UK manicured lawns and gravels of different colours have been used to indicate different aspects of the settlement. Plantation and landscaping can create physical barriers, regulate accessibility and guide movement in archaeological sites (Mallouchou-Tufano 1998). However, the choice of using plants or lawn should depend on the geographical and climatic properties of the setting, and should be used cautiously in order to avoid erosion of unearthed archaeological layers caused by the trees' roots (Doughty and Orbasli 2007). However, lawn is difficult to maintain in the Mediterranean region, and the consequences have already made their appearance in the case of Messene.

Figure 1.3- 1.4 On the *left,* Ancient Messene. Colour and texture of materials used to indicate accessibility and spatial configuration. On the *right,* Çatalhöyük. An example of raised walking board.

Ground level or raised walking decks are usually made of wood, metal, cement or of a combination of such materials and techniques to channel movement, connect different levels of the site/monument or to keep movement entirely above the remains (Fig. 1.4). In practice, such solutions are preferred in cases where the fragile archaeological material dictates accessibility restrictions (Doughty and Orbasli 2007) but in reality they offer more flexibility in planning and designing archaeological walks. This way it is also possible to re-establish ancient routes or movement patterns based on the original character of the monument/site (or to introduce a completely new routing design proposal without violating the necessary access restrictions.

1.2 Interpretative media and their role in archaeological walks

Interpretative media and modes, whose exponential development is mainly witnessed in museum studies, have a long-standing presence and gradually shifting relationship with heritage artefacts and places. Since the early practices of mere display labelling, interpretation in the second half of the 20th century provides location-based, themed and alternative narratives, while today's technologically enabled museums are privileging information and the narrative over objects to achieve the desired engagement of audiences with cultural heritage (Roussou *et al*. 2015). On-site interpretative media have shown a characteristic delay in the adoption of the lessons learnt from museum studies[2] but still play an important role in the interpretation and presentation of archaeological sites. Broadly three types of media can be found: paper-based media such as brochures and guide books, information panels and digital guides. Regardless of the analogue or digital format, or the concurrence of different interpretative media, the latter ought to provide general information about the history and context of the site, interpret the archaeological features and provide guidance for the existing routes and orientation (Mosler 2005). On a more substantial level what interpretative media ought to deliver is the engagement of different audiences with tangible and intangible aspects of heritage (Black 2005; Uzzel 1994) while facilitating a multiplicity of interpretations for heritage places bearing significant natural, cultural and historic dimensions (Smith 2013).

Although to provide a detailed discussion about the use and design of interpretative panels (see Doughty and Orbasly 2007; Moscardo *et al*. 2007; Mosler 2005; Veverka 2011; 1994) falls outside of the scope of this research, it is worth mentioning their role in the context of archaeological walks. Interpretative panels not only provide location-based information about the site, but they function as directional tools, provided that they incorporate plans with route information. Similarly, in archaeological parks, wayfinding signage plays also an important role. The distribution of information panels throughout the site usually depends on the configuration of space, the archaeological remains that interpreters wish to highlight and the design of archaeological walks. Generally, on-site signage is placed at the starting point of a tour, along the paths, alongside significant structures/monuments and in open space areas to provide directions and overview narratives. Robust materials for

[2] The reason why interpretative media and modes utilised in cultural heritage sites have shown a characteristic delay in the adoption of the lessons learnt from museum studies is addressed in Chapter 2 (see section 2.1).

outdoor conditions, location of positioning, and the size and height of interpretative panels are important factors to be considered before making use of these media.

Interpretative panels generally provide access to information, even in places where physical access cannot be granted due to a fragile preservation state. They can also augment the perception of an archaeological site with the information provided, but equally, they can diminish its perception and the overall visitor experience (Howard 2003, p. 247). Using too many interpretative panels can also undermine the authenticity (Arnold 1993, p. 221) and aesthetics (Bath 2006, p. 163; Massung 2010, p.25) of a heritage site, encourage accessibility in sensitive areas (Howard 2003, p. 254), and obscure or/and confuse views of the monuments by cluttering the field of vision with heterogeneous elements. Other pitfalls of using interpretative panels include 'weathering' of materials, damages and the static nature of the interpretative space, and content which cannot be easily reconfigured or updated (Fig. 1.5). Nevertheless, it should be noted that visitors still rely heavily on such media for experiencing archaeological sites.

From the first tours with professional guides, guidebooks and leaflets - still a very common heritage interpretation modality - the heritage interpretation sector has witnessed the increase of a variety of applications appropriating the most recent technological advances. For many years audio guides provided an affordable and effective way of disseminating information about heritage sites (Bath 1996, p.107). Individually received audio narratives about the surrounding site enabled richer, more flexible and personalised interpretation (Massung 2010, 2012). More recently, the utilisation of personal devices such as MP3 players and mobile phones, and the development of downloadable content, reduced the costs of providing interpretation in audio format. However, evaluation studies have demonstrated the pitfalls of such media which make use of linear acoustic narratives. In terms of the visitor experience, the disruption of the social character of heritage visitation and isolation of the user from his/her companions was also ascertained (Crowest 1999, pp. 33, 43; Martin 2000). Additionally, surveys on the topic have pointed out that visitors who make use of audio guides have a limited perception of their surrounding environment, as the acoustic sense overrides the rest of the perceptive mechanisms, a fact which raises safety issues for the visitor (Chrysanthi *et al*. 2012, p. 10; Massung 2012, p. 180). On the contrary, evaluations on more contemporary audio guides utilising interactive design techniques have shown that not only the obtrusiveness of audio-based interpretation can be mitigated but result in rich engagements with cultural heritage objects and places without

disrupting the social character of visits (Elliston and Fitzgerald 2012; Wakkary and Hatala 2007).

Figure 1.5 A damaged information panel from the archaeological site of Gournia. This information panel was the first to be encountered by the visitor, and apart from a useful introduction it also contained a layout map of the town, highlighted ancient paths and the chronological phases of the town.

Apart from audio guides, location-based media, whether static such as haptic screens or mobile, have also been used for heritage site interpretation. Such media utilise a variety of interaction modes (i.e. visual, acoustic, haptic or a combination of the previously mentioned modes), enabling technologies and user interfaces (see Massung 2010). In particular, mobile location-based media and new generation personal devices such as smartphones, tablets and Personal Digital Assistants (PDA) have opened up new ways of disseminating information. Location-based media spur in the mainstream adoption mainly after the new developments in the area of sensing technologies such as Geographical Positioning System (GPS),Wireless Local Area Network (WLAN), Radio Frequency Identification (RFID) tags to name a few (for a good introductory on the GPS and RFID technologies respectively, see El-Rabbany 2006; Hunt *et al.* 2007). Location-based media have the advantage to deliver information at certain locations, providing a more engaging experience, since information retrieval depends on visitor movement and interactions. Based on the aforementioned, I would argue that mobile location-based narratives can be rather flexible, personalised and sustainable solutions for open-air heritage interpretation and compatible enough to co-participate in the effective planning and conduct of visitor movement. A more in-depth discussion about the role of digital in augmenting heritage sites will follow in Chapter 5.

1.3 Chosen case studies: brief history, current state of accessibility and existing archaeological walks

So far, it has been established that accessibility and route planning for archaeological sites is usually handled either as a policy-based or as a practical aspect of cultural heritage management. On the contrary, this thesis argues that apart from those approaches this topic merits further research - both on a theoretical and evidence-based ground- in order to start building a satisfying framework for dealing with visitor movement. In this endeavour, three unique rural prehistoric sites will be primarily used as case studies to unfold the arguments of this thesis. Arguably, the question that comes in mind is 'why rural prehistoric sites in particular?'

As mentioned previously, one of the main issues that prevent visitors from fully engaging with prehistoric sites is their poorly preserved architectural remains in combination with the limited interventions permitted to improve their legibility and presentation to the public (Matero 2000). On the contrary, and as far as later period cultural heritage monuments are concerned, the methods of intervening are much more flexible. For instance, projects for the enhancement of classical antiquities and medieval monuments usually include conservation and restoration works to improve their structural and visual properties (see ICOMOS 1964) while in the case of industrial remains 'sympathetic adaptations' are considered in order to constitute the remaining structures suitable for reuse (see TICCIH 2003). Certainly, the sought engagement to a heritage place is equally and crucially dependent on the adopted interpretative programme (Uzzell 1998). Nevertheless, the available alternative ways of physically intervening to a site increase the chances of applying successful interpretation programmes.

One of the modes of intervening to a site is through contemporary design which can be used at a minimum in such spaces and provided that the purposes it serves are well justified. For instance, contemporary design has been commonly used for the construction of shelters and various visitor facilities infrastructure (Mosler 2005). On the contrary, contemporary design interventions are more often encountered in the case of urban antiquities since it is considered a compatible approach for the integration of archaeological areas surrounded by a contemporary urban scape. When contemporary design is successfully applied, it provides intuitive solutions in presenting archaeological remains to visitors (Warnotte *et al.* 2007). Certainly, this research has not intended to address additional complicated issues deriving from questions of whether or how to

integrate significant archaeological remains into the urban fabric and thus, provide seamless transitions from the city environment to the archaeological remains and accessibility to the public. Concerning the latter topic, the literature review identified a significant corpus of work concerning the enhancement of urban antiquities under the EC strategies (see EC 2006).

Rural visitable sites are also often characterised by the remote location and subsequent lack of public transportation, tourist facilities found at urban centres and internet connectivity. Those factors raise the demand for innovative solutions in attracting public interest. Consequently, rural prehistoric sites, with their sensitive fabric, their poor preservation state and the applicable interventions – usually limited to conservation works – pose serious challenges in thinking for on-site interpretation and presentation strategies. (Chrysanthi and Earl 2013; Hodder and Doughty 2007). Hence, this research focuses on alternative ways of thinking about movement and the archaeological interpretative space whose role in on-site presentation emerges as principal. Besides, as the research kept evolving it became apparent that rural, organised sites provide more control over surveys dealing with visitors and the provided technological equipment. In the next subsections, a brief background about the history and content of the sites will be provided as well as a discussion will follow on the current state of the three chosen case studies. The information provided below are being presented in a very selective manner which will later facilitate the focus of discussions in the next chapters.

1.3.1 The archaeological site of Gournia: a walk in a Minoan Town.

Gournia is located on a small hill, close to the sea and the Gulf of Mirabello of eastern Crete, an area particularly rich in Minoan archaeology (Watrous *et al.* 2012). Gournia is characteristic of the excavated medium-size settlements, dated to the period of the peak of Minoan culture, in the Late Minoan I period: 1550-1450 B.C. It is called the 'Pompeii of Minoan Crete' due to its relatively good state of preservation (Fig. 1.6). From 1901 to 1904 Harriet Boyd Hawes excavated the centre of this Minoan town, revealing a system of cobbled streets, 47 houses, a central building with a court, considered by some to be a small *Palace* and a *Cemetery* (Boyd Hawes *et al.* 1908) (Figs. 1.7-1.8). The ruins of the settlement were visible before the excavation - hence the name 'Gournia' given by the locals due to the stone basins preserved in the area (Fig. 1.9).

Figure 1.6 A panoramic view of Gournia from the southeast.

The most important monuments of the site are the town on the slopes of the low hill; two peripheral paved streets that crossed at right angles with others, which climb the slopes of the hill and are often stepped; they are all connected to a drainage system and divide the town into *insulae*, seven of which have already been excavated. The central building, which is considered to be a small *Palace* and the seat of a local ruler, is built on the top of the hill, to the west of the rectangular court, which many of the private houses opened on to (Preziosi 1983; Soles 1991). The interior of the *Palace* is not as well preserved as other parts of the town, where some stone walls reach a height of 2-2.5m (Figs. 1.10-1.11). Apart from the revealed settlement, Boyd also investigated the Minoan remains along the nearby shore but her findings were not published until recently along with the new research at the area (see Watrous 2012, Watrous *et al.* 2012). The Gournia Excavation Project revealed amongst other structures a harbour complex (a shipshed and fortification walls with towers), a cobbled street connecting the harbour with the town of Gournia and sets of agricultural terraces (Watrous 2012).

Today, the site is open to the public, and of all sites in the Aegean, Gournia gives the visitor the clearest idea of what a town in Late Bronze Age Greece looked like. As well, scholars have compared the typological layout of the town's streets and houses with traditional Cretan villages (Davaras 1989; Mantzourani 2002, p. 151; McEnroe 2010, p. 104). Apart from the on-going excavation led by the University of New York at Buffalo, conservation works are implemented at the northern and central part of the site. According to the Hellenic Statistical Authority (EL.STAT. 2012) the annual number of visitors at Gournia in 2011 was just 10,728 while the same numbers are recorded until the time of writing. Visitors enter from the NE of the fenced off archaeological site where a small ticket house is situated (Fig. 1.12). Apart from the ticket house and a chemical toilet near the entrance of the archaeological site there are no other visitor facilities or designated rest points while only a few trees scattered around the site provide natural shading.

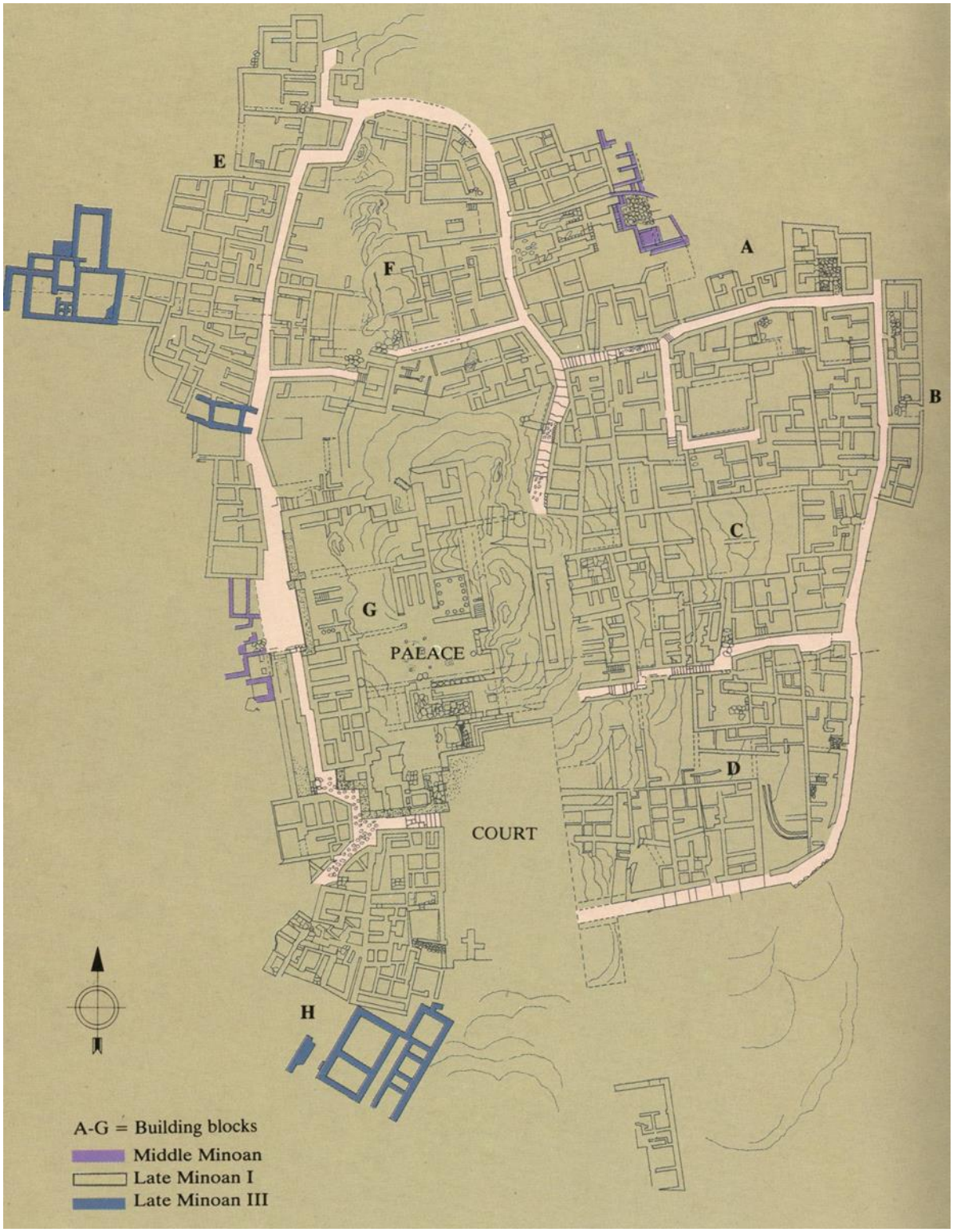


Figure 1.7 Plan of Gournia after H.A. Boyd. Source: ©Archaeological Receipts Fund.

Figure 1.8 Satellite image of Gournia. Source ©Google Earth.

Figure 1.9 One of the characteristic stone basins found around Gournia.

Figure 1.10 A view of the poorly preserved Palace. On the foreground: Palace staircase.

Figure 1.11 A view of the town from NE, demonstrating the good preservation state of the town.

In addition to its well preserved ancient path system which is used for touring the site, the latter presents a case with minimum interventions and a subtle interpretative programme, limited to a few information panels (see Chapter 4, pp. 77-78), which were produced by the local antiquities service ('ΚΔ Ephoreia' of Prehistoric and Classical Antiquities of Greece) in collaboration with the Institute of Aegean Prehistory Study Centre for East Crete (INSTAP). In the current economic climate, the ensuing event of Greece's severe cuts in the cultural heritage sector has influenced among other things the number of staff working at several public and private cultural heritage institutions and sites (see Georganas 2013; Howery 2013). In fact at Gournia, there is only one seasonal guard and one person working permanently at the ticket house. It is also important to note that visitors at Gournia are not usually accompanied by a tour guide. However, the lack of on-site guards in combination with low visitor numbers and the limited on-site interventions, allow a unique experience to the visitors, since they can intuitively move around and freely explore the site.

Figure 1.12 The ticket kiosk located at the entrance of Gournia

1.3.2 The archaeological site of Knossos: an example of extensive physical interventions

A brief history[3] and description of the current state

The archaeological site of Knossos, is primarily known for the Minoan Palace which was founded approximately in 2000 B.C. (Protopalatial period), rebuilt and flourished between 1750-1430 B.C.(Neopalatial period) while there is an earlier phase of a Neolithic settlement dating to 7000 B.C. (see Efstratiou *et al.* 2013). The site is situated on the low hill of Kephala, five kilometres from the contemporary town of Heraklion (Papadopoulos 1997). Knossos was initially discovered in 1878 by Minos Kalokairinos. Subsequently, the site was extensively excavated by Sir Arthur Evans between 1900 and 1931. The impressive structures constituting the 'Palace of Minos', the elegant frescoes and the refined artefacts revealed by the excavations, featured in Evans' extensive reconstructions, which were influenced by the European *fin-de- siècle* modernity (see Hitchcock and Koudounaris 2002; Solomon 2006 and 2007) and assumed historical importance in itself (Papadopoulos 1997). The British School of Athens is still carrying out archaeological research in the broader area of the palace.

From 1976 onwards the archaeological site of Knossos and its extended area was officially protected from development by a Presidential Act, amended in 1983 and 1988 respectively. The Greek state bureaucracy, in collaboration with the local archaeological service (i.e., 'Ephoreia'), designated two extended archaeological zones of around 5.500 square meters in total, with severe building and development restrictions (Fig. 1.13). Zone A includes the Palace's ruins, and the area immediately adjacent to the archaeological site and the other antiquities, and zone B includes a large area of the monuments' surrounding region. The official protection documents did not stop illegal building and disputes with residents, particularly those of four small villages which have been in the area since 1923, and which fall in Zones A and B (see Solomon 2007, p. 225-260). More recently, and after the results of years of archaeological surveys around this area shed light on the absolute boundaries of the archaeologically significant areas, a new Ministerial Decision reduced the protected area to 2.500 square meters (Geroulanos 2011). Moreover, in 2012, a decision was made to unify the monuments to form an open air museum and certain configurations and

[3] For a detailed account on the excavation and conservation history of the site see Papadopoulos 1997.

regulations concerning the extended space around Knossos will be enacted. Until this time of writing and to the best of my knowledge the aforementioned decision still remains unfulfilled. Currently, Knossos is on the Tentative List of UNESCO along with four other Minoan Palaces (Phaistos, Malia, Zakros, Kydonia) (UNESCO 2014).

Knossos is thought to be a significant archaeological site bearing historical, scientific, symbolic and associative to Greek myths, social values (Papadopoulos 1997); and even a much contested aesthetic value (Solomon 2006; 2007). The echoes of the myths of King Minos, the Labyrinth and the Minotaur in modern literature, and more recently in movies and video games, suggest an ongoing public interest in the Minoan civilization. Until today, Knossos is still one of the most popular cultural attractions in the world and the second most visited archaeological site in Greece. According to the Hellenic Statistical Authority Knossos (EL.STAT. 2012) it is the second most visited archaeological site after the Athenian Acropolis, with a total number of 623.338 visitors (Fig. 1.14-1.15)

The heritage management plan apart from an extensive conservation programme handled today by the 'Conservation, Consolidation and Promotion of the Palace and Archaeological Site of Knossos' (UNESCO 2014) focused also on a visitor management (Papadopoulos 1997) which included the regulation of visitor movement within the boundaries of the monument. Since 2003, when a new section of the main visitor itinerary was completed, visitors can use a combination of open plan areas, restored staircases, pathways and remaining corridors from the original plan of the Palace as well as contemporary elevated walking boards and level connecting staircases. The archaeological site has available free-lance tourist guides as well as a series of interpretative information panels distributed within the main palace. In Chapter 6, the conceptual planning of accessibility and implementation of archaeological walks will be critically presented and discussed.

1.3.3 The archaeological site of Çatalhöyük: the fragile Neolithic

The Neolithic site of Çatalhöyük located in Anatolia, central Turkey was first discovered by James Mellaart, during a survey in November 1958 and it instantly attracted the international archaeological community's attention due to its large size (area of 80x80 m at the Konya plain), the density of the tell settlement, an abundance of art with religious symbolisms and evidence of an advanced Neolithic culture (Düring 2013; Hodder 2007; Mellaart 1967; Matero 2000; Tringham and Stevanović 2012).

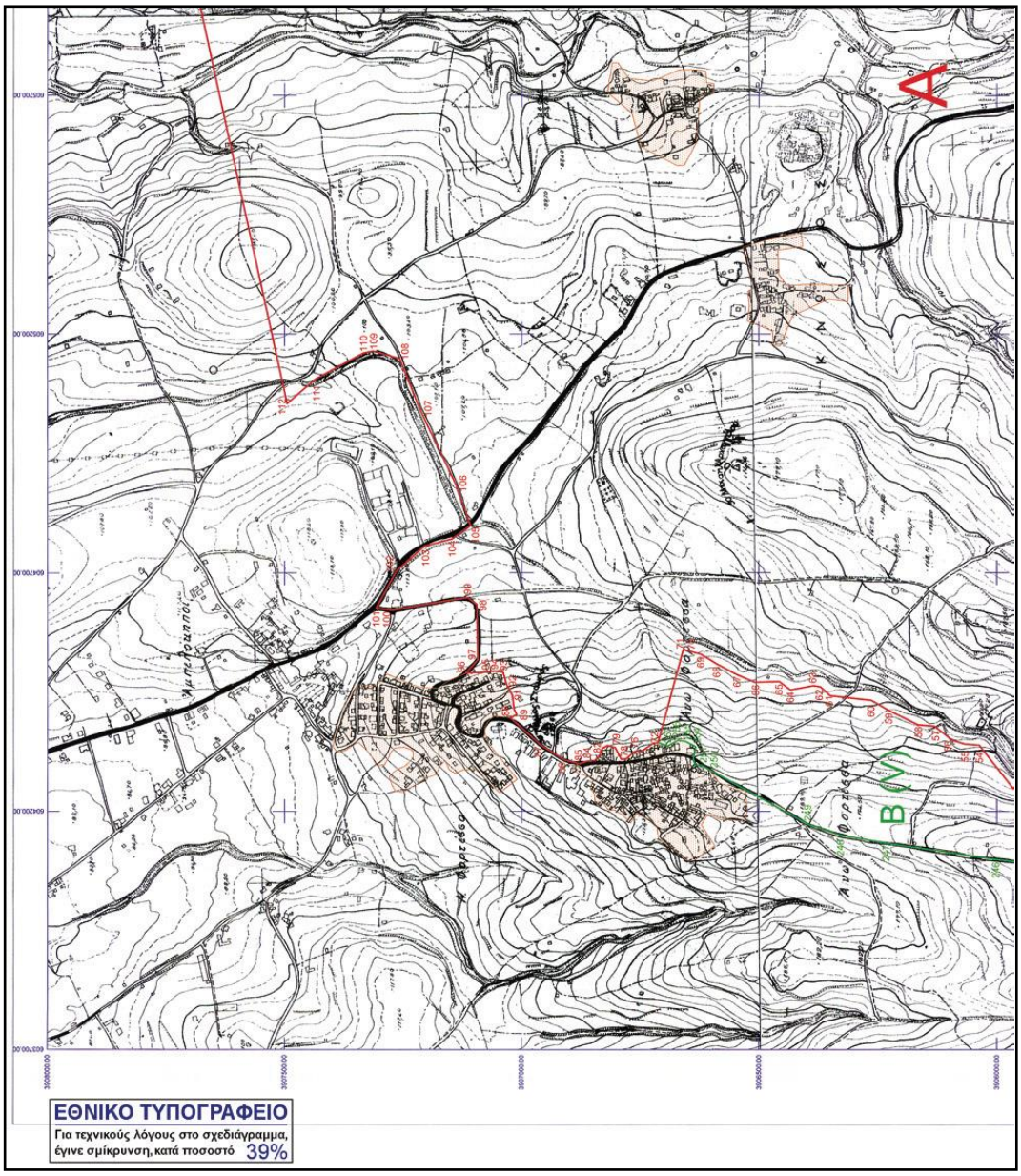


Figure 1.13 Part of the Geographical Military Service map indicating the points of the protection zones A and B around the site of Knossos which is highlighted here with a red ellipse. Initial scale 1:5000 and reduced by 39% for publication purposes. Source: Official Gazette Issue (FEK) No 282, National Printing Service of Greece, p. 2763.

Figure 1.14 Visitors at the entrance of the main archaeological site of Knossos.

Figure 1.15 Visitors contemplating the Palace in front of an information panel.

Since 1993 an international team of archaeologists, led by Professor Ian Hodder, has been continuing research on new basis at two mounds (Hodder 2007; also see Çatalhöyük Archive Reports 1993-2014[4]): the 'East Mound', the Neolithic earlier settled area (7200-6400 B.C.) which contains eighteen levels of Neolithic occupation and a dense concentration of the aforementioned artistic expressions of this culture, and the 'West Mound' dating mostly to the Chalcolithic (6000-5500 B.C.) shows cultural evidence of the period (UNESCO 2012).

Çatalhöyük is very characteristic for the settlement's character and the configuration and features of its houses. The streetless clusters of houses in the early levels from XII-VI, the entrances opened on the roofs and the inhabitants' custom to bury their dead indoors and

[4] Available from: http://www.catalhoyuk.com/archive_reports/.

under plastered platforms revealed at a neighbourhood scale constitute a unique architectural assemblage (Düring 2013; Rosenstock 2006). The houses were also decorated with 'plastered bull skulls (*bucrania*), plaster reliefs, and wonderful paintings, both non-figurative and with complex narrative content.' (Hodder 2008, p. 196). Significant objects of the Neolithic everyday life were uncovered, some decorative (e.g. flint daggers with decorative bone handles, clay or stone figurines depicting human figures and animals) and other utilitarian objects (e.g. obsidian, flint, pottery, worked bone and clay balls) (Çatalhöyük Research Project 2005).

In essence, Çatalhöyük provided important and long term insights of the social and cultural changes that occurred as humans adapted a sedentary mode living and the transition 'from settled villages to urban agglomerations' (UNESCO 2012, p. 2) and stood as a 'bridgehead for the spread of the Neolithic way of life to Europe and beyond' (ibid, p. 35). The aforementioned alongside the unique architectural features and urban character of the site were the two criteria[5] based on which the listing was granted.

Heritage Management and Presentation: The East Mound case

The East Mound of the Neolithic site of Çatalhöyük has been a protected by a perimeter fence and appointed guards since 1958 following from its designation by the Turkish law while the West Mound shared the same protection status only after 1996. Based on the Çatalhöyük Management Plan (2004), the general protection status and conservation strategies at Çatalhöyük are summarised as follows:

Protection and Legislation. The first and third grade archaeological conservation zones were registered in 1981 and 1994 respectively while in 2010 the zone boundaries were expanded in preparation for the world heritage nomination (Fig. 1.16).

Landscape and Vegetation. Spoil heaps remaining from the 1960s excavations are incorporated in educational and training programmes which take place until today at the site. Drainage issues have been dealt with by landscaping and excavating drainage channels around the shelters which direct and manage water flow. The thick vegetation

[5] I refer to Criteria (iii) and (iv) which point out the unique testimony of a cultural and social transition moment in the Neolithic and the outstanding architectural and urban character of the site respectively. Those criteria are stated in Decision: 36 COM 8B.36 adopted by the *World Heritage Committee* at the 36th Session (St-Petersburg, 2012), pp. 201-202.

covering areas of the site that are not currently excavated is systematically preserved and protected since there's evidence that it has had a beneficial effect on preventing the erosion of the un-excavated areas (Hodder 1996).

Integrated Conservation. The initial integrated conservation programme was directed by Frank Matero and included: 'Emergency stabilization and protection' during excavation and between fieldwork seasons of the fragile exposed archaeological features of the site, including urgent backfilling and shoring up of walls, 'condition survey and environmental monitoring', 'material analysis and conservation treatment development, testing, and application' (see Linge 2013; Matero 2000).

Construction of Protective Shelters[6]. Firstly, the construction of the 45 m x 27 m South Shelter was completed in 2003 and covered the Southern Area excavations of 1,300 square metres. This shelter has a steel frame resting on a concrete belt and covered with a polycarbonate roof. In 2008, the completion of the 4040 area Shelter (North Shelter[7]), measuring 25 m x 40 m and covering 1,300 square meters, aspired to facilitate in the future the display of 20 buildings. The North Shelter has a wooden frame covered by polycarbonate and is also constructed on a shallow (1-1.5 m) concrete belt. Without having the intention to open a discussion about the effectiveness of shelters in the long-term presentation of the site[8], it is worth mentioning that although the architects took into consideration both the environmental conditions and the landscape contours in order to come up with compatible and unobtrusive to the landscape designs (Fig. 1.17), they were not particularly successful in considering two main parameters.

The construction of the South Shelter does not leave much room for accessibility planning for reasons that will be further discussed in Chapter 6 and its multiple structural metal crosspieces create a visually overwhelming and obtrusive design once under it (Fig. 1.18). While some of those issues were addressed in the design of the lightweight North Shelter (Fig. 1.19), the microclimate and environmental conditions created in the shelter have had so far detrimental effects on the preservation of the remains it covers despite the removable parts of the shelter (see Linge 2013).

[6] Both the South and North Shelter were designed by architects of Atölye Mimarlik in Instabul after working closely with the Çatalhöyük Reasearch Project excavation teams (Hodder and Farid 2008).
[7] This area is part of a broader excavation area formally known as the 4040 area in the archaeological record but ever since the North Shelter was built it is also referred to as the North Shelter area. The latter term is going to be used hereafter in this thesis as it signifies the accessible part of 4040 area to visitors.
[8] For a discussion on shelters for archaeological sites see the dedicated double volume of the Journal *Conservation and Management of Archaeological Sites* 2001, Special Issue on Protective Shelters, 5(1&2).

Efforts towards a heritage management plan for the protection and presentation of the archaeological site to the public stood as one of three pillars of the Çatalhöyük Reasearch Project (Shane and Kucuk 1998). The communicative outputs of those efforts were produced to satisfy both the remote visitor and the on-site visitors who often "came to the site specifically to see wall paintings" (ibid 1998). The Çatalhöyük Management Plan was completed in 2004, as part of the Temper Project[9], which was concerned with training, education and management of prehistoric sites in the Eastern Mediterranean region (Hodder and Doughty 2007). As it is stated in the nomination document:

> The overall aim of the management plan is to conserve the cultural significance of Çatalhöyük through appropriate management policies. Through a number of subsections it includes management policies on planning, design, excavations, conservation, information management, interpretation, and tourism. (UNESCO 2012, p. 59)

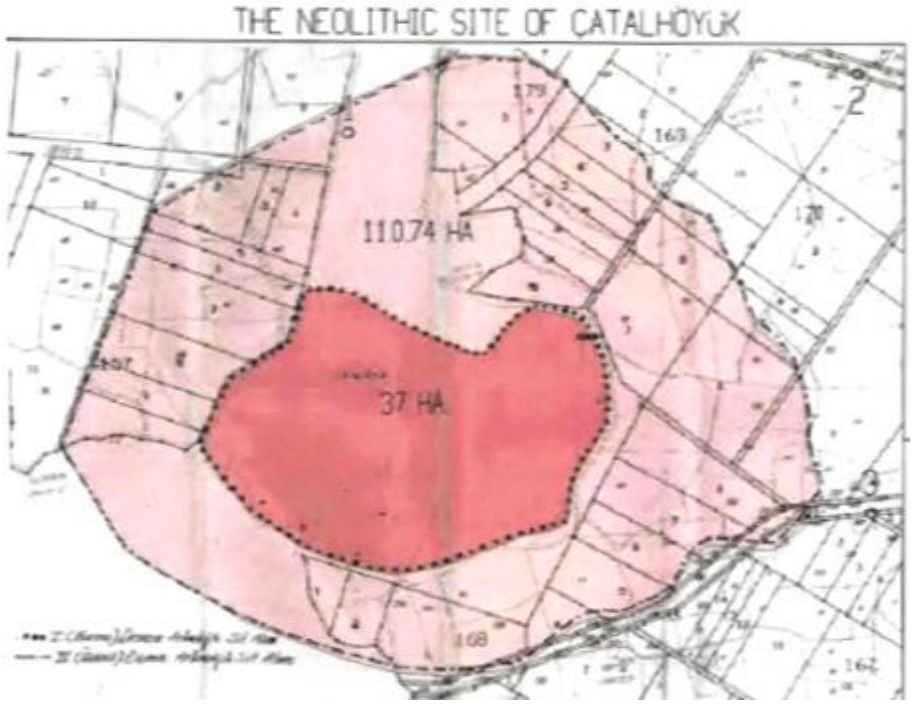


Figure 1.16 Boundary map indicting the first grade protection zone (red colour) and the third grade (pink colour) protection zone buffers. Source: The Çatalhöyük Research Project Archive.

[9] The Temper project, *Training, Education, Management and Prehistory in the Mediterranean* run as part of the European Union Euromed Heritage II Programme (Hodder and Doughty 2007: 1).

Figure 1.17 A view of the shelters in the landscape of Çatalhöyük.

Overall, the Çatalhöyük Reasearch Project has long been an innovator in developing a research approach that seamlessly links the processes involving excavation, interpretation, and dissemination of the archaeological record for public audiences. Interpretation is provided in three separate spaces: the experimental house, the visitor centre and the exposed archaeological remains mainly under the North and South Shelters. A more detailed presentation of the site's current visitor paths, a critical analysis and conceptual proposals will follow in Chapter 6. Since its World Heritage designation in 2012, the site is facing increasing demands, as it attracts more attention by the media and tourist agencies. Consequently more visitors with higher expectations arrive at the – otherwise geographically remote - site seeking memorable experiences on site (Perry *et al.* 2014).

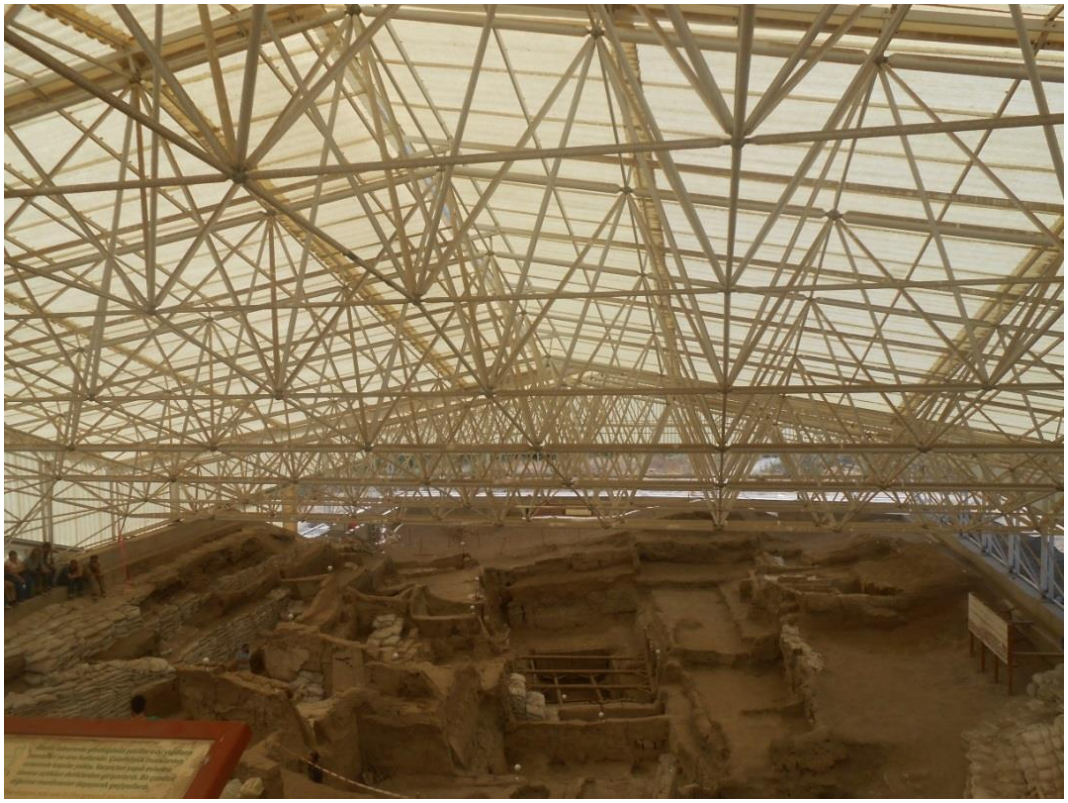


Figure 1.18 A view from the east high vista of the South area.

Figure 1.19 A view of the North Shelter area from the South.

1.4 Conclusions

Evidently, the literature review and the examination of how visitor accessibility and movement is dealt with returned a series of related policies and a plethora of practical implementations. Some of the latter are often considered as a subproject of broader management, conservation and accessibility agendas rather than an integral part of on-site interpretation and thus, understanding of the visited space. It was also made apparent that the topic of visitor movement in archaeological sites has not received an adequate attention with regards to the underlying theoretical and methodological approaches that could frame and provide better insights and toolsets to explore it.

For the exploration of this aspect of AHM, I chose to work with three archaeological sites that present different challenges and opportunities to explore visitor movement as an intuitive interaction with the sites or their intended presentation strategies. The archaeological site of Gournia presents an intriguing example of archaeological sites that have had limited interventions and on-site interpretation as well as a manageable number of visitors (see Chapter 4). Thus, the site affords exploration and free movement *via* its ancient paved paths. Questions, of how the visitor movement is conducted and how this

might affect the site in the long term are arguably raised. On the other side of the spectrum, the archaeological site of Knossos provides an interesting case study for exploring archaeological walks, as it represents archaeological sites with existing visitor walkways based on conceptual design approaches. In Chapter 7, pertinent issues of conceptual design and practical implementations will be thoroughly discussed and Knossos, as the 'product' of early and later presentation experimentations, presents vivid examples to facilitate this discussion. Further to this, Evan's early physical augmentations of the site will be discussed in the context of the 'augmented space' paradigm in cultural heritage, the latter being an important outlook of this study. Additionally, the significance of the site is reflected on the visitor numbers who flood it throughout most of the year. Moreover, Çatalhöyük presents a case with a World Heritage Listing, an elaborate Heritage Management Plan and interventions for the preservation and protection of the site. This constitutes a pioneering agenda for the presentation of the site to public audiences but at the same time, it faces serious challenges in terms of visitor accessibility and experiences related to the diminished and visually poor remains.

The diversity in the current state of visitation, the level of accessibility and different approaches in dealing with visitor movement of the chosen sites provides a fertile ground for discussing visitor movement, developing new methodologies and exploring research questions in planning for on-site interpretation, as those were set in the introduction. The next chapter starts with a discussion on the 'interpretative spaces' and continues with the notion that we ought to consider the on-site visitor behaviour in planning and assessing archaeological sites alongside other methods. I will attempt to explore this argument by providing a theoretical discussion on the relation of visitor movement and the interpretative space and provide the state of the art from different and relevant discourses on this topic.

Chapter 2: Understanding space through movement

> We inherit our idea of the labyrinth from a tragic and pessimistic tradition, in which it signifies death, despair, madness. However, the maze is in fact the best model for allowing moving bodies to pass through while at the same time retracing their steps as much as possible; it gives the best odds to finite journeys with unstructured itineraries. Mazes maximize feedback... (Michel Serres, 2008, p.143)

2.1 Defining heritage interpretation space in museum and heritage site contexts

A definition of the term 'heritage interpretation space' is required in order to understand the importance of movement in such spaces and the adoption of appropriate methodologies for studying it in the context of heritage site management. Here, the notion of space will be compartmentalised in order to indicate the different elements comprising such spaces, and an attempt will be made to bring them together once more under the common overarching theme of explorative pedestrian movement in heritage spaces. The words 'space' and 'place' are used hereafter where appropriate as encompassing terms denoting any of the other specific terms used in this chapter, i.e., cultural landscape, heritage site, archaeological site, monument, museum, historic centre. Their main difference is that 'space' is used here as a more abstract and general term while 'place'[10] is imbued with cultural meaning and its use denotes the established tangible and intangible values of heritage in their spatial context. This distinction here is not an attempt to define semantically, ontologically or contextually those terms but rather to facilitate the theoretical discussions in this chapter.

Heritage interpretation, as *per* Tilden's (1977, p. 38) dictum 'Through interpretation, understanding; through understanding, appreciation; through appreciation, protection', has played an important role in changing the way societies associate with the past and its

[10] According to the Burra Charter (Australia ICOMOS 2013, Article 1, principle 1.1) the term place 'means a geographically defined area. It may include elements, objects, spaces and views. Place may have tangible and intangible dimensions'. It has been argued that the attempt of the Burra Charter to define the terms used in its declaration creates more confusion with the encompassing adopted style rather than resolving the existing terminological problem (see Silberman 2015).

values, and in presenting its tangible remains in the present, whether this is conducted successfully or not (Uzzel 1998a; 2006). If we were to define broadly the meaning and purpose of interpreting heritage today, we would refer to a range of activities aiming to raise public awareness, understanding and engagement with its tangible and intangible values (ICOMOS 2007). As Silberman has put it, heritage interpretation is:

> …the constellation of communicative techniques that attempt to convey the public values, significance, and meanings of a heritage site, object, or tradition… (2013, p. 21)

Considering that heritage is also 'inherently a spatial phenomenon' (Graham *et al.* 2000, p. 4), heritage interpretation occurs at a certain space whether it is a museum, a historic centre or an archaeological site.

Leaving aside an exhaustive discussion about the contested definition of interpretation (Ablett and Dyer 2009), and the complex mechanisms and a variety of stakeholders involved in the 'making of interpretation' in different spaces and contexts, it is important to remember that more contemporary theoretical approaches denote the importance of 'visitor perception' in this process. Much of this research is drawing upon phenomenological theory, and the affective response-experiential discourse of the public, to denote that peoples' on-site experiences are vital to the interpretation process (Lekakis 2009; Massung 2012; Silberman 2013; Solomon 2007; Urry 1990; Uzzel 1998). This approach came to the fore to balance a particular stance towards the aims of interpretation and the strategies employed at heritage sites, which prioritise the protection of heritage sites; a tendency deriving from the origins of interpretation in the conservation movement and the assumption the heritage values rely on the materiality of the remains of the past (Araoz 2011; Silberman 2015; Uzzel 1998). In essence, when we are planning for interpretation as well as catering for the protection, enhancement and communication of a heritage space, whether it is a heritage site or a contemporary building accommodating artefacts, we ought to study the interaction between heritage artefacts, space and visitors in order to cater for visitors' experience. While this notion was acknowledged relatively early and adopted in museum studies, there is still a reasonable hesitation in the case of heritage sites, due to the sensitive materials that form these spaces and the awareness that the visitor-heritage site interaction increases the likelihood of erosion (Doughty and Orbasli 2007; Hall and McArthur 1998, p. 107). Consequently, the nature of a space where interpretation takes place shapes the interpretative strategies employed in cultural heritage. In this interaction of visitor with the interpretative space, museum interpreters have

prioritised the visitor experience and heritage site curators the protection of the ancient or historic fabric; perhaps, with an intension not to exclude experience from the process.

However, in both cases it is becoming increasingly apparent that involving the public in heritage interpretation (Silberman 2013) and observing the space-visitor interaction provides valuable insights for improving the interpretation of heritage spaces. Before a discussion is initiated around this interaction, and in order to better understand the relationship between visitor perception and interpretative heritage spaces, it is necessary to delineate the properties of such spaces.

2.1.1 Elements constituting interpretative heritage spaces or the complexity of defining them

In museum and exhibition contexts, such spaces - in the physical sense - consist broadly of the layout, the geometry and configuration of a given space, and the exhibits along with their auxiliary and interpretative infrastructure. Layout refers to the properties and the way that a space is organised, and configuration refers to the changing relations or patterns formed by a system of interlinked spaces (Hanson 1998; Hillier 1996, p. 35; Hölscher *et al*. 2007, p. 3). Configuration could also be described as an amalgamation of social and spatial set of rules that people use 'unconsciously to operate in space' (Psarra 2009, p. 236). In essence although, we can understand these configuration patterns instinctively, it becomes quite a challenging, if not an impossible task, to describe them in an analytic manner (Psarra 2009, p. 5). An analogy of how configuration mechanisms work in space is the use of language in communication (cf. Hillier 2005). Geometry then becomes another level of spatial understanding, particularly through its relationship with the configuration of space. In Psarra's eloquent words:

> So, geometry can bear upon the cognitive, aesthetic, semantic and social aspects of architecture…The power of geometry to articulate spatial relations and theoretical speculations interfaces the design of buildings with concepts both internal and external to architecture and its social programme. (2009, p. 239)

These characteristics of space form a 'cocoon' which accommodates the displays, around which the interpretation and the narrative of the heritage space are structured. However, displays cannot be considered just as additions to a space. To avoid repeating dualisms encountered in certain architectural theory circles of the late 20th century such as 'structure *versus* ornament', artefact displays should be seen as an integral part of space (Tschumi

1996, p. 249). Therefore, exhibits and their interpretative physical or digital infrastructure similarly interact with the properties of architectural space, and thus play an equally significant role in the formation of the contemporary heritage spaces and their narrative.

On the other hand, it could be argued that not all heritage sites share similar characteristics or mechanisms of space formation with more contemporary heritage interpretation spaces. More specifically, in the case of historic buildings or sites which are converted into interpretation spaces of their own history or the heritage of a nearby region, we can encounter similar elements of heritage space formation. In fact, these heritage spaces present excellent manifestations of the interpretation of the past, as their architecture encompasses the essence of social, religious or political structures of the particular period when they came into being (see Moser 2010). However, we would find it difficult to define archaeological sites as heritage spaces in the same way as we may do with contemporary and historical settings.

Archaeological sites today constitute rather obscure spaces; architectural remains, contemporary structures and the effects of time and nature influence these complex settings (Chrysanthi and Earl 2013; Lekakis 2009; Loukaki 2008). It has also been noted that archaeological sites are perceived as 'non-places' and as a consequence the visitor cannot relate them to a familiar rural or urban environment (Lekakis 2009; Walsh 1995, p. 132). Scholars, influenced by the research field of landscape archaeology mainly developed through English scholarship pertaining to prehistory (see Thomas 2012), approach archaeological sites with significant tangible remains with close reference to their broader setting in the surrounding landscape. In the context of heritage, landscapes have a significant place in the hierarchy of spatial scales that Graham *et al.* define as one of the attributes of places (2000). It has been argued that landscapes also play an important role for the public understanding and engagement with archaeological sites by providing a visual backdrop, whose properties such as form, colour and light affect the attractiveness of a place (Mosler 2005, p. 33). In archaeological sites where significant structural remains exist, fragmentation and palimpsests render the properties of space and thus, its configuration becomes a rather trivial issue to process, investigate and describe. The ruins of a once solid architecture do not usually appear 'to the naked eye' as reminiscent of human processes encompassing social, religious and political structures of the past. Of course, some archaeological sites, such as some of the case studies examined in this thesis, bear more indications of such structures, or their physical remains better preserve the element of geometry than others.

Nevertheless, all sites preserve a certain spatial configuration or pattern which is not understood or perceived objectively and in uniformity by individuals. Consequently, such spaces are quite open to interpretation, but they only become interpretative once we intervene in them in order to apply a new social programme that will simultaneously reveal some of its previous functions, and enhance the 'readability' of the remaining structures. Indeed, one of the goals of contemporary interventions to such spaces is to shape the lost configuration of properties for visiting purposes. Another substantial difference between contemporary, historic heritage spaces and archaeological sites is placed on the fact that archaeological remains constitute at once the 'architectural' space - even if fragmented - and the exhibits. Thus the interpretative infrastructure, with its role in highlighting parts of the architectural remains in order to provide the context for the 'missing' counterparts and to regulate visitors' movement, is taking part in the formation of space.

Despite the considerable differences between contemporary, historic and archaeological interpretative spaces, and notwithstanding the apparent common interpretative purposes they serve, these spaces become places of meaning once people start to interact with them, and with each other, while exploring them. Spaces of heritage interpretation are, without doubt, though sometimes by default, freighted with meaning. According to The Burra Charter 'meanings denote what a place signifies, indicates, evokes or expresses to people' (ICOMOS 2013, p. 3). For example, archaeological sites such as Knossos have multiple meanings; Knossos bears the meaning of myths which echoed from historic times throughout the centuries, and the discursive, ideological, and nationalistic distortions of these myths, as well as the interpretations assigned to the monument during the 19th and 20th century (Duke 2006; Hamilakis 2006; Solomon 2006). Apart from the 'official' channels that provide interpretation through representations, places acquire meaning through the productions of popular arts and media (Moser 2001; Walsh 1992). However, when it comes to spatial perception, it takes someone to move within these spaces and pause at locations to contemplate and process the available information. Moving around a site, pausing and combining location-based information with information acquired before or during the visit, is the process of transforming any space into a place of meaning (Tuan 1977, p. 6). In Witmore's (2004) words: 'Through movement, activity and interaction, and lived experience, places come to be constituted cognitively, and in the process they become meaningful'. The interaction with heritage interpretation spaces, whether the architecture is intact or in ruins, cannot be investigated without turning the lenses towards 'the movement of bodies in space' (Psarra 2009, p. 233; Tschumi 1996, p. 3).

2.2 Space and pedestrian movement

Having described the physical elements that constitute heritage interpretative spaces it is necessary to discuss the process of perceiving our surroundings through movement. The relationship of human movement and physical spaces has been identified in many disciplines as an important topic of theoretical and scientific significance. The exploratory interaction of individuals and societies with their natural and built environment has concerned the work of many disciplines ranging from architectural theory to design practices, from phenomenology to cognitive sciences and most relevant to this research, the fields of museum and heritage studies. By providing an overview of the diverse theoretical and epistemological approaches to the notion of pedestrian movement in places, I wish to guide this discussion through and over the underlying discrepancies conveyed by the different schools of thought and ultimately to argue for a balanced approach that might be of value in considering visitor movement in archaeological sites.

2.2.1 Theoretical approaches in the investigation of space and movement: architectural and phenomenological scholarship

One of the first theoretical approaches on the relation of pedestrian movement and the configuration of spaces is witnessed in the work of Camillo Sitte, an Austrian architect of the late 19th c. Sitte, argued against strict geometrical rules in designing public spaces - the dominant tendency of neo-baroque and academic formalism of his times (Moughtin *et al.* 1999, p. 67) - by theorising exemplars from the Renaissance, where artistic ingenuity informed by sensitive observation resulted in works displaying harmony and aesthetics (Collins and Collins 1986, cited in Moughtin *et al.* 1999). One of the principles he established pertains to the decision making process of placing statuary in public spaces (e.g. a square), and is based on an intuitive observation of children placing snowmen away from beaten paths (Moughtin *et al.* 1999, p.65). Drawing from this observation, he suggests that the best *locus* to place a statue in an open public space is the most untouched - by pedestrian movement - irregular area observed on a snowed ground surface. In other words, he suggests an organic design platform of space, which is informed by the elusive trails of pedestrian movement, the 'lines of communication' (Collins and Collins 1986, cited in Moughtin *et al.* 1999, p. 65).

Architectural theorists, in response to Modernism and following on from Postmodernists' critique on the notions of functionalism and conceptual order in architecture, have argued that architecture should be studied in the context of bodily movements and the events that take place in a particular space in order to understand it (Lefebvre 1991; Malpas 2004; Psarra 2009; Tschumi1996). In parallel to this, Tschumi believes that space, both as a term and as a notion, should be enhanced by encompassing all the different definitions and meanings that other disciplines use. Superimposed elements of space such as 'structure (or frame), form (or space), event (or function), body (or movement), and fiction (or narrative)' create multiple realities and interpretations (Tschumi 1996, p. 251). The dynamic and ever changing balance between these elements make room for these multiple realities to emerge while these dynamics - and regardless of the designer's or interpreter's intentions - are largely adjusted by the subject experiencing them. This brings to the fore the issue of the subjectivity of space perception and Tschumi's question:

> Is the perception of space common to everyone? If perceptions differ, do they constitute different worlds that are the products of one's past experience? (1996, p. 53)

To this end, the theory of phenomenology in disciplines pertinent to the perception of the environment, such as Cultural Heritage studies, was developed and used as a method to describe the personal, perceptual and sensual encounters with the world (Heidegger 1962; Merleau-Ponty 1962, 1964). The notion of perceiving rural monuments has been discussed at a theoretical level, mainly in landscape phenomenology studies (see Ingold 2000; Tilley 1994 and 2004). In particular, the participation of the senses in understanding and forming relations with space assumes a central role (Casey 1996, p.19). In this framework, some scholars consider the archaeologist's body as an interpretative vessel, which through movement, embodied experience and interaction with the cultural heritage landscape will be able to reveal the past (cf. Flynn 2008; also see Thomas 2006). However, the notion of subjectivity inherent in phenomenology has attracted a great deal of criticism, in that it fails to explore 'the objective', or the processes which are fundamental in perceiving space. Phenomenological approaches place emphasis on self-reflection and on the recollection of internal perceptive mechanisms to provide rigorous and detailed accounts of spatial experiences and perception. Such attempts to describe the subject-space interaction become more of a mental account of the experience and thus, it becomes problematic to assess what portions of filtered perception by reasoning, these descriptions involve. Furthermore, as mentioned previously, any descriptive method is by default destined to fail

in revealing the ‘elusive’ configurational properties of a space, a fact which is central to the investigation of this study.

More recent theoretical approaches to the ways we experience space, in an attempt to preclude inherent ‘Cartesianesque’ dualities such as subjectivity *versus* objectivity and perception *versus* sensation, mould their arguments from a position ‘in between’ without preferring one over the other. Architectural theorist de Vega (2011), influenced by the work of Deleuze (Deleuze and Guattari 1987) illustrates this by emphasising on the notion of affection in experiencing space and suggesting ‘a phenomenology without senses’ (paraphrasing Deleauze’s ‘Body without Organs’ cf. Message 2005). She argues that perceiving and sensing - as functions of mind and body respectively modified by affection - work in synergy and ‘are tied to the idea of movement’ (de Vega 2011, p. 45). Moreover she explains that:

> …we are experiencing space as what it does rather than what it aims to represent…there is a tight link between experience and the notions of potential and performance. These refer to a force, a tending towards, in effect; a movement…This kind of experience does not provide a single reading of a space, but multiple; overlapping, ever-changing and at times, simultaneous. Out of these multiplicities of interactions and affects, certain recognizable patterns will emerge. (2011, p. 45)

These emerging patterns in the interaction of human movement and space open up new ways of thinking and informing visitor movement planning at a conceptual and practical level. It could be argued that a sense of objectivity in perceiving built spaces is inferred in this approach, since multiple movements in space, with their overlapping or diverse footprints, provide a valuable feedback on the configurational properties of space which are being experienced. Emotionality, intentionality and in general the intangible or not yet understood mechanisms of perceiving spaces remain purposefully subjective and unexplored. Nevertheless, they are incorporated and thus, reflected in the movement of bodies giving way in understanding space through its properties; through its affordances enabling spatial motility.

2.2.2 Spatial cognition in the study of human movement-space interaction

Disciplines pertinent to spatial cognition have claims to more scientific, and thus more ‘objective’, approaches to human movement-space interaction. Spatial Cognition is generally defined as the research ‘concerned with the acquisition, organization, utilization,

and revision of knowledge about spatial environments' (Hölscher *et al.* 2007). Different disciplines such as neuroscience, ecological psychology, physiology, geography and architecture to name a few, employ a variety of theoretical approaches and experimental methodologies to define these complex processes of spatial perception and movement. Cognition has had its criticism and self-criticism, in that it assumes that cognition consists of a representational system of the word which exists independent of the world in the mind (Varela *et al.* 1991). However, for other scholars perception does not happen in the brain nor with the senses, but it is rather a whole body complex process which involves movement in three dimensions in order to occur (Gibbs 2006; Gibson 1966 and 1979). Middle ground approaches such as embodied action (Varela *et al.* 1991) and embodied cognition (Gibbs 2006) attempt to overcome these issues, and enhance the arguments of cognition by often addressing the philosophical and experiential questions of phenomenology.

Psychologist James J. Gibson (1977) provided a valuable insight on spatial perception and human movement, suggesting that it is highly dependent on locomotion affordances existing in the environment which is being explored. By the term 'affordance' Gibson referred to the mutual relationship between an animal and its environment, providing a significant theoretical foundation within the discipline of cognitive psychology for objectively inquiring about the perception of the environment. In the MIT encyclopaedia of cognitive sciences, Wilson and Keil state that:

> An affordance, once detected, is meaningful and has value for the animal. It is nevertheless objective, inasmuch as it refers to physical properties of the animal's niche (environmental constraints) and to its bodily dimensions and capacities. An affordance thus exists, whether it is perceived or used or not. It may be detected and used without explicit awareness of doing so. (1999, p. 5)

Gibson defines a surface that fulfils four properties, namely rigidity, levelness, flatness and extendedness as 'walk-on-able', and argues that if there is optical reception of these four properties then the affordance is perceivable. To extend this notion he gives the example of a surface which possesses these properties, and additionally is raised at the level of a person's knees, making the point that this surface also affords 'sitting-on'. It is important to note that he refers to both physical and artificial properties of the environment as affordances. The theory of affordances in relation to human movement has been interestingly explored - apart from the discipline of ecological psychology - in architectural and museum design (Maier *et al*. 2009; Wineman and Peponis 2009), in Computer

Interaction Design (Norman 1988;1999), cultural heritage and media (Kalay *et al*. 2008) and archaeology (Ingold 2000).

Much of this research is still more concerned with the process of perceiving or wayfinding in the human movement-space interaction, rather than investigating the properties of space or aggregate movement patterns for understanding this relationship, and informing the design of spaces. For the latter, a significant research field, called space syntax, was initially developed by Bill Hillier and his colleagues in the early 1970s, to understand the relationship between space and society (instead of individual subjects) (Hillier and Hanson 1984). Despite the initial misconception found in the early studies of space syntax that by studying the built environment we can infer the complexities of social behaviour, space syntax scholars realised that this relationship is a two way interaction. Much of the space syntax research is currently focused on pedestrian mobility and wayfinding in built environments, and developed by multidisciplinary and collaborative schemes between scholars from environmental psychology, urban planning and architecture, computer scientists and other disciplines pertinent to spatial cognition (Hölscher *et al.* 2007).

2.3 Movement in heritage interpretative spaces

According to visitor-centred approaches in Cultural Heritage, planning for interpretation and presentation should accommodate the 'things we value' from our past (Giaccardi 2011; Howard 2003, p. 19) and those things should be explained from within the contemporary way of living so that 'heritage does not act as a relic, a remnant of the past *per se*, but rather a dynamic source of contemporary values' (Ganiatsas 1996). The things of value derive from our personal interests, our diverse and complex ways of perceiving and inquiring the remains of the past. To quote Manos Hatzidakis' words from the book 'Third Programme Comments':

> Tradition obtains value only when it doesn't rely on representation, but instead in our every day, without sophistication lives. This is when tradition is used naturally, with no need of explaining. Only then it has the right to exist. (1980, p. 146, my translation)

The 'visitor perception' approach also raises some questions about the authority of curatorship and the authority of the stakeholders over cultural heritage. It is therefore imperative for cultural heritage interpreters to acknowledge that people enter these sites with certain cultural and cognitive baggage, as well as certain expectations as to what they

are about to experience or learn (Smith 2006). All the above, along with the information that the site provides, form the visitor experience. Getting feedback from people's experiences in such spaces is an essential process in heritage planning and therefore should not be a one off and one way process where interpretation is provided by experts for the visitors to consume (Silberman 2013).

One of the modes for examining the visitor perception is to look at the visitor-heritage space interaction through movement. Evidently, movement provides a more affective understanding of the space being explored, provided that exploration is the mode of this interaction with space. In 'exploratory' locomotion occurring in public spaces or rural settings, such as museums and archaeological sites, movement is conducted in the mode and pace of discovery as opposed to 'habitual' motion, where people are hardly aware of their surrounding built environment (Bechtel 1967). The realisation of the importance of, and establishment research on the links between human movement and space, led to the acknowledgment of the benefits of studying this relationship in designing more adaptable environments to society's needs. It also explains why this relationship has been heavily explored in museum studies; observing and capturing the traces and emergent patterns of this interaction between visitors and the interpretative heritage space with all its counterparts reveals the elusive configurational properties of such spaces. Similarly, the multiple interpretations of space through movement and interaction emerge as patterns signifying a space, while freeing the scholar from the need of exhaustive personal encounters and descriptions, and enabling a more world evidence-based and scientific assessment of space. This approach becomes extremely valuable in the case of interpretative design and catering for movement in spaces of cultural significance.

2.3.1 Visitor movement in the museum context

The early acknowledgement of the twofold interaction between architecture and interpretative design and, between interpretative spaces and human response, generated a substantial subfield of museum research investigating the visitor behavior in heritage interpretation spaces. Interesting work has been carried out which suggests that designing visitors' itineraries in contemporary purpose built spaces should be informed by visitor observation methodologies. Ever since Melton's ground breaking work in this field, a vast range of methodologies have been developed to observe visitor locomotion, orientation, wayfinding and occurring circulation patterns (Bitgood and Patterson 1986a; Bitgood and

Patterson 1986b; Bitgood *et al.* 1988; Klein 1993). While in some cases a visitor-centred approach is followed, others have denoted the importance of the visitor/exhibit interaction approach (Bitgood 2006) and how the arrangement of the exhibits influences visitors' behaviour (Falk 1993). Parsons and Loomis (1973, p.15) state that '... the actual flow of visitor traffic can only be known by empirical study, a notion that runs through a series of visitor observations 'in the field''.

One of the most common methods of observing visitors' flows, which is still practised, is the method commonly called 'shadowing'. This means that the observer follows the subjects unobtrusively throughout their visit, and keeps notes depending on the nature and aims of the research. The visitor may or may not be aware that he/she is being followed. Another strategy follows a more place-based approach. According to this, the observer picks out the locations of particular interest according to the type of study conducted within the exhibition, and makes more high resolution observations. Notes could be kept on the way visitors navigate and choose itineraries, on the stops and the patterns of contact with displays and their visual gaze or scanning of the physical setting (Kaynar-Rohloff 2009). The notes can be accompanied by marking itineraries with lines on maps (Melton 1935) and the use of a diverse symbology and coding to indicate frequency, direction of movement and points of interest (Klein 1993). Such observations are usually accompanied by the collection of qualitative data based on questionnaires and interviews structured according to the aims of the study. Serrell (1998), with her seminal paper 'Paying attention: visitors and museum exhibits', provided a standardisation of collection and analysis of data and denoted the importance of 'time and tracking' studies.

The 'pen and pencil' method is still commonly used for recording observations. An innovative method (for the time) called 'Hodometer' utilised electric contacts placed at a foot square grid under the floor to track visitor movement (Bechtel 1967). Photographic and video recordings have also been acknowledged as important documentation methods in such studies, providing high resolution data for qualitative analysis. However, video recordings in particular present several problems, including coverage of multiple spaces and patching multiple video files to track visitors throughout the museum/exhibition space (Yalowitz and Bronnenkant 2009). In order to overcome this problem some software and tracking devices solutions emerged, such as the 'Noldus Observer' and the 'Museum Experience Recorder' (see Yalowitz and Bronnenkant 2009).

In museum design studies, a significant amount of work has also been accumulating, which is influenced by environmental behaviour and space syntax studies, and explores the

relationship of physical design (i.e., layout or configuration of a building) with the interpretative design (i.e., exhibition) and the influences in the visitors' exploration patterns. Established approaches include the employment of space syntax and isovist methodologies to investigate the visitors' exploration modes and patterns of movement in relation to the exhibition layout (Bechtel 1966; 1967;1970; Choi 1999; Peponis and Hedin 1982), and accessibility and visibility analysis on movement paths and their relationship to the display objects (Peponis *et al.* 2004). Comparative studies of actual pedestrian movement and agent-based modelling have also been conducted to triangulate results and answer hypothesis. The Centre for Advanced Spatial Analysis (CASA) compared recorded visitor tracks in the Tate Britain Art Gallery with the results from modelling agents, the walkers, moving in the gallery's virtual space (Batty 2003). The simulation considered modelling and refining factors related to geometry and social repulsion/attraction, and explored evolving movement dynamics in rooms with equal attraction values in order to ascertain whether the observed densities of movement in certain rooms had to do with the exhibits or the layout. Interestingly, the experiment showed that the configuration of the gallery certainly conditions visitors' movement regardless of the existing exhibits (Batty 2003, p. 97). Similarly, Kaynar conducted a critical comparison of the results from simulating spatial visibility and visitor's spatial behaviour, suggesting that visibility constitutes a critical factor of physical design influencing visitors' spatial behaviour (Kaynar 2005).

2.3.2 Visitor movement in the heritage site context

In Chapter 1, it was mentioned that catering for on-site visitation and accessibility is dealt with as a site specific task, and according to the individual agendas that heritage specialists envisage for the protection and interpretation of each site. Heritage sites have a certain spatial character formed by sensitive fabric, and unlike contemporary spaces, the emphasis is placed in channelling and controlling visitor movement through specific paths. Although not numerous, there is significant work which places emphasis on studying visitors' response to such spaces. This work is conducted either formally, to inform interpretation programs or to explore peoples intuitive interactions with heritage in the context of every-day life (see Arvanitis 2010). More commonly, the 'visitor perception' approach is usually left aside in interpretative planning as a theoretical endeavour of the discipline, and

considered to be a ‘factor that cannot be scientifically measured’ (Chrysanthi and Earl 2013; Lekakis 2009).

Still, it has been ascertained that methods such as unobtrusively observing visitor behaviour and engaging visitors in discussions can significantly inform interpretation planning or the design of digital interpretative media, as it provides insights about what visitors value the most and how they interact with and move within heritage spaces (Ciolfi and McLoughlin 2011). Descriptive analysis of visitors’ movement, looking at temporal and spatial patterns of their activities, is usually employed as a preliminary phase to inform later development stages of more refined analysis (Fennell 1996). There is also significant work in tracking visitor movement and more rigorous methodologies developed to investigate collected time-space data (Russo *et al*. 2010; Shoval and Isaacson 2010). Much of this work, however, is mainly concerned with either tourist mobility research questions or with the development and refinement of methodologies for investigating pedestrian mobility. Some of these research objectives concern tourists’ decision making, spatial cognition and the exploration abilities of tourists (Xia *et al.* 2008), movement patterns and flows within urban centres and space/destination consumption. The latter category is concerned with identifying the hot spots of urban centres according to tourists’ time-space behaviour around them.

Shoval and Isaacson (2010) compiled a thorough study titled ‘Tourist Mobility and Tracking Technologies’, where they discuss the theoretical and methodological issues in visitor tracking, provide a detailed account and assessment of available land-based and satellite tracking technologies, as well as some methodological issues and research challenges in developed applications on tourist mobility. Similarly to museum studies, the issue of temporal and spatial behaviour, along with the appropriate methodologies to capture and analyse those parameters, features in their study as one of the key issues in studying spatial mobility. This work also presents interesting analysis and visualisation solutions in two or three dimensions.

Fewer, but nevertheless insightful, are the analyses conducted on detecting the locations where tourists stop. Commonly, such approaches are based on the division of trajectories into ‘moves’ and ‘stops’, while a conceptually alternative approach considers a stop as part of the trajectory where the moving entity does not move (Spaccapietra *et al.* 2008). Four methods have so far attempted to address this semantic approach. The first three methods based on intersections of trajectories with the locations of interest and speed values require some sort of predefined time or space threshold in order to be applied. Additionally, a

satisfying prior knowledge of the locations visited, their landscape and urban features and the type of activities that are expected to occur, are also essential for these kinds of analysis (Orellana and Wachowicz 2011). The fourth approach focuses on the notion of 'movement suspension', which refers to 'the reduction of speed associated to stopping behaviour even when pedestrians are not completely still or when their slow movement is undistinguishable from GPS inaccuracies' and uses movement vectors to represent 'the collective movement that can be measured or sensed at one place at one time' (Orellana and Wachowicz 2011, for more information on the methodology see Orellana 2012). The study gathered GPS track logs and applied LISA, a local index of spatial association to analyse the data. The method has been validated, and according to the results clusters of movement suspension overlap with known attractions of the area, path intersections and interpretative and visitor facilities infrastructures. The analysis also generated 'unknown' clusters, signifying areas of the suspension movement that the study had not included. This fact suggests that the methodology proposed is suitable for detecting the places of interaction independently of the purposes of each study, and can provide interesting interpretations of the visitor-space interaction. However, the study assumes that each location corresponds to a single attraction (cf. Orellana and Wachowicz 2011) and thus, high resolution observations of aggregated points of interest, or the investigation of the visitor-space interaction in archaeological sites with multiple attractions at the same location, are not possible with this methodology.

Finally, ever since this research initiated, the topic of studying visitor movement in open-air heritage sites has attracted an increasing attention and there have been different uptakes of the subject depending on their objectives. For instance, Moussouri and Roussos (2013) employ a purpose built mobile tracker with self-reporting functionalities to explore the relation between family group motivation and strategy. The latter concerns both the intention of visitors before the visit as well as the formal museum strategies on presenting the exhibits. A comparative analysis of the data obtained by tracking observations, interviews and strategies as defined above suggested a close relationship between the type of the visited place (i.e., whether it presents exhibit or non-exhibit function) and the strategies that family groups employ (i.e., pertaining to educational or entertainment priorities) (Moussouri and Roussos 2013). Other studies employ GPS tracking alongside the technique of shadowing and interviews to reveal visitor behaviour in archaeological sites and how this process can inform on-site interpretation and presentation strategies (see Wallace 2013). The latter approach is heavily relying on the researcher presence

throughout visiting tours while the analyses of data are conducted in a laborious, non-computational manner.

2.4 An epilogue: affordances of space and visitor movement as a collective output

A brief discussion on movement and affordances will be attempted, drawing from the first observations conducted in a variety of archaeological sites visited during this research. This discussion provides a link between some of the ideas discussed in this chapter on movement, and the role of interpretative infrastructure in visitor movement as discussed in Chapter 1. It also provides a smooth transition to the next chapter concerned with the methodologies employed in this research. In the case of archaeological sites that haven't had interpretative interventions, images of visitors incoherently crossing the site and stepping on the low-preserved ancient walls in their attempt to find their way around the site are commonly encountered (Palyvou 1997). These phenomena occur when the site lacks sufficient spatial on-site interpretation, and thus the spatial organization and former function of the monument is ignored by the visitor. One could argue that this behaviour occurs, despite the awareness - at whichever degree - shared by 'western cultured' visitors, that in organised sites walking on ancient walls is not allowed and is discouraged either by explicit signage or by on duty guards. Nevertheless, this argument can be quite misleading, particularly when it assumes that visitors' behavioural patterns are framed within a widely adhered to western understanding of how to behave at museums and heritage sites.

Under Gibson's theory prism a series of affordances for movement in archaeological sites can be identified. Leaving aside the properties of the landscape itself, within an archaeological site some of the preserved features of its architectural character can guide movement such as ancient paved paths, well maintained structural features such as walls and ancient entrances and symbolic stone features (e.g. the Sacred Stone in the case of Gournia). Other areas create open and flexible options as to where the visitor can move, that could be either part of the ancient planning (e.g. public open spaces) or the result of a disorganised area of the archaeological site. Movement decisions are initiated from a moment of stillness; people decide to stop and observe particular structures closer and continue their interpretative exploration. Therefore, it could be argued that the environment affords stillness as well. Paralleling Gibson's notion of surfaces that afford 'walking-on' to

the case of rubble and low-preserved walls, it is becoming apparent that people, despite their cultural and cognitive baggage (i.e., experience from visiting heritage sites under the western view of heritage management with signs prohibiting stepping on ancient remains), perceive such features as 'walk-on-able' and hence, if something attracts their attention, and access to it requires that they walk over a wall, they will. The awareness of walking around a site under the supervision of a guard may or may not influence this interaction with the site.

Artificial affordances of archaeological sites can be divided in two broad, but nevertheless distinct, categories; archaeological remains after the excavation works and contemporary interventions for the protection, enhancement and interpretation of the site. Therefore, apart from the actual architectural remains and their augmentation through works of preservation and restoration, archaeological sites are constituted by additional interpretative interventions, such as interpretative panels, paths, human, digital and printed guides and other contemporary structures serving the visitors' needs. From observations and the analysis of the structured interviews carried out on site, it has also been ascertained that interpretative panels play an important role in the way people move around archaeological sites, functioning as points of interest. However, even if we list, compare and analyse all the possible physical and tangible elements that people encounter in archaeological sites, perhaps it would be a futile endeavour to assume an understanding of how they influence movement, especially since the latter is the expression of a series of underlying complex mechanisms that form our understanding of a place. The same assumption could be made concerning the motivations of visitors during their visit in heritage sites and how those influence movement (cf. Moussouri and Roussos 2013).

Arguably, understanding how intuitive movement takes effect in spaces such as an archaeological site, with multiple points and layers of affordances, involves a great deal of complexity. Some things, or some locations, can attract our attention because they are interesting visually, aesthetically or morphologically, because they are highlighted (e.g. with information on panels), because the surrounding views are a spectacle on their own or because we followed someone else (Pearce 1982). But while it is hard to grasp in an evidence-based manner the complexity inherent in processes of perception and movement, a different line of thinking might provide at this point a more insightful direction. It has been argued that our thinking is expressed by actions taking place in the world that we are immersed in (Ingold 2007, p.28; Thomas 2012, p.175). This has been termed as an 'explicit' (Johnston 1998, p. 57) or the Gibsonian 'direct' (Ingold 1998, p. 39) perception

which resides in the lived and embodied experience of interacting with a place (de Vega 2011; Thomas 2012, p. 175).

Therefore, I argue that in order to attain a better understanding of the interpretative and mobility affordances of space, we should consider the multiple footprints of visitors' movement and interaction at heritage sites as expressions of the experienced spaces. This outlook could provide an insight on the affordances or limitations offered by the informative environment for exploration. Given that people's movement around a site constitutes the main vehicle through which a site is being presented to the public, I postulate that capturing the collective footprint of this exploration is a valuable process for revealing the properties (physical or intangible, interpretative, of archaeological or natural interest) of space before or/and after any interpretation programme and intervention is applied. The intentions, emotions and social characteristics of visits, although acknowledged as very important factors influencing visitor movement, are left intentionally underexplored. Besides, their co-participation in visitor movement behaviour is reflected on the observed movement, lingering and interaction events.

In the next chapter, I suggest a methodology developed to address this very argument. Apart from recognised forms of observation and the collection of qualitative data, technologies such as GPS body tracking, geo-tagging and applications of GIS were employed. I will attempt to establish that the interpretation of the processed data provides a better insight and an overview of the site's affordances for movement as well as the weaknesses of current interpretation infrastructures.

Chapter 3: Building up a visitor-centred methodology for assessing the visitor-space interaction

Building and adding on previous theoretical frameworks and methods, as discussed in the two previous chapters, this chapter discusses the methodology developed to examine visitors' interaction with archaeological sites, and the possibilities that open up from this investigation for informing on-site interpretation and presentation. A critical point of this endeavour was the development of a 'hybrid' methodology to assess the visitor-space interaction by utilising visitor feedback related to interpretation, experience, movement and spatial behaviour patterns in archaeological sites. Thus, a bottom up approach is followed for revealing the properties of space by utilising visitor-sourced data as opposed to expert-led assessments of cultural heritage sites.

The term 'hybrid' is used here to explicate that this methodology does not aim to holistically cover the methods heritage specialists could potentially employ to assess and inform on-site interpretation; rather the visitor perception is at the core centre of this methodology. Another reason why the term hybrid is appropriate here is because the methodology considers both qualitative and quantitative methods of collecting and analysing data. It addresses a common question in such visitor centred approaches in cultural heritage interpretation; whether to engage with a qualitative or quantitative oriented methodology. How effective is it to measure experience, movement and behaviour in such spaces, and use the results to inform interpretation? On the other hand, theoretical and experiential approaches, as compelling as they may be in their attempt to explore detailed individual accounts, do not seem to be adequate in practical terms. Convincing other researchers, policymakers and stakeholders of the significance of the collected data and results entails more than presenting a few evocative narrations of the visitors' experience. Evidently, different opinions on this matter have lead researchers to adopt a variety of approaches in evaluating visitors' interaction with heritage spaces. Here, I followed a mixed-method approach, which integrates both qualitative and quantitative analysis of data as those approaches are often suggested in the cases where the researcher is required to validate experiential and observed findings (Brannen 2005; Bernard 2005; Creswell 2009).

In this chapter, I present and discuss the employed methods and tools that were used to collect, process and analyse a series of data that reveal the aggregated footprint of the visitor-space interaction.

3.1 Qualitative and quantitative data collection

The systematic visitor data collection occurred during a number of summer field sessions from 2010-2013 mainly at the archaeological site of Gournia and Çatalhöyük. However, the visitor data collection was also applied at the archaeological site of Knossos in order to provide a comparative study of the methodology's potential in different contexts (see Chapter 4, section 4.2). Although, the planning of those field sessions (each of which lasted approximately from seven to eight days) would have benefited from longer study seasons, it became impossible based on the time/expenditure management plans that had been in place.

The consent of visitors to participate in this study was critical and it entailed a very brief introduction of the purpose and the nature of the study without providing information that might influence the subjects. The assertion alone that their involvement in this study would be valuable in the context of a collaborative and participatory approach to cultural heritage research was usually successful in ensuring their consent. As it was often reported, visitors were willing to participate in a study which is 'interested in their opinions'. Apart from securing visitors' consent, it was also crucial to approach visitors that represented different 'profiles' (depending on their age, sex, country of origin, educational level, financial status, interest in cultural heritage etc.) in the mosaic of cultural heritage tourists who would offer the required polyphony in the dataset. It is important here to note, that although demographic information were systematically recorded throughout the field sessions they do not form factors of my analysis. This decision is based on the view that any attempt to strictly classify visitor experiences, opinions and spatial behaviour based on demographic factors is susceptible to sketchy and perhaps even misleading results (Burns 1999, cited in Solomon 2008, p. 114). Besides, as mentioned in Chapter 2, the motivations and complex mechanisms behind our perception of and conduct within cultural heritage spaces is not relevant in the process of revealing the collective footprints sought in this investigation.

3.1.1 Questionnaires, observations and interviews

The first stage of data collection included a variety of qualitative-quantitative methodologies such as non-systematic observations, interviews and distributed questionnaires, which are typically used for assessing interpretative programmes at heritage sites and museums (Ham and Weiler 2006; Savage and James 2001). However, the overall visitor-informed approach was influenced by Spaceshaper, a tool developed by the Commission for Architecture and the Built Environment (CABE), which works as a participatory platform for assessing and redesigning existing public spaces. CABE and Historic England[11] have worked on notions of local character and identity through a participatory process termed 'townscape and heritage appraisals' (EH and CABE 2008). This approach is generally described as creating a shared understanding of place by working with local people to co-assess the significance of certain areas and inform future planning (Graham *et al*. 2009). For the purposes of this research, a similar participatory approach was adopted in order to rethink space and movement in archaeological sites by actively involving visitors and site staff in the assessment and planning process.

The non-systematic observations were conducted from vantage points of the sites in an unobtrusive manner and concerned recording (with pen and paper and/or camera) general remarks and patterns about how visitors moved around the sites and what attracted their attention. The visitors were not followed throughout the site nor were their behaviour rigorously recorded. Besides, a more appropriate method was designed for high resolution and systematic observation of visitors (see section 3.1.2) which complied with the ethical procedures of this research study. This process revealed some of the issues that the archaeological sites face in terms of visitor management, and the areas which attracted noteworthy activities and interaction with the archaeological space. Apart from observations, the archaeological site staff was often engaged in informal, open interviews. Such discussions about the site through the different lens of interpretation and personalised experiences provide an additional layer of feedback on the topic.

At the end of their visit, visitors were asked to fill in a questionnaire, which was designed and structured specifically for the purposes of this study (see Appendix A and Fig. 3.1-3.2). Apart from certain general questions about the visiting mode, the aesthetics of the site and the demographics section the questionnaire's content is mainly designed to explore

[11] Former English Heritage.

visitors' spatial choices and interpretative preferences. Apart from the structured questions posed in the form of categorical, yes/no and rating scales (see Savage and James 2001), the questionnaire was also designed to allow people to express their opinion on what they liked and disliked the most from their visit. As well, they were asked to provide their opinions on what they would like to see in a future interpretative program. Posing such open questions warranted that their responses will be varied, the collected data will be richer, and consequently the methodology can be more successfully applied. According to Gaver *et al*.:

> Asking unambiguous questions tends to give you what you already know, at least to the extent of reifying the ontology behind the questions. Posing open or absurd tasks, in contrast, ensures that the results will be surprising. (2004, p. 56)

Consequently, the questionnaire was designed in order to allow visitors to participate in the assessment stage. This way a shared and perhaps more complete understanding of the archaeological space in its present form is sought.

The survey was initially created in English and translated further to Greek, Spanish and Turkish. In total, 187 visitors took part at this stage of on-site data collection (for the distribution of samples per archaeological site see Table 3-1) and provided their assessment and views on four basic domains: a) On-site accessibility, b) Spatial perception and awareness of the site's layout as they walked around; the ease or difficulty in identifying the remains, c) Aesthetics of the site; for example they had the opportunity to assess the preservation state, conservation and maintenance of the site; the contemporary structures and plantation. Finally, visitors assessed the existing interpretative infrastructure and commented on what more they would like to see in a future implementation.

Table 3-1 Types and quantity of qualitative data collected per archaeological site.

	Collected Data/Number of participants			
Archaeological Sites	Questionnaires	Observations	Interviews	Web Resources
Gournia	Yes (63)	Yes	Yes (9)	Yes
Knossos	Yes (15)	Yes	Yes (4)	Yes
Çatalhöyük	Yes (74)	Yes	Yes (22)[12]	No

[12] The interviews were conducted by the Visualisation Project members at Çatalhöyük and here, I use the results of our published work in the project's newsletters of years 2012-14 (see Çatalhöyük Archive Reports).

Additional information was also gathered from web image repositories (i.e., Flickr and Panoramio), social media (i.e., Twitter, Foursquare) and crowdsourcing sites (i.e., TripAdvisor). The collection of a variety of qualitative data on-site and from web repositories ensured a rich and diverse feedback. Overall, visitors were very positive in providing their feedback on-site mainly at the archaeological sites of Gournia and Çatalhöyük (Figs. 3.1-3.2), whereas at Knossos several visitors appeared to be more reluctant due to time or group tour constraints.

In several cases the open-ended questions section of the questionnaires provided poor responses as expected (see Schuman and Scott 1987), while feedback retrieved from web repositories was much more informative. Based on conducted experiments to compare visitors' response to open-ended *versus* closed questions, it has been well-established that visitors often prefer the 'multiple choice' type of questions rather than having the option to freely comment on a subject (Ham and Weiler 2006; Schuman and Scott 1987). In the case of heritage site visitors, perhaps people are more inclined to provide detailed accounts of their experience from a post-visit comfortable location. Having an incentive to post rich accounts of one's experience at a heritage site also seems to work effectively. Social media, crowdsourcing platforms and personal blogs provide such incentives pertinent to self-promotion, communication, sharing and the feeling of being part of a community (see Giaccardi 2012).

Figure 3.1- 3.2 Visitors filling in questionnaire forms. On the left: ticket house at Gournia. On the right: visitor facilities bench by the entrance/exit of Çatalhöyük.

However, retrieving such information from web repositories for research purposes involve certain weaknesses. More specifically, such visitor feedback is usually anonymous and

therefore, the feedback cannot be associated with a specific visitor profile. Further to this, the feedback is generated for purposes other than research; hence, there is more emphasis on the researcher to deal with the above bias. Nevertheless, the process of interpreting any qualitative data unavoidably involves the researcher's subjectivity to a certain extent. Thus, the employment of mixed-method approaches and the triangulation of findings is suggested for minimising the aforementioned issues.

3.1.2 Spatiotemporal and image data collection

Apart from non-systematic observations and the collection of qualitative-quantitative data about visitors' views on the site, tracking and recording technologies such as GPS body tracking and camera recordings were employed for high resolution observations. Lightweight GPS devices – at the time of the survey - had proven to be the most efficient tool for tracking pedestrian movement in relatively small sized and entrance-exit controlled areas such as archaeological sites (Shoval and Isaacson 2010). Each visitor was asked to carry a small lightweight wearable GPS device. Three GPS Garmin eTrex devices were employed, which usually visitors hung around their necks or placed in their pockets. Additionally, visitors were given the respective synchronised small digital camera and were instructed to take pictures during their visit, as they would normally do with their own camera (Fig. 3.3). This method, called Visitor Employed Photography (VEP), has been commonly used in visitor studies for measuring visitor attention to exhibits or to the natural environment (Camp *et al.* 2000; Ham and Weiler 2006).

Figure 3.3 A participant equipped with the GPS device and the small synchronised camera.

Taking notes on the number of visitor and the number of GPS device/camera each time a visitor initiated and finished his/her visit was essential for keeping the incoming data organised. This data collection method has proved unobtrusive to the visiting experience, and often visitors reported that they were not always conscious of taking part in an 'experiment' or having been 'assigned a specific task'. At Gournia, in total 60 GPS tracks were recorded and 1656 images were captured by visitors. In terms of the GPS data quality, the open rural site, the good weather conditions and the lack of high vegetation provided an optimum accuracy reading of 3m all around the site. Additionally, the record interval was set to 'time', and the GPS receiver which was set to retrieve its location once every 2 seconds, resulted in the collection of high resolution GPS data. Apart from GPS track logs, GPS points were collected from the locations of the interpretative panels, which were required for the visitor-space interaction analyses.

3.2 Handling, processing and analysis of collected data

In the following sections I will describe the employment of different software and the methods used in order to organise, process and analyse the obtained visitor-led data. For the above purposes it was necessary to employ a variety of methods and technologies which were suitable for dealing with qualitative and quantitative data. It is also important to note here that the selection of technologies used was a result of a long-term engagement and experimentation with different software and their properties, both open-source and commercial whose licences were provided by the University of Southampton.

3.2.1 Handling and analysis of observations, interviews, web comments and questionnaire responses.

Engaging in a mixed method research which draws information from different formats and from a variety of sources entails great complexity in organising and making sense of the datasets. Below, I delineate the approach and the tools chosen for the analysis of different data obtained by observations, interviews, open-ended and structured questions.

Qualitative research has long exited the intense epistemological debates fuelled by positivistic and interpretative oriented approaches (Kelle 1995, pp. 2, 22). Admittedly today, the use of Computer Assisted Qualitative Data Analysis Software (CAQDAS)

provide robust tools to organise, code and parse diverse datasets as well as present and disseminate research outcomes in an effective manner. Certainly, there is a common consensus in qualitative research, that the inspection of qualitative data still remains a subjective and interpretative process relying on the researcher's skills of finding the conceptual associations in the data (Ryan 2009; Sibert and Shelly 1995). In this, the main contribution of CAQDAS is placed on providing the tools to facilitate and prompt such conceptual processes, as well as making those trails of thought more transparent (Hoover and Koerber 2011; Ryan 2009).

All the datasets deriving from observations, staff interviews, web repository quotes, and the open-ended questions of the questionnaire where imported in QSR NVivo 10, whose student license is provided by the University of Southampton. The data consisted mainly of text and images. In order to start exploring the data firstly, a thematic coding of the data was initiated based on three categories that existed already as open-ended questions in the conducted questionnaire survey: Visitor Likes, Visitor Dislikes and Visitor Suggestions. Those categories formed the first class of nodes (the containers of relevant information from different sources) of the coding process since they were broad enough to be subcategorised or expanded with the integration of data from other resources. In this way, I did not follow strictly a grounded methodology where the data lead the interpretation (Strauss and Corbin 1997) but a rather flexible mode of data exploration where the leading role of data versus researcher led questions are in a constant interplay. Gradually and after going through all data from different sources another two first class categories were created (see Table 3-2), as well as a number of secondary nodes developed in two subclasses (see Appendix B).

Table 3-2 The table exported from NVivo shows the first class nodes in which the data were coded.

	Name	Sources	References	Created On	Created By	Colour
	VisitorLikes	4	207	25/5/2014 2:09 PM	AC	
	VisitorSuggestions	3	64	25/5/2014 2:25 PM	AC	
	VisitorDislikes	3	63	24/5/2014 1:11 PM	AC	
	Comparison	2	22	3/11/2014 2:09 PM	AC	
	General Reports	11	15	14/11/2014 8:26 PM	AC	

Coding the data in nodes proved to be very useful because thematically relevant data from different sources are gathered under the respective container, making the iterative exploration of data more efficient and the underlying patterns within the data more visible (Fig. 3.4). The diagram displayed in Figure 3.4 is rather simplistic. In reality, there is versatile movement between the stages of entering, coding, querying and exploring the data. In this, text analysis and visualisation tools enable a more serendipitous investigation of the coded data. For instance, the implementation of a word frequency analysis throughout the coded data can instantly provide the most frequently words used by visitors. Then the analysis conductor can run the same analysis in the first class nodes separately in order to verify if the same words reappear in the frequency tables or different words have higher ranking depending on the theme.

Certainly, stand-alone words and out of their context do not necessarily express meaning but they provide indications that something significant is said around those words within a topic and consequently, the following steps of inquiring and interpreting those words within the text acquire more weight and therefore, validation of the qualitative analysis. The software also keeps the provenance of coded data and other useful descriptive statistics within each node in order to provide the researcher with an overview of the data and control over the coding and interpretation process. For instance, the 22 coded references concerning positive visitor feedback related to the theme 'information' derived from two different datasets: a) The dataset comprised of feedback found on the web and b) The open-ended sections of the questionnaire.

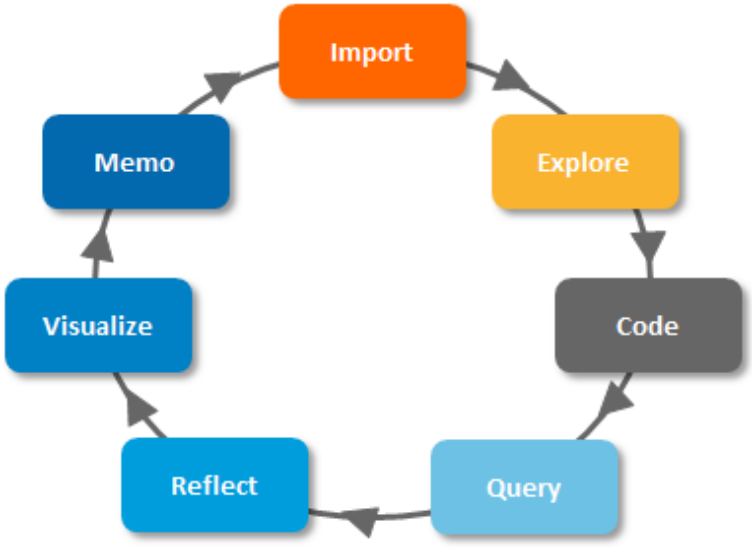


Figure 3.4 An example of the iterative process enabled by NVivo10. Adapted from NVivo10, Getting Started Guide.

All the above information along with the count number of coded references and the percentage of references used from each dataset to form this node are available within each node in the following form:

<Internals\\Text\\WebR_data> - § 7 references coded [1,53% Coverage]

<Internals\\Text\\OpenEnded_VisitorSurvey_Gournia> - § 15 references coded [2,87% Coverage]

However, the most important part of the analysis is the interpretative synthesis of the findings in coherent arguments which relies solely on the researcher's skills. In Chapter 4, I will attempt an interpretation of this analysis' findings in order to highlight the importance of integrating such data in the context of exploring the visitor-space interaction. In terms of visitor responses provided in structured questions, the data were digitised and transcribed in excel spreadsheets. Then all data were converted in numeric values for enabling standard statistical analyses mainly performed in IBM's Statistical Package for Social Sciences (SPSS Statistics 22).

3.2.2 Converting and organising GPS and image data.

The GPS data were downloaded and saved from the GPS devices (Garmin serial/USB format) to GPX XML format, which was easily converted into other formats *via* GPS Expert, a commercial standalone software application for handling GPS data. In the GPS Expert user friendly workspace a series of data processing were conducted such as ensuring that all data are in the same Geographic Coordinate System (i.e., GCS_WGS_1984), inspecting and validating the GPS data (both from the automatically generated statistics and the visualised output on the Map window), editing metadata and converting the final data into appropriate formats for later analyses. Additionally, the image data were geo-tagged for displaying, arranging geolocation data and other metadata of image files and exporting them to appropriate formats (mainly shape files) for further analysis (Fig. 3.5).

Both tracks and image files, along with other geolocation data (for example the location of available information panels), were imported in ArcGIS, the main environment which allowed organising and visualising the data in layers and performing various analysis as it will be demonstrated below (section 3.2.3). Additionally, variables that derived from the

FileName	Artist	DateTimeOriginal	TimeS...	Latitude	Longitude	Altitude	FocalLength	MapDatum
DSC02684.JPG	v1	18/08/2011 09:08:16	08:08:16	35° 6' 35.567879"	25° 11899209' ...	32.34 m	5.80 mm	WGS-84
DSC02685.JPG	v1	18/08/2011 11:08:39	08:08:39	35° 6' 35.413380"	25° 47' 35.8101...	32.34 m	5.80 mm	WGS-84
DSC02686.JPG	v1	18/08/2011 11:08:59	08:08:59	35° 6' 35.336160"	25° 47' 35.6556...	30.89 m	23.20 mm	WGS-84
DSC02687.JPG	v1	18/08/2011 11:09:44	08:09:44	35° 6' 35.181648"	25° 47' 35.8101...	29.93 m	23.20 mm	WGS-84
DSC02688.JPG	v1	18/08/2011 11:12:20	08:12:20	35° 6' 34.718184"	25° 47' 35.8101...	29.45 m	5.80 mm	WGS-84
DSC02689.JPG	v1	18/08/2011 11:13:08	08:13:08	35° 6' 34.409160"	25° 47' 35.7329...	31.38 m	14.50 mm	WGS-84
DSC02690.JPG	v1	18/08/2011 11:13:31	08:13:31	35° 6' 34.331940"	25° 47' 35.7329...	31.86 m	23.20 mm	WGS-84
DSC02691.JPG	v1	18/08/2011 11:14:00	08:14:00	35° 6' 34.177428"	25° 47' 35.6556...	31.86 m	5.80 mm	WGS-84
DSC02692.JPG	v1	18/08/2011 11:14:41	08:14:41	35° 6' 33.791184"	25° 47' 35.6943...	34.98 m	5.80 mm	WGS-84
DSC02693.JPG	v1	18/08/2011 11:18:11	08:18:11	35° 6' 32.864220"	25° 47' 35.5784...	38.59 m	17.40 mm	WGS-84
DSC02694.JPG	v1	18/08/2011 11:19:07	08:19:07	35° 6' 32.864220"	25° 47' 35.5784...	35.70 m	5.80 mm	WGS-84
DSC02695.JPG	v1	18/08/2011 11:20:14	08:20:14	35° 6' 32.632488"	25° 47' 35.5011...	36.18 m	5.80 mm	WGS-84
DSC02696.JPG	v1	18/08/2011 11:20:37	08:20:37	35° 6' 32.478012"	25° 47' 35.2694...	36.43 m	5.80 mm	WGS-84
DSC02697.JPG	v1	18/08/2011 11:21:29	08:21:29	35° 6' 32.400756"	25° 47' 34.7286...	40.51 m	5.80 mm	WGS-84
DSC02698.JPG	v1	18/08/2011 11:21:54	08:21:54	35° 6' 32.477976"	25° 47' 34.5742...	40.03 m	23.20 mm	WGS-84
DSC02699.JPG	v1	18/08/2011 11:22:48	08:22:48	35° 6' 32.709744"	25° 47' 34.4196...	37.62 m	5.80 mm	WGS-84
DSC02700.JPG	v1	18/08/2011 11:23:08	08:23:08	35° 6' 32.632488"	25° 47' 34.1107...	33.30 m	16.00 mm	WGS-84
DSC02701.JPG	v1	18/08/2011 11:23:27	08:23:27	35° 6' 32.786964"	25° 47' 33.6858...	34.50 m	5.80 mm	WGS-84
DSC02702.JPG	v1	18/08/2011 11:23:36	08:23:36	35° 6' 32.864220"	25° 47' 33.5699...	34.26 m	5.80 mm	WGS-84
DSC02703.JPG	v1	18/08/2011 11:23:49	08:23:49	35° 6' 32.709744"	25° 47' 33.5699...	34.26 m	5.80 mm	WGS-84

Figure 3.5 An example of the geotagged image metadata.

time, space and image data were exported in a spread sheet for further exploration of the collected data (see Appendix B). Finally, Google Earth (GE) was used to retrieve satellite images of the archaeological sites, which were Georeferenced in ArcGIS and used as background maps.

3.2.3 Analysis and processing of GPS data

Firstly, a series of descriptive statistics were undertaken in order to obtain a summative understanding of the GPS data. Those statistics are particularly valuable for heritage site assessments since the examination of individual movement characteristics can prove to be rather idiosyncratic and difficult to classify and thus, be of use to specialists. Based on such statistics it is possible to obtain the average, minimum and maximum values of movement characteristics such as pace, duration as well as covered distance and area (see section 4.2.1, Table 4-2). In order to further investigate the general movement characteristics of visitors, a series of non-parametric correlation[13] analyses were conducted. Such correlations, as it will be illustrated throughout the next section reveal the relationships - if any - between the given variables and provide further insights on how visitors move around the site. It should be noted however that a significant correlation does

[13] Here, I refer to Spearman's correlation, for data that are non-normally distributed as is the case with the particular dataset.

not imply causality (Field 2005, pp. 127-8), a notion that is very crucial when interpreting the results.

In terms of analysing the obtained GPS data, it should be noted that all the following described spatial analyses were conducted in a Projected Coordinate System (WGS_1984_UTM_Zone_35N) using Transverse Mercator, as the projection method. After converting and projecting the data accordingly, and organising them into feature layers, a set of two Line Density analyses of the visitors' itineraries was carried out in ArcGIS with the data from the field session of 2011 and 2012-13 respectively (see Figs. 4.10-4.11). This analysis calculated the density of the visitor movement line features that fall within the given radius parameter (5m) and is calculated in units of length per units of area (in this case meters per square kilometres) (see Silverman 1986). The resulted values were classified with Natural Breaks (Jenks) into 6 classes and were visualised with a colour ramp (from warm colours indicating higher values of density to cold indicating lower values). The visualised output of the Line Density analysis provided the collective footprint of visitors' movement within the archaeological site and a better insight, and overview of the site's affordances for movement.

Additionally, a conceptual model was implemented and in ArcGIS which utilizes a set of Analysis and Spatial Statistics tools (i.e., Buffer, Intersect and Linear Directional Mean) in order to obtain an overview of visitor circulation directions (see Fig. 3.7). Buffer and Intersect analyses were used to isolate sets of visitor movement (represented as linear features in ArcMap) at several appointed locations of the site in order to perform the Linear Directional Mean (LDM) analysis for each set. The latter identifies the mean direction, length and geographic centre location for each set of lines as long as linear features preserve their starting and end points (see Mitchell 2005). Each output is visualised with an arrow symbol and together they provide visitors' direction patterns at significant parts of the site such as the Palace area and several path junctions. It is important to note that the radius used to intersect the line features varied depending on the location under investigation. As a general rule, for high resolution observations at small path junctions the movement lines were intersected with smaller circular features (Buffer Distance from point of 3m), whereas for locations presenting a significant sprawl of movement larger circular features were used (Buffer Distance from point up to 6m).

Furthermore, in collaboration with George Caridakis, Lecturer at the Department of Cultural Informatics, University of the Aegean, we developed an original approach in the context of exploring GPS visitor tracks for Cultural Heritage oriented research.

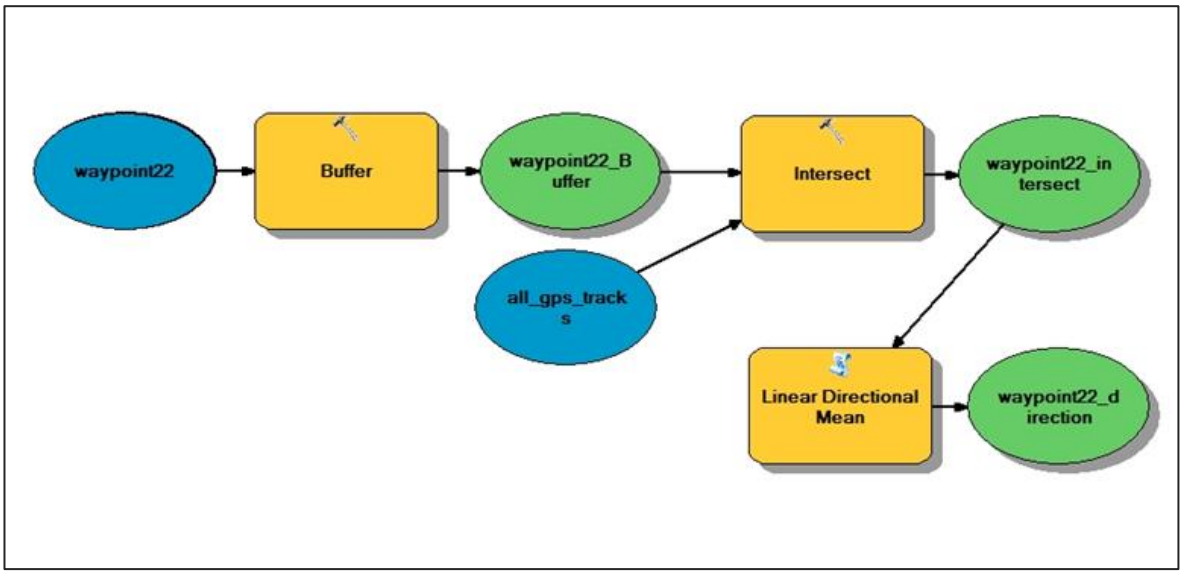


Figure 3.6 The conceptual schema of implementing Linear Directional Mean analysis.

This approach is based on Self-Organising Maps (SOM), a computational method that has been used as a data visualisation or dimension reduction technique (Caridakis *et al.* 2010), which we chose 'to utilize as a space modelling tool in order to derive a more abstract representation of the archaeological space' (Chrysanthi and Caridakis 2015) based on a selection-and-learning process of the visitor movement data. Although the computational approach is presented in detail in our publication, it should be mentioned here, that this method enabled a more sophisticated time-space exploration of the data as well as the investigation of significant research questions and hypotheses with regards to visitor movement, lingers and interaction with the archaeological space, as I will discuss further in Chapter 4.

3.2.4 Hotspot analysis with rendering and thematic classification of images

A major step towards making better sense of the collected image data was the HotSpot (HS) analysis, carried out in ArcGIS with the aggregated and integrated points of image locations captured by the visitors. To perform this analysis, ModelBuilder was used to create a simple model containing a number of geoprocessing tools including Copy Features, Integrate, Collect Events, and Hot Spot Analysis with Rendering *(*Fig. 3.8).

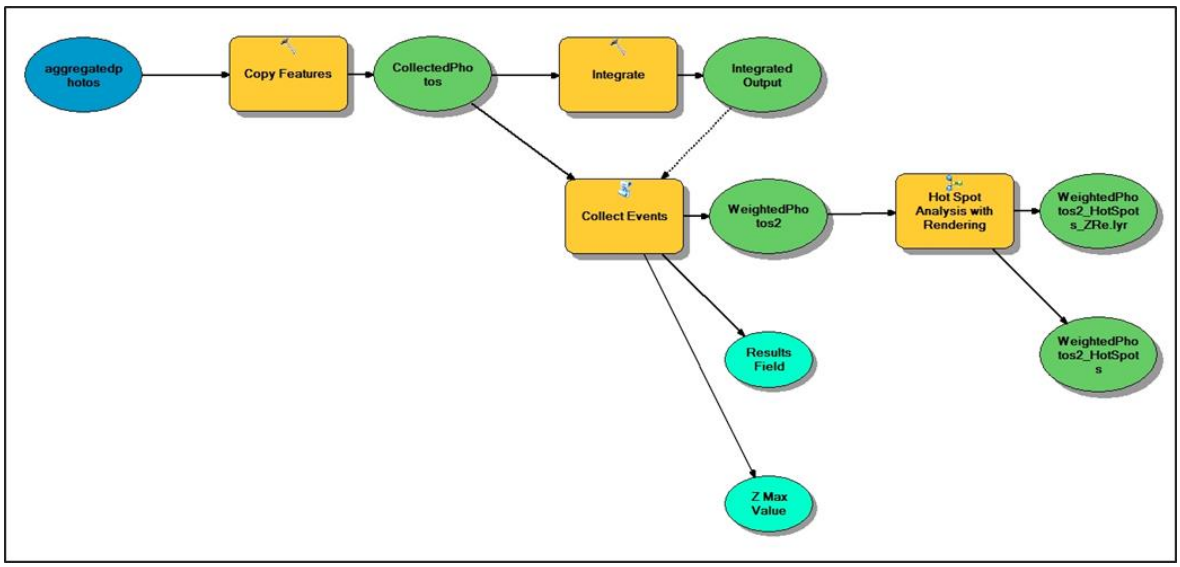


Figure 3.7 Conceptual schema of the HotSpot analysis.

While the methodological procedure of setting up and running HS analysis is well documented (Mitchel 2005; Scott and Warmerdam 2005), it should be noted that one of the crucial decisions for implementing such an analysis is to select a conceptualisation of spatial relationships (i.e. inverse distance, travel time, fixed distance, K nearest neighbors and contiguity). In this investigation it was important to measure the clustering of image points at the smaller possible distance in order to obtain a dense output of image clusters for high resolution observations. Fixed distance was chosen as a suitable conceptualisation of spatial relationships in terms of being more compatible with the visitor-space interaction approach and providing more control over the scale of the investigation. With the fixed distance option, the researcher can set a radius of 'influence' as the conceptual model of spatial relationships for the data (image point features). Then each feature is processed within the context of those neighbouring features and within the designated distance, while features outside the distance of a target feature do not influence calculations. The chosen fixed distance for this analysis is 6m, which is approximately double the value of the average spatial accuracy of the data (3m).

This analysis indicated the areas that visitors recorded the most, and provided an alternative exploration of the visitor-space interaction. The analysis generated 58 unique locations, the 'hotspots', which represent weighted clusters of image data. The resulted clusters were classified with Natural Breaks (Jenks) into 4 classes and were visualised with a colour ramp (from warm colours indicating higher values of weighted clusters to cold indicating lower values). More specifically, the red dots indicate areas where visitors

captured the most photos and following the colour range from warm to cold, the blue dots indicate the least image recordings. The exact value of each generated HS is found in the ICOUNT field, which is the resultant count attribute indicating the number of events/image points contained in each HS. The attribute table generated from the analysis was exported and organised in a spreadsheet (Fig. 3.9).

In order to identify recurrent patterns and themes in the data, I proceeded with a thematic analysis using QSR NVivo 10. The images were imported in the software and were coded based on broad categories formed after keeping two main questions in mind: 1) From which locations are visitors capturing general views of the site or views of the surrounding land and seascapes? 2) Which artefacts, structures, contemporary and natural features within the site attracted visitors' attention? Essentially, this was a choice for a more research driven - as opposed to a data driven - approach based on these two questions. Considering that people take photographs of instances or the things they want to remember from their visit, this experiment reveals the hotspots of the site as visitors assessed them.

In thematic analysis, codes are typically developed to represent the identified themes but in this case it was equally important to include the HS ID in order to preserve the spatial reference of each image. The coding system was also designed to allow a cross-site examination of the recurrent themes. The example of Hotspot 13 will be used here, to illustrate the benefits of using applied thematic analysis with coding in identifying (along with the qualitative analysis presented above) the things that visitors appreciate the most about the archaeological site.

HS13 was generated to the north edge of the palace, near the identified remains of a bathroom. The thematic analysis of images contained in HS13 indicated five themes which were coded as below:

1) *Stone Basin* theme> Theme 1 Stone Basin> **T1SB**

2) *Drainage System* theme> Theme 2 Drainage System> **T2DS**

3) *Sea and Landscape Views* theme> Theme 3> **T3V**

4) *Palace Remains* theme> Theme 4 Palace Remains> **T4PR**

5) *Circulation System*> Theme 5 Circulation System> **T5CS**

In practice, each image that depicts one of the gradually generated themes receives a reference in NVivo that includes the HotSpot ID number, the ICOUNT value and the

respective theme code. For instance an image contained in HotSpot 13, which depicts a stone basin receives the final code HS13/ICOUNT 77/T1SB. However, the latter part of the code (i.e., T1SB) is the critical one for exploring the data. In the example of the stone basins, one can acknowledge the efficiency of the coding method with the use of theme numbers representing the identified theme within the hotspot, and the theme abbreviations, which ensure that a recurring theme across the site can be easily identified. This code format is necessary as it facilitates the intuitive discovery of patterns in the data, depending on the kind of question we ask of the data. Consequently, if one wishes to find the most popular represented theme within a certain location (hotspot), then a series of text queries within the hotspot can return the most popular theme. If, on the other hand, the user wants to identify the frequency of one theme across the site then s/he can run text queries with the grammatical abbreviations. For instance, the stone basin is represented by 10% within HS13 and the overall representation of the theme in all coded data is 4%. Finally, it is important to note that NVivo allows coding in different regions of the image each of which can receive a different coding reference (Fig. 3.10). This way an additional layer of transparency and objectivity is ensured in the process of thematic coding.

FID	HotSpot_ID	ICOUNT *	Label	Easting	Northing	GiZScore	GiPValue	Distance	Weight_FID
463	13	77	DSCN0441.JPG	389962,13	3885847	1,9721	0,048598	6,42302	33
464	13	77	DSCN0449.JPG	389965,41	3885857	1,9721	0,048598	8,79478	41
465	13	77	DSC05448.JPG	389959,13	3885857	1,9721	0,048598	5,096682	93
466	13	77	DSC05449.JPG	389965,06	3885862	1,9721	0,048598	12,35984	94
467	13	77	DSC02923.JPG	389958,48	3885845	1,9721	0,048598	6,597459	175
468	13	77	DSC02924.JPG	389958,51	3885848	1,9721	0,048598	4,230411	176
469	13	77	DSC02925.JPG	389958,51	3885848	1,9721	0,048598	4,230411	177
470	13	77	DSC02926.JPG	389957,5	3885845	1,9721	0,048598	6,583513	178
471	13	77	DSC02927.JPG	389954,54	3885843	1,9721	0,048598	9,549207	179
472	13	77	DSCN0510.JPG	389963,01	3885848	1,9721	0,048598	6,49936	303
473	13	77	DSC03008.JPG	389966,39	3885852	1,9721	0,048598	8,425136	392
474	13	77	DSC05502.JPG	389954,83	3885846	1,9721	0,048598	6,496315	422
475	13	77	DSC05539.JPG	389951,7	3885848	1,9721	0,048598	7,650187	459
476	13	77	DSC05540.JPG	389955,07	3885845	1,9721	0,048598	7,158314	460
477	13	77	DSC02742.JPG	389958,33	3885852	1,9721	0,048598	0,489183	564
478	13	77	DSC02743.JPG	389958,33	3885852	1,9721	0,048598	0,489183	565

Figure 3.8 An instance of the exported data generated from the HotSpot analysis.

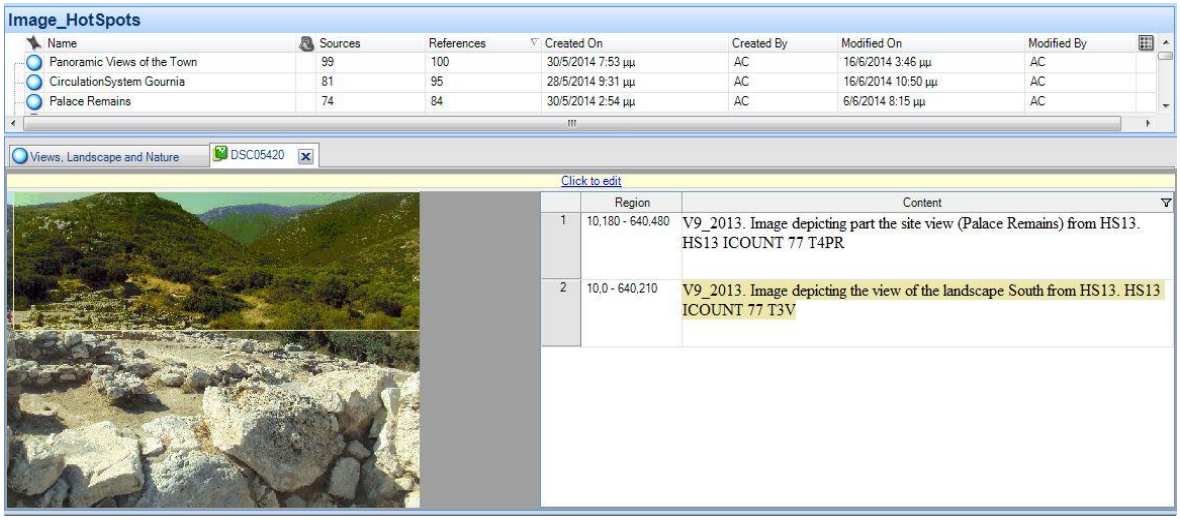


Figure 3.9 A print screen demonstrating the utilisation of NVivo workspace in coding separately different regions of the image.

Chapter 4: Important findings and assessment of the visitor-centred methodology

In this chapter, I present the most important findings from the visitor-centred methodology in order to reveal critical patterns of visitors' interaction with the archaeological site of Gournia, since the latter was the main case study for the development of the proposed methodology. However, I will provide - where necessary - some examples from the case studies of Knossos and Çatalhöyük in order to strengthen the arguments of the proposed methodology. This chapter aims to reveal the potential of the hybrid methodology employed in order to explore the visitor-space interaction rather than to provide a holistic assessment of the current state of the archaeological site of Gournia. Indeed, the versatile body of collected data enables the researcher to ask different questions with regards to visitor movement and interaction with the archaeological site. However, the focus of this investigation is to reveal the affordances of the archaeological site and its context mainly in relation to the visitor movement within the site and in doing so, to highlight the methodology that was developed for this purpose.

Current state of the interpretative programme at Gournia

As it was previously mentioned in Chapter 1 (p. 28), visitors use the well preserved ancient path system to navigate the site (Figs. 4.1-4.3) and the site itself presents minimum interventions as well as a subtle interpretative programme, presently limited to eight information panels[14]. The interpretation panels were designed and placed in areas of particular archaeological interest: *the Palace, the Sacred Stone, the Shrine, the Tombs* and three houses where a potter's wheel and a preserved mudbrick wall (*House Ac*), a possible stone crucible[15] (*House Cf*) and a clay wine press (*House Dd*) were found. Additionally,

[14] The information panels became eight in 2013 with the addition of the *Tombs* panel. In 2010, when I visited the archaeological site for the first time, the information panels were actually seven despite the highlighted indications on the 'General Map' (see footnote 5) that the existing information panels are ten. The 'General Map' panel was withdrawn sometime after summer 2010, and was replaced in 2013.

[15] The stone crucible find suggests that the inhabitants may have worked with bronze. This piece of information was displayed in the respective IP.

there is a General Map[16] at the beginning of the visitor tour, labelled 'The Minoan Town of Gournia' which provides a brief history of the town's discovery and general contextual information regarding the character of the town and its features. This information panel also includes the town's layout plan with highlighted the aforementioned Points of Interest (POI), the preserved paths and the phases of the settlement. The visitor is also given for free a two-sided, folded brochure that comes with the ticket of two euros and has the option to buy the official guide book of the site 'Gournia' (Davaras 1989). The main problem with both the brochure and the official guide is that they contain an overview map which does not provide the POIs of the archaeological site as the General Map does. Instead, their layout map annotates (with letters from A-G) the blocks of houses and includes a second plan of the palace with forty numbers that indicate the respective parts of the building. Similarly, the explanatory text of both paper-based media is focusing on the features of the palace rather than the whole town's features in a unified narrative. Evidently, the interpretative agenda of the paper-based media is not in alignment with the one provided on-site through the information panels. Perhaps, they could have been considered as complementary media resources, if at least, the overview maps with their POIs were cross-referenced.

Figure 4.1 One of the characteristic preserved paved streets of Gournia.

[16] In order to facilitate the discussion in Chapter 4, the introductory and overview panel labelled as 'The Minoan Town of Gournia' will be referred to as General Map IP.

Figure 4.2 Different types of the preserved paths at Gournia. On the *left*: one of the characteristic stairways.

Figure 4.3 An example from the available information panels around the archaeological site (House Dd).

4.1 Findings from the qualitative and quantitative analysis of visitor feedback and observations.

Before presenting the main findings from visitor feedback, it is essential to provide some general demographic information about the profile of visitors who participated in this study. Both women and men participated in this survey at Gournia, at equal percentages (50.8% and 49.2% respectively), of different age groups (see distribution graph in Fig. 4.4), while the majority demonstrated a high educational profile. Also, the place of origin varied but the most significant majorities originated from France, Italy, United Kingdom, Greece, Spain, Russia and the USA. In terms of their profession, 27% is working in modern professional occupations, 19% in traditional, 15% are senior managers or administrators, 7.9% are middle and junior managers and 4.8% are university students (see Appendix A, demographic section). Finally, 57.1% reported that they live comfortably on present income, while 11.1% and 3.2% reported that they are coping and finding it very difficult on present income respectively. The surveyed visitors at a percentage of 73% visited the site with friends and family and have had previous information about the archaeological site of Gournia before arriving at the site. The majority of visitors found relevant information mainly in books and magazines (69.8%) as well as on relevant websites (17%).

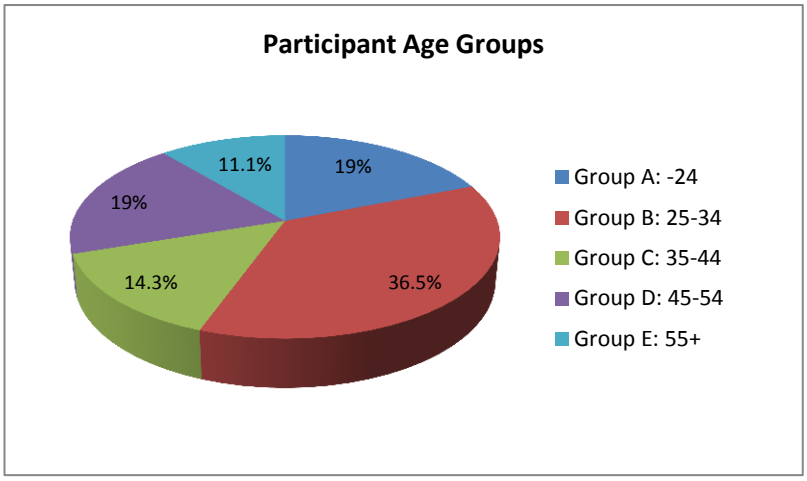


Figure 4.4 Pie chart with the distribution of participant age groups.

At a first glance of the coded data in NVivo workspace, a striking observation is the number of references coded under the first class theme node 'VisitorLikes', which contains visitors' positive feedback about Gournia. This number (207 references) is approximately three times more than the numbers appearing in the two next first class nodes (64 and 63

references respectively). It could be argued then, that visitors' overall experience at Gournia was rather positive. This fact is also supported by the feedback that 57 visitors provided for the Tripadvisor platform, where the archaeological site receives 84% of positive comments and a rating of 4.5 out of 5, where one equals to terrible and five equals to excellent. At this early point it is reasonable to start asking about the reasons why the majority of visitors have had a positive experience in an archaeological site with a rather limited interpretative programme, such as Gournia.

Visitor feedback on the Presentation of the site: Information - Contemporary Research and Works - the surrounding Land and Sea scape.

The most recurring theme both in the process of thematic coding as well as in use of different tools to explore the qualitative data was around the theme of information. The word frequency analysis implemented in the entirety of coded data returned the word 'information' first in the ranking of the 50 most frequent words, with a weighted percentage of 3.31 (the frequency of the word relative to the total words counted). It was important then to investigate further why visitors used this word so frequently in their feedback and in which context. A first step towards this investigation was to look at the questionnaire data and find out what interpretative resources the visitors used to visit the site. The analysis returned that 38.1% used the on-site information panels, 35.7% used a guide book, 21.4% used nothing and just wondered around the site along the existing paths while, 4.8 % used a guide or other interpretative resources. Since the particular question was multiple-response, I also calculated the percentage of visitors who chose to use both on-site information panels and guide book which is 23.2%. In order to obtain a first understanding on how visitors rated the on-site interpretative resources (information panels), I ran a cross-tabulation between two variables. The first variable concerns visitors who chose to use information panels for the interpretation of the site and the second variable concerns how they rated on-site interpretative resources. The result displayed in the below graph (Fig. 4.5) is rather positive although the high percentages of neutral and negative responses indicate that the issue merits further investigation.

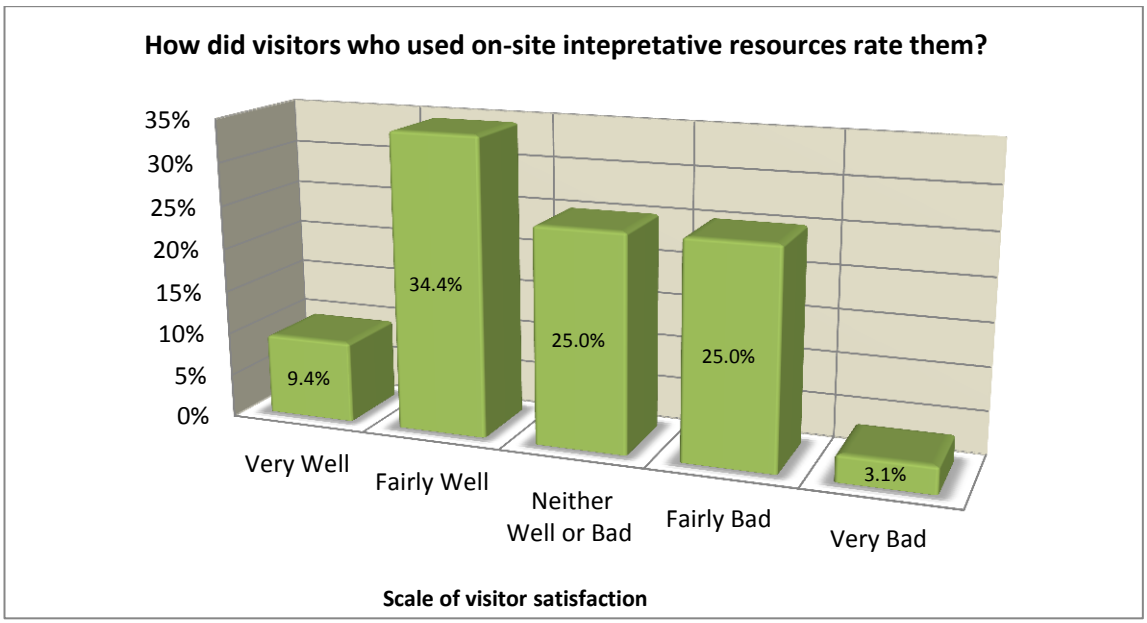


Figure 4.5 Graph illustrating the result of a cross-tabulation on how visitors who used on-site interpretative resources rated them. The percentages are calculated within the number of visitors who used those resources.

Returning to the qualitative analysis, the next phase was to run a separate frequency analysis for each first class node as *per* above. The analysis of category 'Visitor Likes' returned the word 'information' in the 11th place (1.01 %, count 9), whereas the 'Visitor Dislikes' and 'Visitor Suggestions' categories appeared in the first place (7.95%, count 21 and 9.06%, count 25 respectively). In the rest of categories, 'information' either does not appear at all or appears in a non-significant ranking position. Although, the results already suggest that the visitors were not satisfied with the information provided about the site and therefore, their priority is to suggest more or better information, the next step of inquiring the data will provide a clearer and in-depth understanding of visitors' opinion.

To investigate this, I went through the coded data and their sources. Under 'Visitor Likes' first class node I coded a secondary node with feedback referring to information. Similarly, under each of the nodes 'Visitor Dislikes' and 'Visitor Suggestions', there are also second class nodes labelled 'Information' with third class nodes labelled as 'Lack of Interpretative Media' and 'Employment of Interpretative Media' respectively. It is important to note that visitor feedback concerning the available information for the interpretation of the site does not necessarily contain the word 'information' and this is the reason why the next stage involves looking more closely to the data within the different classes of nodes and inspect them in their contextual coded references.

In terms of visitors' positive comments on the available information for Gournia (22 coded references in total), the information panels are thought to be well designed and well distributed around the site. As WR#26 and WR#48 comment respectively:

> *The information boards are well done and in English which is helpful.*
>
> *This site is particularly impressive although the remains are the foundations of buildings. We were able to distinguish each part [of the site] and some explanatory panels evoke concrete traces of workshops/shops found at the site.*

Visitors also comment positively on the information panels which portray artefacts currently exhibited in museum collections[17], at 'the place of discovery' (V#32), and that there's an overview map of the site with the different (colour coded) phases of the site. However, many visitors believe that despite the good distribution of information panels, the latter are not sufficient to satisfy the interpretative needs of visitors and suggest future visitors to bring guide books as WR#14 characteristically writes:

> *Heritage signage gives visitor information for a number of locations but it is worth taking a guide book of some kind with more information to get the most from a visit.*

The majority of negative comments on information (50 references in total) refer mainly to the insufficient information available for the interpretation of Gournia and the lack of specific interpretative media. Similar wordings such as the one V#11 provided 'I want to learn more', are recurrent in the collected data. Visitor feedback also offers detailed aspects of what kind of information is missing for the interpretation of the site. For instance, the majority of mentions concern the scarcity of information pertaining to the physical remains of the Gournia as V#52 reports:

> *Sadly, there are few information about the characteristics of houses, rooms etc.*

Examples of why more information on the characteristics of houses are important for visitors, offer the two following reports (V#8 and V#49):

> *We were trying to find the entrances of houses in order to envisage a typical Minoan house but we could not find them*

[17] Finds from the archaeological site of Gournia are exhibited at Herakleion Museum and the Museum of Agios Nikolaos, which was founded in 1970 to accommodate the increasing needs of Eastern Crete archaeology. For more information about the museums and their exhibits see Yiannis Sakellarakis' guide the *Herakleion Museum* (2003) and Costis Davaras' guide *The Museum of Ag. Nikolaos* (n.d.).

> *I didn't appreciate the lack of images labelling the streets vs building areas. Sometimes it was confusing what was the intention of the house and what was a walkway between houses.*

Another reason why visitors were trying to identify the entrances of houses is what V#80 reports:

> *Also, I couldn't always find the entrances of each house and found myself wondering about whether I was looking at one house or two each time.*

While evidently, quite a few non-specialists are able to identify ancient thresholds (as I will demonstrate below in the thematic analysis of HS) we should not of course assume that everyone has the ability to identify such features around the site or that 'it's probably not something that visitors want to know'. As it is evident from the aforementioned, the ability to identify different features of the site through interpretation enables visitors to imagine how this town or individual houses might have looked like. Many visitors also point to the lack or insufficiency of specific interpretative media such as interpretative panels, maps, and guide books available in more languages (other than Greek and English), pictures and reconstructions of the site as well as of specific buildings. It should be noted here that the lack of a general map was reported in the field seasons when the existing respective information panel was removed in 2011 to be replaced two years later. However, even during field seasons where this general plan was in place, visitors thought that it was not always 'where it was needed' (V#13) or that 'there was not a general map at the top near the palace' (V#59). Additionally, others compared the provided map on the free leaflet with the maps included in their guide books and expressed their preference for the latter.

Visitors also provided valuable feedback when they were asked to suggest what needs to be included in the interpretative programme of the site. Leaving aside the general demand for more information, visitors provided their own specific questions about the site that they would have liked to be answered in a future interpretative programme. For instance, V#12 left the archaeological site wondering about a number of information:

> *I would like to know about the tombs. There was no explanation or date. Was there an ancient harbour belonging to the town? Where did they get the drinking water from?*

Here, I should point out that the visitor was interviewed before 2013, when the eighth information panel was added at the tomb area. Also, the recent archaeological research

programme and its results[18] have not yet been integrated in the interpretation of the site although many visitors reported to have known and expected to be informed about the new 'discoveries'. Apart from the lack of specific information on tangible aspects of the site such as the 'height of buildings' (#V27) or 'the stone basins and their function'(V#39), visitors referred to the lack of information about more intangible aspects of the site's history such as V#55 who believes that there is 'insufficient information on ancient inhabitants' life' and V#80 who '…would have liked to learn more about the use of the houses and the residents' everyday life in this town.' Also, a few mention that they wanted more information to contextualise the settlement within the broader area of Minoan contemporary settlements.

In terms of the suggested interpretative media and leaving aside the most popular feedback of adding 'more information panels', visitors suggest the availability of more visual resources such as plans, pictures, architectural drawings and graphical reconstructions. A characteristic phrase that sums up the request for more visual media is offered by an 11 years old visitor (#21) who suggested '…a picture of the whole site as you think it would have been like in Minoan times'. As mentioned previously, some visitors consider that information panels are already adequate but still, they are not enough to enable visitors to appreciate the site. As WR#11 writes:

> *…Worth using guide book and internet-sourced information about the site and its features as the visitor information on the site, whilst adequate, does not let you appreciate the significance of the entire site as much as I would have liked…*

Then, interesting (but also anticipated) is the fact that by comparing the collected feedback from different years I discerned a gradual shift in the preferred media from reconstructions and drawings to technologically enabled interpretation. For instance, in 2011 I recorded phrases such as 'I would suggest painted pictures of houses' (V#8) and 'explanatory boards by houses, streets etc. - detailed plan and total reconstruction at one of the houses so then one could have as precise information as how it was' (V#25), while in 2012-13 more often phrases like 'The site needs 3D reconstructions and modern technology' (V#53) and 'I would suggest a purpose built audio tour or smartphone app tour' (V#49) occur. Further to the above, visitors also mention different interpretative media based on their experience. Quite a few visitors mentioned 'gps location based information' (V#46) - who were perhaps, under the influence of the gps devices offered by the study and certainly from the

[18] For some findings of the recent archaeological research at Gournia see Watrous 2012 and Watrous *et al.* 2012.

geocaching activity as it was reported – and two mentioned 'a pop-up guide book like the one used in Rome'[19](V#3 and V#56).

Since the interpretative programme is an integral part of the general management scheme of each site, it is worth discussing at this point visitors' opinions on other aspects of the site's management. Overall, there are more positive mentions with regards to the management of the archaeological site than negative or suggestions but nevertheless, the examination of the data reveals a characteristic contradiction in visitors' opinions. Amongst the most noteworthy positive comments are the on-going archaeological and conservation works, the non-commercialised approach of the site's management, the small entrance fee (2 euros) and the lack of touristic crowds and reconstructions.

In terms of the on-going works at Gournia, visitors exhibit a vivid interest in the recently excavated parts of the site even at periods when excavation is not taking place at the time of their visit. Stefania Chlouveraki, the leading conservator at Gournia, reported that when the team is working on-site, visitors ask them about the conservation work, their techniques and generally for more information about the site. Stefania, also suggested that the work of archaeologists and conservators should be integrated in the interpretative programme of the site (even in the form of information panels). In the absence of any information about the aforementioned on-site activities, often visitors use their imagination and creativity to interpret archaeologists work or if they are lucky enough they enjoy being spectators of an on-going excavation. As WR#1, WR#16 and characteristically write:

> *Gournia is still being excavated and all the tools to perform the arch[a]eological dig were there to see. Simon was able to put some dirt in the sifter and demonstrate to our daughter, Sienna, how the scientists look for artefacts.*
>
> *Just us and the archaeologists. Worth a visit, very interesting site with few tourists. A group of students were excavating the site, very interesting to see what they had just uncovered!*

At the same time but to a lesser extent, visitors complain mainly about the lack of visitor facilities and request shade and rest points. Oddly, some of the visitors who rated positively their experience at Gournia, because amongst its other qualities, it 'was really quite with very few visitors' they also suggest that the site 'needs more marketing' (WR#13). This known tension in cultural heritage (see Chapter 1, p.), is reflected in the collected visitors' feedback and expressed aptly by WR#20, who writes:

[19] Visitors refer to the *The Pompeii Pop-up* book by David Hawcock, Peter Riley and Thorston Opper (2007).

There are very few visitors here - and that is a pity and blessing at the same time.

Finally, visitors were offered the chance to rate a series of aspects of the site pertinent to the aesthetical appearance and presentation of the site such as its preservation state, conservation works and maintenance, contemporary structures and plantation. Visitors provided on average positive feedback on the 'conservation and maintenance' and 'preservation state' categories, whereas the rating of category 'contemporary structures and plantation' exhibits a remarkable peak on average ratings (Fig. 4.6). The latter brings in mind the existing antithesis in visitor feedback, whether the site should be more commercialised with contemporary interventions (i.e., the provision for visitor facilities and an interpretation centre) or it should be left as such. In the following parts of this section, I provide more evidence about this existing tension.

Up to this point, it has been shown that Gournia presents a very subtle interpretative and management approach, which is limited in targeted conservation and maintenance works and an insufficient, according to visitors, on-site interpretative programme. At this point, we may start wondering about which qualities of Gournia are appreciated by visitors and led them to provide an overall positive assessment of the site.

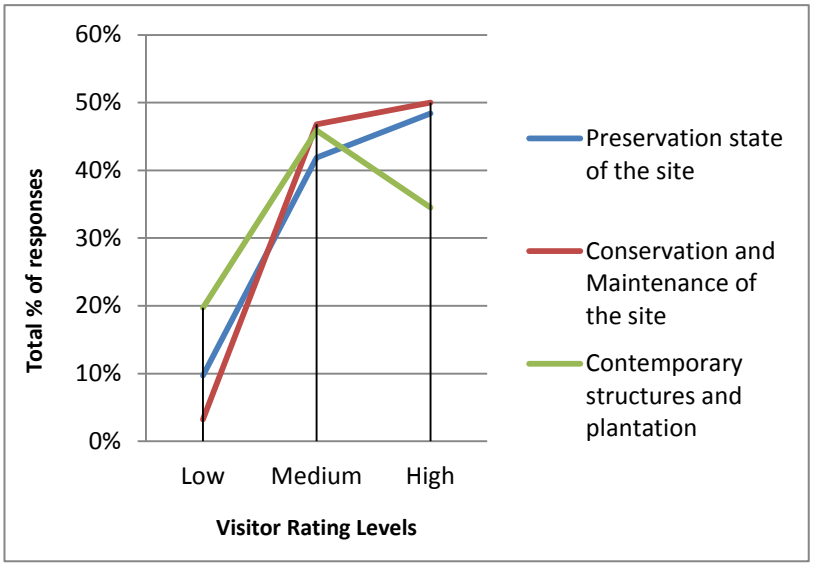


Figure 4.6 Graph illustrating visitor rating on the preservation state, conservation works and maintenance, and contemporary structures and plantation of Gournia.

Gournia's most appreciated qualities

Having explored all the information related feedback that visitors provided for Gournia and having illustrated the transparency of the qualitative data analysis procedure I will continue

with the presentation of findings pertinent to this chapter's subject in a less analytic manner. Continuing the investigation of what visitors valued about the archaeological site of Gournia, the most populated theme node is identified under 'VisitorLikes' nodes and refers to the site's character and features. In this category, the majority of mentions concern the urban characteristics of the site, the houses and their features as well as the preserved paved streets and the stairs. More specifically, visitors often reported that they found the different 'elevation of houses very picturesque' (V#17) and they particularly appreciated 'the whole site which gives the idea of the ancient city's appearance' (V#34). Other characteristics reported about the whole settlement are the size, the 'uniqueness and completeness of the town' (V#57) and the layout. As WR#1 writes:

> *In Gournia you really got a feel for the size of the rooms, the layout of the houses and the way that the town was constructed.*

Many visitors also refer positively to specific structures and features of the site such as the drainage system - which is only mentioned in some guide books -, the clay wine press found in *House Dd*, the preserved mudbrick wall of *House Ac*, the *Tombs*, the *Palace* and the stone basins which were scattered around the site. In essence, apart from experiences that are loosely connected to the archaeological space itself, certain visitors displayed a vivid interest in detailed investigations of the remains or the information they convey. For instance, I observed visitors standing in front of the information panel at *House Ac* with the remaining mudbrick wall and gesturing to their peers their guessing of the height and possible shape of the house. Several visitor mentions indicate a particular interest in features of the site that are closely associated with Minoan everyday life and perhaps, this does not come as an unexpected find since Gournia, is one of the few excavated towns in Minoan Crete and certainly the most extensively excavated one. Because of this, the site offers more opportunities to trigger our imagination about the past through its tangible tokens (the remains) of Minoan everyday life and their association with aspects of contemporary (or better yet traditional) life. Three of the examples are very characteristic of above notion:

> *WR#29: This site includes a large area of houses where ordinary people lived, in addition to the usual palace structures. It gave a much fuller idea of what Minoan life might have been like.*

> *WR#40: An hour's visit was enough to walk through the narrow streets between the remnants of the ancient houses to discuss the presence of sewage in the 15th century B.C. and take beautiful pictures.*

> *V#11: This place smells history…you can feel how people lived and worked back at the time.*

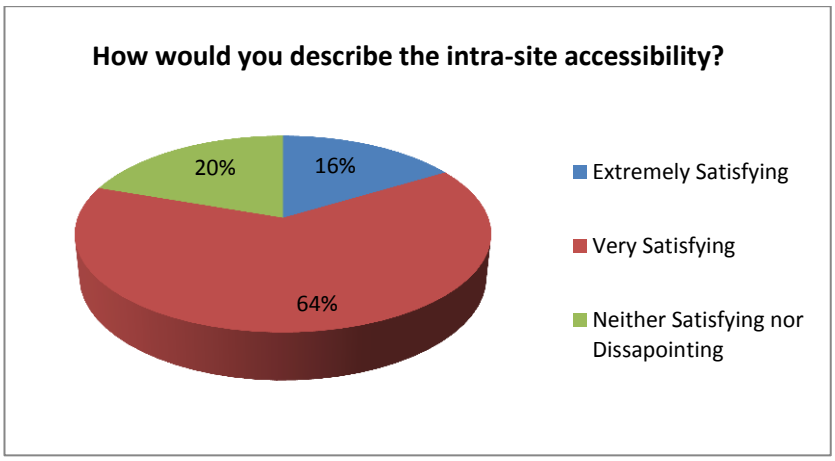


Figure 4.7 Pie chart illustrating the positive visitor feedback on accessibility assessment of Gournia.

Visitors also rated positively the level of intra-site accessibility (Fig. 4.7) and in the question 'Which of the following parts of the site you wished to visit but were not accessible?' they referred mainly to on-going excavation areas (24.6%), antiquities located off the main walking paths (21.5 %) and parts of the site from where they could enjoy a view of the site or the surrounding landscape (12.3%) whereas a significant percentage (33.8%) felt that there weren't any accessibility restrictions to the places they wished to visit.

In terms of the preserved streets forming the main walking paths of the site, what is particularly interesting from the frequency analysis of all coded references is that the words 'walk' (count 79) and 'streets' (count 75), are placed in the sixth and seventh place of the ranking whereas the same analysis of the node 'VisitorLikes' brought them in the first and third position respectively. Needless to say, that these rankings and what they reveal are of great importance to the aims of this study focusing on visitor movement within the archaeological site. As WR#26 writes:

> *You can walk the streets of the town and look into the houses and get a real feel of how the Minoans lived.*

Similarly, WR#13 comments:

> *we really enjoyed wandering this site, which gave a good feel for what the town layout would have been like. It was amazing to walk on such ancient paths.*

The analysis suggests that the fact that visitors were able to walk on the preserved cobbled streets and stairs knowing that they were approximately 3.500 old, had a significant impact to their experience and engagement with the site regardless of whether they were satisfied

with the available interpretation and presentation of the site. Another indicative example of the above provides WR#27 who writes:

> *...you can walk where you like and use your imagination!*

Another significant aspect of the archaeological site of Gournia, which, as I will demonstrate more evidently in the following sections, relates to visitor movement, is the setting of the site itself. Different parts of the site, at different angles offer unique views towards the almost unspoiled surrounding land and sea scape, with the exception of the National Road Ag. Nikolaos/Sitia at the NE of the site. It is worth noting that the word 'view' is mentioned positively 53 times in contexts relevant to the surroundings and the site itself. However, since visitor oral and textual feedback is usually quite vague to provide details of which views attracted their attention, I will also demonstrate below how the thematic analysis of images can tackle in a complementary manner this issue. In certain cases it seems that the location of the site and the offered views are valued more than the monument itself. As WR#43 reports:

> *The place is beautiful to see, more by its location, views and romantic character than the remains themselves!*

Although, it falls outside the scopes of this thesis to investigate the reasons why 'views' are so important for the visitor experience, I should remark here the notion that heritage meanings are always under negotiation with society and ultimately undergo constant transformations depending on the possible interactions between the interpreted values of the past and the adopted values of the present (Harrison 2005, p.4). For instance, the 'stunning views' (WR#26) as an asset of cultural heritage sites could be uncritically associated with the current value of properties with views in the real estate market. Then particularly at heritage sites where the interpretative programme has not anticipated the jeopardy of such heritage values and thus, has not included a narrative about the importance of the monument's setting, visitors could understand and appreciate the monument's views only on a contemporary value outlook. For instance, the vantage points of the site overlooking the sea could also become ideal spaces of interpreting the relation of Minoan culture to seafaring (see Hägg and Marinatos 1982).

<u>The role of movement in engaging the visitor</u>

The engagement of visitors to the site is also ascertained by the ranking of the words that express 'feelings' and 'senses' in the second position (count 128). The automatic word

processing aggregated in one category the words ‘experience’, ‘feel’, ‘feeling’, ‘impressed’, ‘sense’, ‘smell’, ‘enjoy’, ‘loved’ which, demonstrate the strong experiential and emotional connection of visitors to the archaeological site and its surrounding nature. This engagement with the archaeological site of Gournia is also evident by the number (50) of positive references coded under theme ‘experience’. Arguably, a positive experience can take different meanings for different individuals so further analysis of the coded references would ascertain what sort of experiences were considered engaging by the visitors. Here, the word ‘walk’ was listed by far as the first most popular word used in the word frequency analysis of this node whereas ‘imagine’ was listed as second. This alone, is perhaps an indication that the mode of movement and the affordances offered by a cultural heritage space to trigger the imagination add or diminish visitor experiences and thus, the degree of engagement to cultural heritage. WR#12 and WR#16 provided characteristic examples to support the above argument:

> *Walking around one could imagine the residents of this town dragging sled loads up to the workshops and other locations.*
>
> *Not much information available, some signs in English but no leaflet, however you do get a feel for the place from walking around.*

Similarly, when V#97 was asked about what interpretative resources he used during his visit he reported that he only read some of the information panels (he also took pictures of the ones he encountered in his visit) but mainly he was:

> *…more interested in taking different paths each time, to explore the site. I liked the option to choose alternative paths.*

In the above cases it seems that the variety and flexibility in moving around the site compensated for the insufficient interpretation available for the site. Variations of the words ‘accessibility’ and ‘exploration’ are also found frequently not only in relation to the multiple existing paths but also in relation to the lack of any contemporary interventions that would channel movement, such as ‘ropes and railings’. Movement restriction plans and implementations have been considered responsible for imposing ‘a structured and more organised gaze of a less involved spectator’ in the archaeological site of Knossos (Solomon 2008, pp. 78-79). For some visitors the atmospheric qualities of the site afford almost complete immersion into the past which reflects positively to their on-site experience. As WR#21 reports:

> *We thoroughly enjoyed the peaceful atmosphere and spent an hour or walking in the footsteps of those ancient Cretans, with just the occasional whoosh from a passing coach or truck to remind us that we were actually in the 21st century.*

Gournia in Comparison

At this point it's worth discussing some of the coded references that concern visitors' mentions about Gournia in comparison to other Minoan archaeological sites they have visited and particularly to Knossos. The opinions on this matter seem to be in discordance. While, some believe that Gournia 'may not be as impressive as either Knossos or Phaistos' (WR#21) or not 'Not as well preserved as Akrotiri on Santorini' (WR#14) because of the degree of reconstructions, interventions and management as well as, the level of preservation of the sites in comparison, others favour it for the exact same reasons. In a visitor's words (WR#25):

> *Most beautiful archaeological site on Crete. One of the best (and least visited) archaeological sites on Crete. While all the poor sods are trotting around Sir Arthur Evans' dusty reconstruction, take a beautiful and illuminating stroll through a well preserved and only mildly reconstructed hilltop palace and city.*

Visitors' varied feedback particularly on the controversial issue of Knossian reconstructions has been reported previously[20] and it certainly shows that we cannot generalise when it comes to individual preferences which are largely dependent on cultural and cognitive baggage, and personal aesthetics (Chrysanthi and Earl 2013; Lekakis 2008; Solomon 2008). As Solomon illustrates in her thesis certain visitors exhibit a positive reception of the reconstructions because they provide a more complete image of the monument adding colour and volume to the complex of remains and trigger their imagination. At once, others consider the reconstructions as falsified, visual renderings of the remains consisting of modern and misleading aesthetics and materials. My analysis suggests that visitors who found Gournia more interesting than Knossos was primarily because 'it has not been altered in any way' (WR#26) and because of its preservation state as opposed to Knossos' reconstruction state, the atmospheric qualities of the location such as the 'calmness', 'quietness' and 'the views', the absence of 'touristic crowds', 'the freedom to move', as well as the 'on-going excavations'. Further, the reason of being able to understand the visited site is stressed by visitors such as WR#10, who writes about Gournia '…a lot more to understand here without a guide than at Knossos (a guide is definitely needed at Knossos)'. Here, it is worth using a quote from one of Solomon's interviewees, Irini, who in a discussion about the reconstructions and the loss of authenticity provides her unfulfilled expectations from her visit at Knossos:

[20] For further details on the different stance that visitors of Knossos exhibit with regards to Arthur Evans' reconstructions see Esther Solomon's thesis, Chapter 3, section III (2008).

> *Irini: I think that this [i. e. the uncertainty about the reliability of the restoration] ... diminished my admiration for this place, the emotion that I could feel. Because why do we come to this place? To get an image about what went on here thousands of years ago! There were people living here, they created things, they had an organised life... and this is what I was looking for... to find this human element, to discover the traces of their lives; maybe I approach it too sentimentally…* (Solomon 2008, p.134)

Although the discussion was led to the loss of authenticity and how such reconstructions lacking archaeological evidence constitute sites such as Knossos a 'copy without an original' (Solomon 2008, p.135), and diminish our engagement with the real traces of the past, we shouldn't overlook the point that the visitor makes about the failure of Knossos' presentation to emotionally engage and instil the social context of Minoan culture in visitors. The demand and expectations of visitors for more information about the everyday life and social aspects of Minoan culture was identified earlier with regards to the available interpretation at Gournia. However in comparing the two sites based on the feedback, visitors find it more difficult to imagine and thus, relate to life in a Minoan Palace, where interpretation has to play a key role for the engagement of the different audiences. At the same time, visitors perhaps found it easier to make sense of a life in a dense settlement, with streets, houses with workshops and in general indications of a 'familiar' social scheme, albeit at Gournia such information is provided at the most basic level.

Spatial Awareness, comprehension of monuments and interpretative resources.

A series of the analyses were undertaken with the structured questionnaire data in order to explore further the relationship – if any - between spatial awareness and understanding of the monument's structures and the whether the interpretative resources used had any influence on either factor. The first hypothesis is that the more visitors comprehended the remaining structures of the site the more confident they felt aware of their position within the site. In order to test this hypothesis, I ran a correlation analysis to identify a possible relationship between the variables of 'spatial awareness' and 'monument comprehension'. The two variables originated from visitors responses in the respective questions J and M (see Appendix A). The analysis provided a matrix, which gives the correlation coefficient between the two variables and the significance level of this coefficient (Table 4-1). The result shows that there is a significant relationship between spatial awareness and monument comprehension, $r=419$, p (two tailed) $< .01$. Therefore, the result suggests that there is significant relationship between participants' confidence (or lack thereof) of being

aware of their position within the site and the comprehension of the remaining structures at Gournia. The correlation is also positive, which supports the initial hypothesis as expressed above.

Table 4-1 The matrix indicates the results of the correlation analysis between two variables: a) The Spatial Awareness (J), and b) The Comprehension of Remains and their Use (M) (as rated by visitors). The double asterisks next to the correlation coefficient values indicate that the relationship between those variables is significant.

Correlations

		J	M
J	Pearson Correlation	1	,419**
	Sig. (2-tailed)		,001
	N	63	62
M	Pearson Correlation	,419**	1
	Sig. (2-tailed)	,001	
	N	62	62

**. Correlation is significant at the 0.01 level (2-tailed).

Similarly, I wished to explore the relationship between comprehension and visitor satisfaction in terms of the interpretative resources used (see Appendix A, questions M and O). The hypothesis set was that the more visitors are satisfied by interpretation the more it is likely to have comprehended the remains of the site. The analysis returned r=.402, p (one-tailed) < .001, which verifies the existing relationship between those variables. Certainly, there is a number of variables influencing visitors' comprehension of the monuments but it is important to note that in this case the visitor satisfaction in interpretation accounts for 20.04%[21] of the variability in the comprehension of the monument.

The same analysis was performed with the variables pertaining to the spatial awareness (as rated by visitors) and their satisfaction from the interpretative resources used. In this case the hypothesis is that the more satisfied visitors were by the interpretative resources they used the more aware they felt about their position each time in the site. The results here too suggest that the hypothesis is met since the coefficient correlation value is .335** and the significance of the value is .007. However, a similar analysis exploring whether there is a

[21] This is R^2, the correlation coefficient squared and converted into a percentage.

relationship between each of the interpretative resources used (mainly information panels and guide books) and the degree of spatial awareness did not provide results that suggest a significant relationship. Further to this, a cross-tabulation between the different interpretative resources used and the spatial perception awareness was conducted in order to observe and visualise the level of spatial awareness and the distribution of interpretative resources used within each level. The result confirms the correlation analyses since the different interpretative resources are proportionally distributed to the three levels of awareness[22] (Fig. 4.8). The results also illustrate that the majority of visitors feel a rather medium awareness of their location in the site during their visit (regardless of the interpretative resources they use). This outcome is also related to the proposed location-based interpretation which was expressed by visitors.

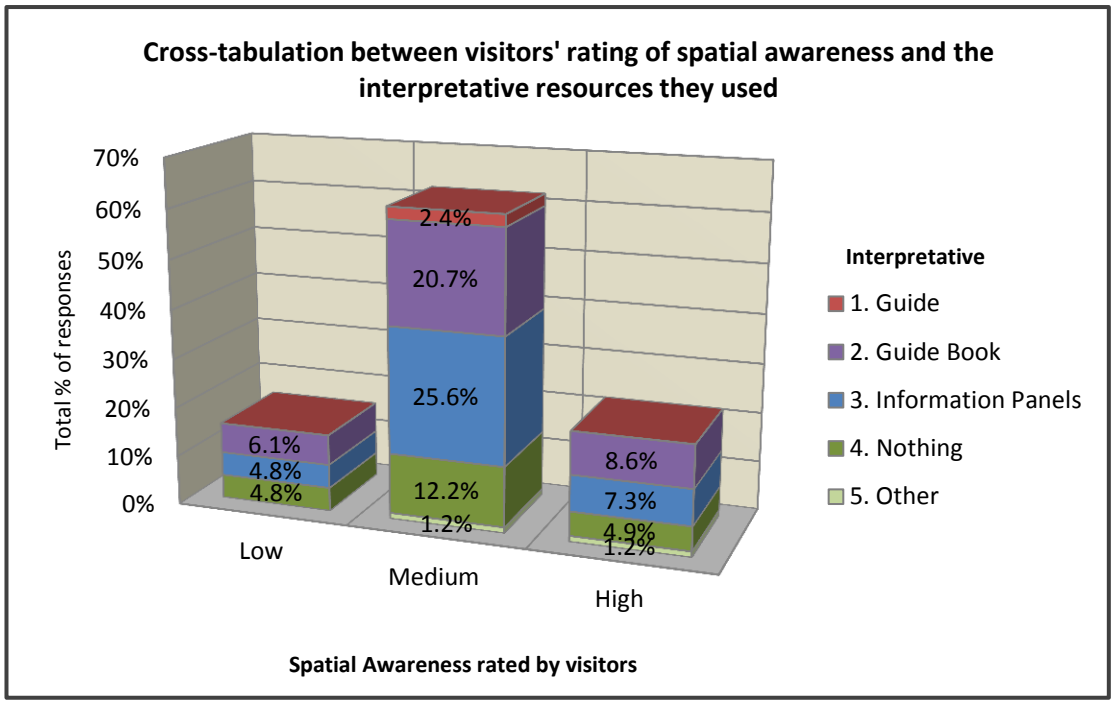


Figure 4.8 Bar chart illustrating the proportion of different interpretative resources used according to the rating levels of spatial awareness.

[22] The three levels of spatial awareness 'Low', 'Medium' and 'High' were created after grouping the numbers of the scale provided (1-10) based on standard deviation and variance.

4.2 Findings from space-time analyses

A number of findings resulting from the followed multipronged space-time analysis approach are discussed in this section. Firstly, general statistics (i.e., descriptive, correlation and regressions) are applied in order to draw the main characteristics of visitor movement around Gournia. A comparative analysis of the same statistics applied in the case of Knossos and Çatalhöyük in section 4.2.4 will further highlight the potential of applying those statistics on visitor movement datasets. The analysis continues with the application of spatial statistics in ArcGIS (i.e., Line Density Analysis and Linear Directional Mean) in order to further explore the visitor-archaeological site interaction, while the comparative examination among datasets from different fieldwork seasons will highlight the changes introduced in visitor movement by the on-site interventions (i.e., new excavation areas, information panels and paths). Finally, an integrated time-space analysis on a sample dataset will reveal the interaction of visitors with the on-site information panels.

4.2.1 General statistics: descriptive, correlation and regression

A series of descriptive statistics were initially generated from the obtained GPS visitor tracks, which provided a useful summative estimation of visitor movement characteristics. At Gournia the average duration of a visit is 40 minutes and the average distance covered is approximately 1 km at a pace of 1,63 km/h (Table 4-2). In order to further investigate the general movement characteristics of visitors, a series of non-parametric correlation[23] analyses were conducted. Firstly, I wished to explore - a seemingly self-evident directional hypothesis[24] – whether there is a relationship between the total walking distance covered by individual visitors and the duration of their visit. The assumption is that the more distance they covered the more time they would have spent around the site. Indeed the correlation analysis in the case of Gournia returned a positive relationship between the total walking distance and the duration of visit, $r_s=.667$, $p< .01$ (one-tailed), proving that the hypothesis is valid (Table 4-3). In fact, the distance covered by a visitor accounts for

[23] Here, I refer to Spearman's correlation coefficient which is a non-parametric statistic used for data that are non-normally distributed as is the case with the particular datasets. For more information on how Spearman's test works see Spearman 1910.

[24] As I will illustrate below in section 3.5 this hypothesis is not self-evident and does not apply in all archaeological sites.

44.5% of the variability in duration of visit. At the same time, a similar analysis of the variables ‘average speed’ (or else, pace of movement) and ‘duration’ returned a negative relationship, rs=-.449, p<.01 (one-tailed). This means that at a variability percentage of 20.2%, the fastest visitors walked around the archaeological site the less time they spent on site and *vice versa*. In essence, the duration of a visit can be predicted to a significant extent by the pace of movement and the distance covered, which account for 69.8% in the variability of visit duration. This find is based on the respective Linear Regression model analysis, whose results are reported in table (Table 4-4).

In order to determine whether the pace of movement is related to any of the other variables, I tested a directional hypothesis predicting that the faster visitors’ pace was the more distance and area they covered. Although, the first test returned a significant positive relationship between pace and distance, rs=.278, p<.05 (one-tailed), the second correlation test (between pace and area of movement) return a negative relationship, rs=-.238, p<.05 (one-tailed). At the same time, even pace can explain only 7.7% of the variability in the total distance visitors covered and 5.7% in the respective area covered. Finally, the total area visitors cover does not relate to either distance or duration of visit.

Table 4-2 Descriptive Statistics of visitor movement at Gournia.

	Minimum	Maximum	Average
Duration (minutes)	00:16:09	01:24:58	00:39:37
Total Distance (meters)	523,74	2.245,00	1.100,943
Area Covered (square meters)	1.064	9.954	6.223
Average Speed (kilometers/hour)	0,8	3,1	1,63

Tables 4-3 and 4-4 Tables reporting the results of Multiple Regression for predicting the duration of visit, with 'Total Distance' and 'Ave. Speed' used as constants in the prediction model.

Correlations

GOURNIA			Total Distance	Duration	Area	Ave. Speed
Spearman's rho	Total Distance	Correlation Coefficient	1,000	,667**	-,053	,278*
		Sig. (1-tailed)	.	,000	,345	,016
		N	60	60	60	60
	Duration	Correlation Coefficient	,667**	1,000	,153	-,449**
		Sig. (1-tailed)	,000	.	,122	,000
		N	60	60	60	60
	Area	Correlation Coefficient	-,053	,153	1,000	-,238*
		Sig. (1-tailed)	,345	,122	.	,033
		N	60	60	60	60
	Ave. Speed	Correlation Coefficient	,278*	-,449**	-,238*	1,000
		Sig. (1-tailed)	,016	,000	,033	.
		N	60	60	60	60

**. Correlation is significant at the 0.01 level (1-tailed).

*. Correlation is significant at the 0.05 level (1-tailed).

Model		Unstandardized Coefficients		Collinearity Statistics
		B	Std. Error	Part
1	Total Distance	.010	.00	.71*
	Ave. Speed	-298.08	36.60	-.59*

Dependent Variable: Duration, Note R^2= .698 (p<.001). * p<.001.

4.2.2 Spatial statistics results

The Line Density visualised outputs, plotted on the Gournia map, instantly highlighted the areas with increased accessibility and enabled observations on visitors' movement throughout the different data collection sessions. The fact that Gournia has one of the best-preserved prehistoric path systems, and that the poor preservation state of the palace allows visitors to walk over the palatial remains, is directly reflected on the visualised movement patterns. Thus, high density values can also function as an 'alarm' for irregular movement behaviour in certain areas. An example of the latter is provided by the area at the north of *House Ac*, where the density analysis indicated high accessibility of visitors despite it being off the main paths (Fig. 4.9). The house entrance is well preserved, and is accessed by the ancient path system, which leads to a stone paved court. The information panel is placed inside the paved court facing towards the entrance. The density analysis results not only indicated an increased access to this area, triggered by the information panel, but also an attempt by some of the subjects to continue their walk through a narrow passage between *House Ac* and *Ab* and end up walking through and over the remains mostly towards the east, as the Line Directional Mean analysis indicated. The individual examination of visitor tracks also showed that few of the visitors who attempted to find their way through the corridor finally decided to turn back. While the good preservation state of the walls that define the corridor prompt visitors to follow the path, the rubble preservation state of the remains to the east of the NE end of this corridor becomes very disorienting and hard to walk through. It is possible then to argue that the surrounding structures' preservation state and/or configuration of remains led visitors to this spatial decision making with negative consequences both on their experience and the preservation state of the remains.

A similar observation that demonstrates the effectiveness of this analysis concerns certain high density values which are concentrated alongside the main paths. A characteristic example is the lower peripheral path to the east of the town with a NS direction which is intersected by three paths leading to the top of the hill. At the intersections one can observe broader areas of high density values. However, a fourth area with the same density characteristics is *House Ck*, whose entrance is easily accessible from the main path, leading to a preserved staircase and finally to an open plan area (area C).

Figure 4.9 An example of accessibility and direction observations. Area of House Ac with the respective information panel and the narrow corridor at the north leading to a dead-end. On the *left*: results from the Line Density analysis. On the *right*: results from the Linear Directional Mean analysis.

In this case then, it appears that the configuration and preservation state of the House CK remains, afford accessibility, movement and thus, off the path exploration of the remains at the particular area. The comparison of the two Line Density analyses enabled the observation of certain changes in movement behaviour due to specific on-site interventions that occurred throughout the data collection sessions, such as new excavation areas, preliminary works of path construction for visitors with disabilities and the placement of new information panels (compare Figs. 4.10 and 4.11). Based on comparative observations of the results, visitors were attracted by the new excavation areas (2012-13) mainly at the NW of the town, where the analysis returns a broader sprawl of movement as well as higher values of density. Similarly, in 2012-13 visitor movement appears to be confined from the SW area of the Palace where there were also on-going excavations. It is important to note here, that the data collection sessions at Gournia were not synchronous to the excavations but occurred at periods after the fieldwork project had concluded its work on-site. However, visitors were able to identify the recent excavation areas even where the project had not left access restriction roping; a fact that was also verified by the thematic analysis of images. The analyses also indicate a change in movement behaviour at the northern end of the excavated town, where the investigative excavations initiated in 2011 in order to facilitate the construction of a path designed to fit the requirements of accessibility for disabled visitors. Although, the works were not concluded (at least up to the final data collection in the summer of 2013) they did leave a defined dirty path, which became one of the main used paths of the site. This path was mainly used from visitors after the end of their tour since it naturally leads towards the entrance/exit of the

archaeological site. Another significant change in visitor movement behaviour can be observed at the tomb area (north of the town) where in 2013 a new information panel was placed. The second Line Density analysis not only indicated increased circulation and accessibly in the tomb area, but also a new alternative pathway towards the exit of the site directly from that area. This pathway is a gradually and naturally formed steep passage which clearly brings in mind the 'lines of communication' (Collins and Collins 1986, cited in Moughtin *et al.* 1999, p. 65) and indicates a spatial requisite created by movement (both staff and visitors) in this area. Nevertheless, in its current state the path poses serious safety concerns for the visitors.

Additionally, the Linear Directional Mean analysis was applied in several locations that were strategically chosen along the existing paths, at intersections, near information panels as well as open plan areas, where movement appears to be ubiquitous and complex. Although, the results suggest that the visitor movement direction is quite diverse and idiosyncratic, certain general tendencies can be observed (Fig. 4.12). For instance, it is evident that the majority uses the east and lower peripheral paved path in order to begin their tour (direction from north to south) and choose to continue their way to the hill top mainly *via* the same path that turns to the west and leads to the palatial court open area. From that point visitor has three options: move towards the palace (north direction), move towards the south-west corner of the palace and the *Sacred Stone* (north-west direction), or move towards the H house complex (north direction).

Although, the results indicate that most visitors choose to move to the north and north-west, it is difficult to discern from this analysis which direction of the two prevails. Nevertheless, it has been empirically observed that most of the visitors move usually to the north-east of the court, where the 'Palace' information panel is located and then continue to explore the Palace area. The low length value of the generated arrow SW of the Palace also suggests that there isn't a significant flow of movement coming from the court area. Another significant find, as mentioned previously, is that visitors use the recently cleared dirty path at the north of the town in order to walk towards the lower part of the town and exit the archaeological site.

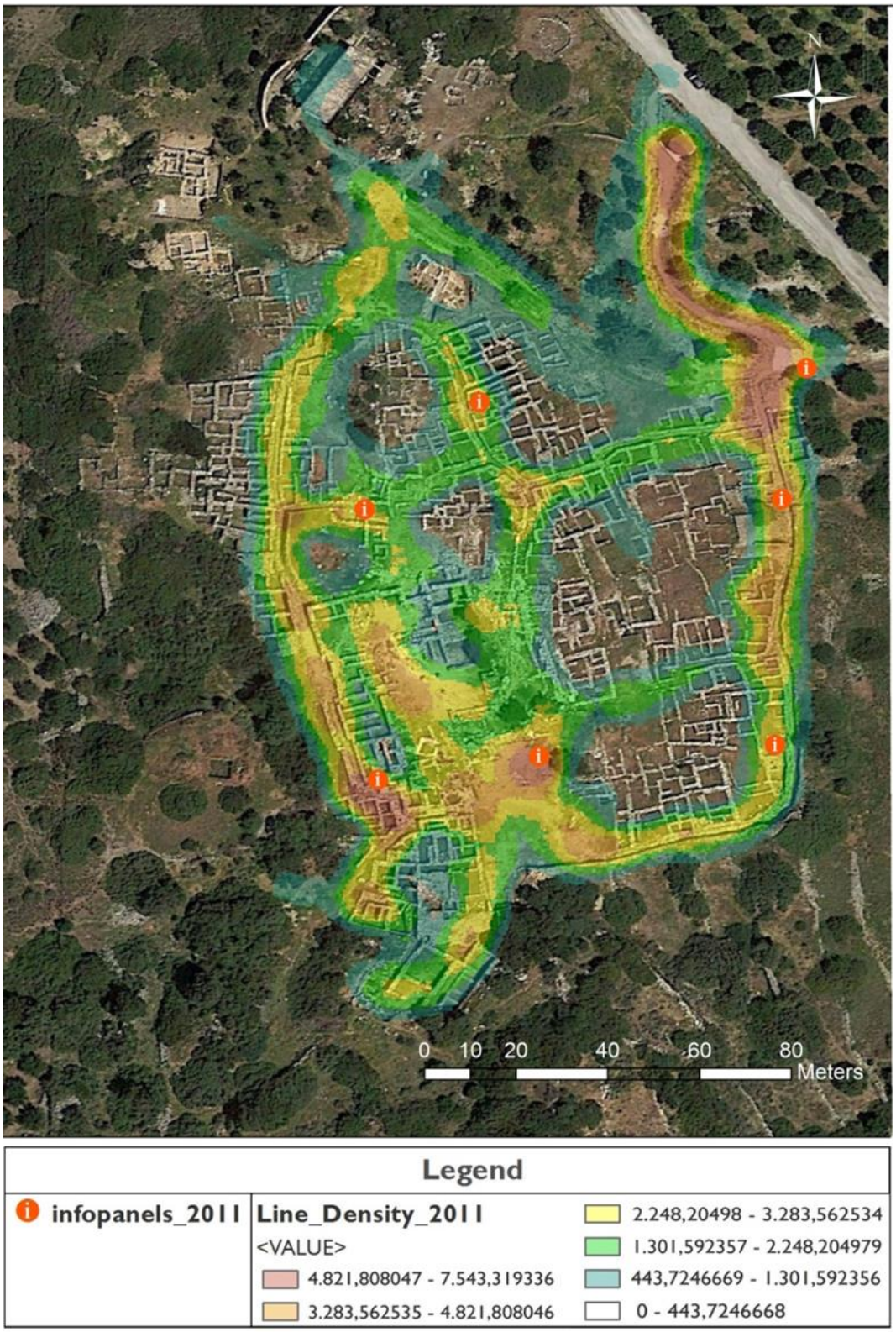


Figure 4.10 Satellite image of Gournia overlaid with the Line Density analysis results of 2011 GPS data (23 samples) as well as the location points of existing information panels in 2011. High values (visualised with warm colours) indicate high density of visitor movement whereas low values (cold colours) indicate low density of movement. Background image © Google Earth.

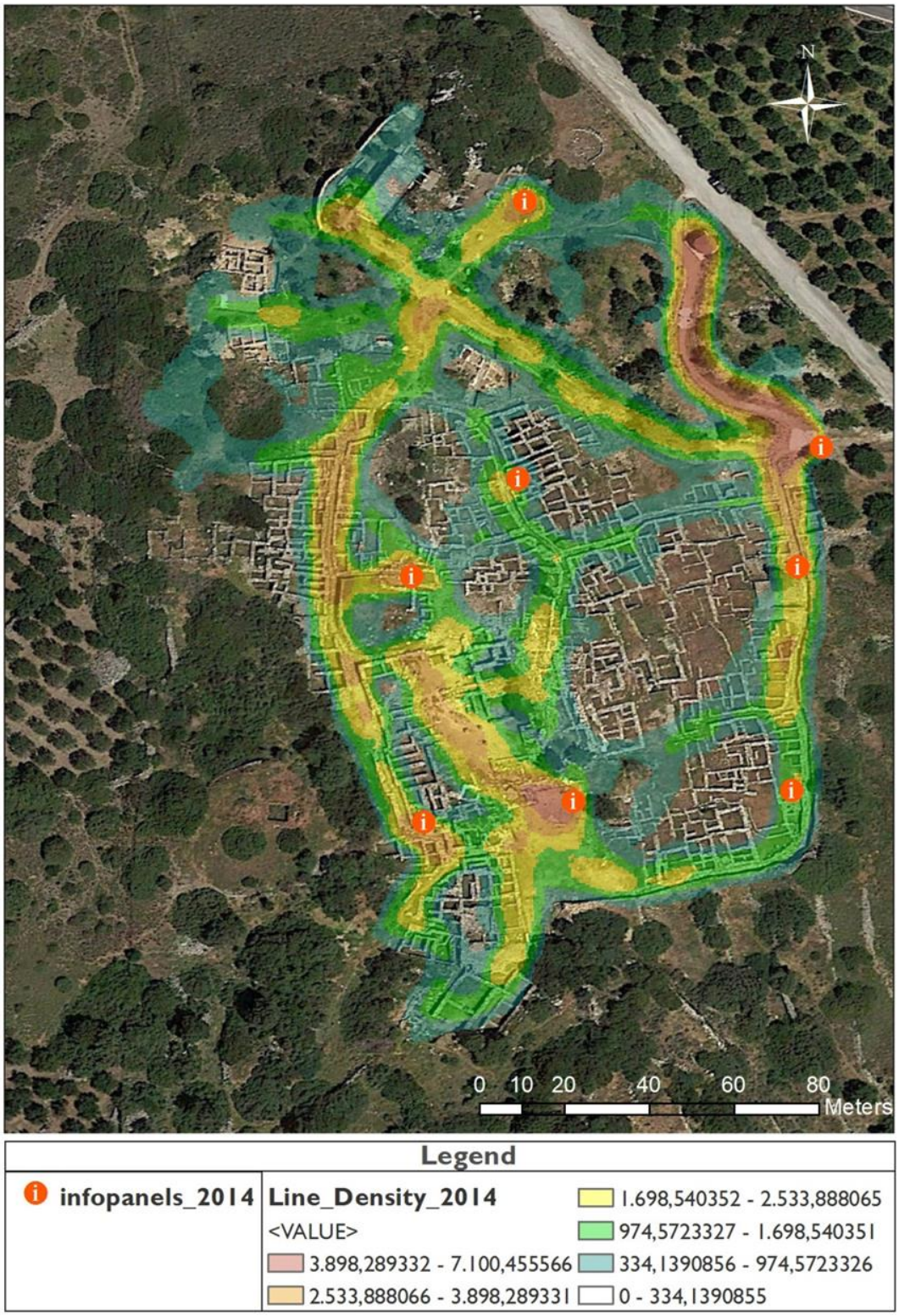
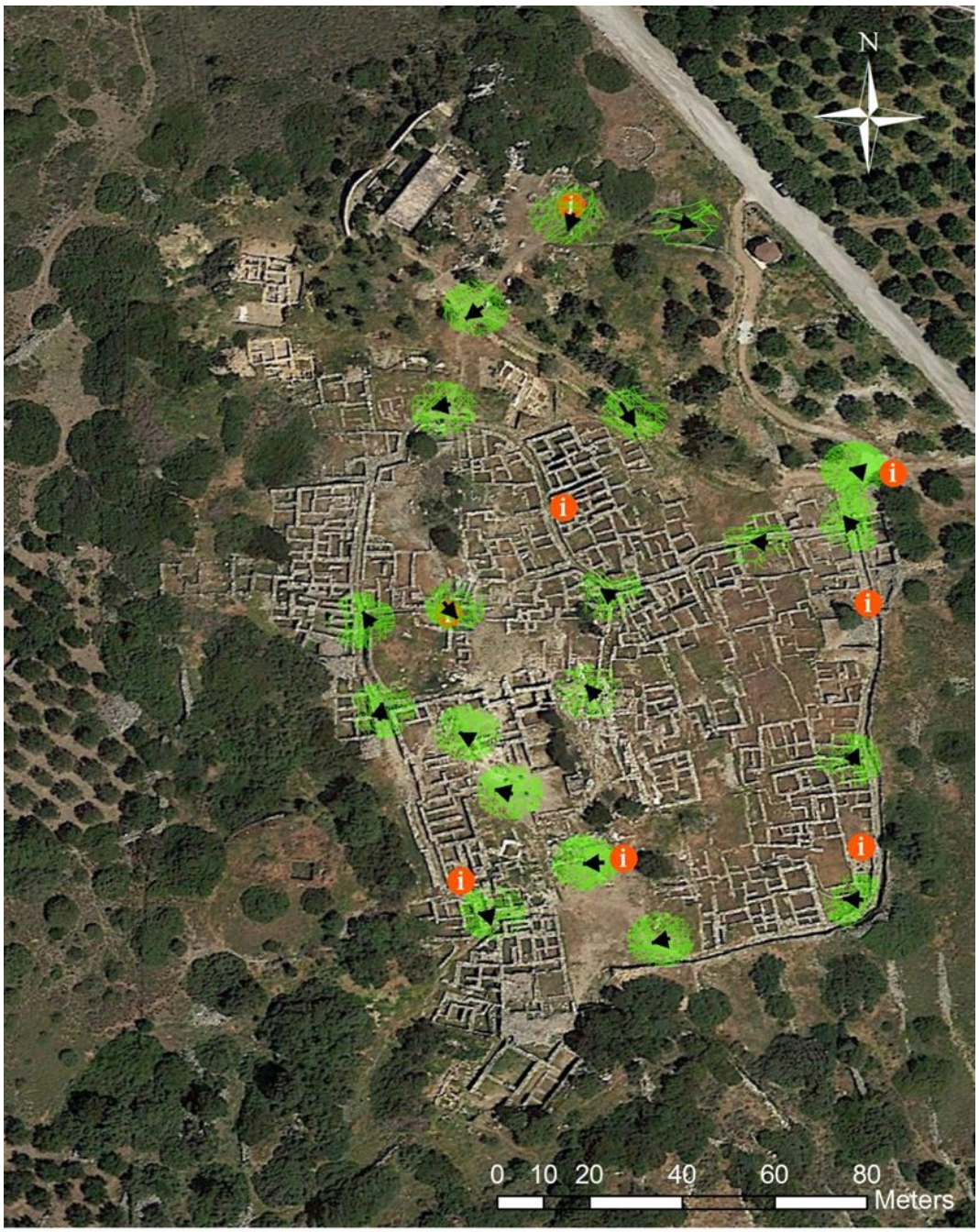


Figure 4.11 Satellite image of Gournia overlaid with the Line Density analysis results of 2012 and 2013 GPS data (37 samples) as well as the location points of existing information panels in 2013. High values (visualised with warm colours) indicate high density of visitor movement whereas low values (cold colours) indicate low density of movement. Background image © Google Earth.



Legend	
infopanels	Linear Directional Mean arrow >
	Buffer Intersected Visitor Tracks >

Figure 4.12 Satellite image of Gournia overlaid with Linear Directional Mean analyses results as well as the location points of existing information panels in 2013. The orientation of the arrow symbols and the direction of the arrowhead indicate the mean orientation and direction of movement at each location. The length of the arrow indicates the positive mean value of movement orientation. Background image © Google Earth.

4.2.3 Findings from an integrated time-space analysis

Apart from broad characteristics of visitor movement such as pace, density and direction of movement, I also wished to investigate in a robust manner which IPs are used the most and the time visitors usually spend around the respective POIs. The terms POI is used here to signify the features of the archaeological site which are included in the current interpretation of the site with the placement of relevant IPs. The aim of this investigation is to provide a quantitative and movement-based assessment on the effectiveness of on-site interpretative resources. While the modelling and analysis protocol is described in Chrysanthi and Caridakis (2015), it should be mentioned here that the analysis calculated the correlation of visitor tracks to each IP location. This correlation is relevant to both the encounters of IPs in visitor itineraries as well as the duration of stay at each. In this case, a sample of 20 visitors was used. This sample concerns subjects who visited the site in 2013 (after the placement of the eighth information panel in the tomb area) and participated both in the GPS and Questionnaire sampling sessions.

In terms of the first investigation, the analysis returned frequency data which reflect the total amount of time each visitor stopped in each POI. The results were organised in a cumulative statistics table which includes the number of visitors that passed by each IP, the minimum, maximum and mean values of the time spent at each IP location (Fig. 4.13). The results clearly demonstrate that not all visitors passed by and consequently used all of the existing IPs and that there are significant differences between the timeframe that each IP location attracted visitors' attention. More specifically, almost all visitors passed by the *General Map* and *Palace IPs*, while *Cf House*, *Shrine* and *Tombs* IPs were visited by more than half of the subjects. The rest of the IPs, namely *Dd House*, *Ac House* and *Sacred Stone*, present medium and low values of visitation. Based on the results, a first observation is that the least visited IPs are placed alongside main walking paths and not located in the most remote parts of the site, as is the case with the *Tombs* IP. In fact the latter, located at the most remote part of the archaeological site, approximately 50 meters at the north of the excavated Minoan town, was used by 12 out of 20 subjects. Regardless of the exact reasons behind this ascertainment, the fact that many of the IPs are not discovered and thus, used by visitors aligns with the results from the qualitative analysis, which suggest that visitors wished for more information. Besides, the lack of an overview map with the existing IPs (such as the one provided in *General Map* IP) in the provided leaflet as well as the lack of spatial associations between individual IPs (i.e. overview maps integrated in IPs with the spatial reference 'You are here') might explain part of the

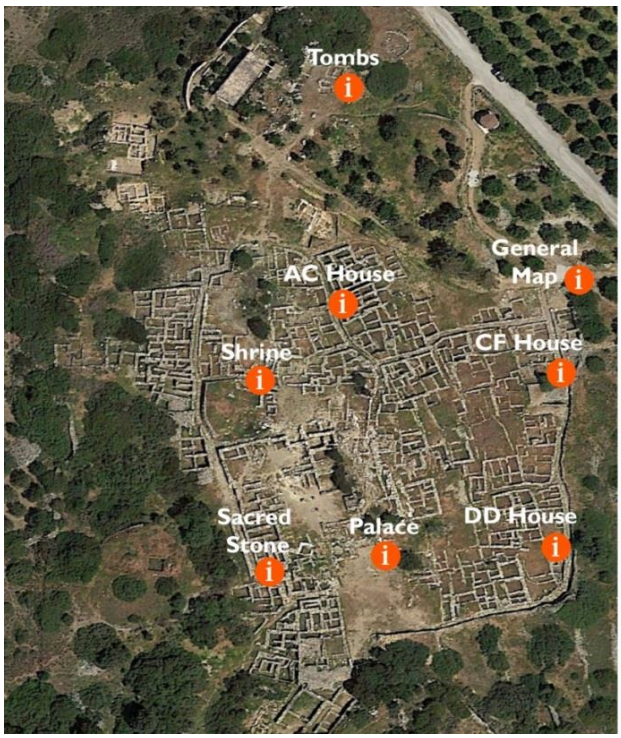
problem. Certainly, the fact that many of the subjects leave Gournia without having passed by certain key locations of the site demonstrates that poor interpretation practices have a significant impact in how visitors walk, interact and consequently engage with an archaeological site.

Interesting finds are also obtained from examining the time values. Certain IPs such as the *General Map*, the *Palace* and the *Tombs* contain more information than others and thus, the hypothesis is that they require more time to be inspected and understood by the public. This hypothesis is ascertained by the average time spent (1.7 minutes) around those IPs the respective remains in comparison to other, less elaborate IPs. However, the same hypothesis is not established in the case of *Dd House* and *Ac House*, in which case the minimum and average duration of stay values are remarkably high in comparison to the rest. It is also interesting that *Ac House* IP is the second and *Dd House* the third least used IPs of the archaeological site. This lengthy duration values can neither be explained by the information provided on the panels alone nor by the official guide book and leaflet, where *Ac* and *Dd Houses* are not even mentioned. Certainly, the data are not adequate enough to attempt an in-depth interpretation of the results but a loose hypothesis could be made based on the qualitative analysis. The latter suggests that visitors engaged particularly with information pertaining to the Minoan everyday living and its conditions of living. Then, it could be argued that both of those house remains are unique and engaging in that they convey such information about the Minoan past (*Ac House* preserves a mudbrick wall – suggesting an upper structure - and a window, while a wine press was found in *Dd House*). Nevertheless, the results clearly demonstrate that the on-site information is inadequately used by visitors, indicate which areas of the archaeological site are misrepresented to the public - despite the curators' intensions - and require interpretative improvements.

4.2.4 A comparative assessment of spatial statistics

Correlation coefficient, used as a statistical analysis for identifying the relationship between general characteristics of movement is a particularly valuable tool for assessing certain visitor movement tendencies within an archaeological site, as it became evident in the case of Gournia (see section 4.2.1). However, one could argue that in the case of Gournia certain hypotheses seemed to be self-evident such as the assumption that the covered distance is related to the duration of the visit, which was verified in the case of Gournia. For reasons of comparison and for validating whether this confirmed hypothesis

is a common pattern occurring at cultural heritage sites or whether this does not apply in all cases, I ran similar analyses with the Çatalhöyük and Knossos datasets.



Descriptive Statistics					
Information Panels	N (visitors)	Min (sec)	Max (min)	Sum (sec)	Mean (min)
General Map	19	16	3.6	958	1.7
CF House	15	16	1.9	484	1.1
DD House	10	70	3.3	504	1.7
Palace	20	30	5.3	1049	1,7
Sacred Stone	5	2	0.6	28	0.5
Shrine	14	6	3.2	547	1.3
AC House	8	62	3.3	485	2
Tombs	12	28	3.9	573	1.6

Figure 4.13 On the left: satellite image of Gournia indicating the existing information panels in 2013. On the right: table indicating the cumulative statistics concerning information panels and the time visitors spent around the respective IP locations.

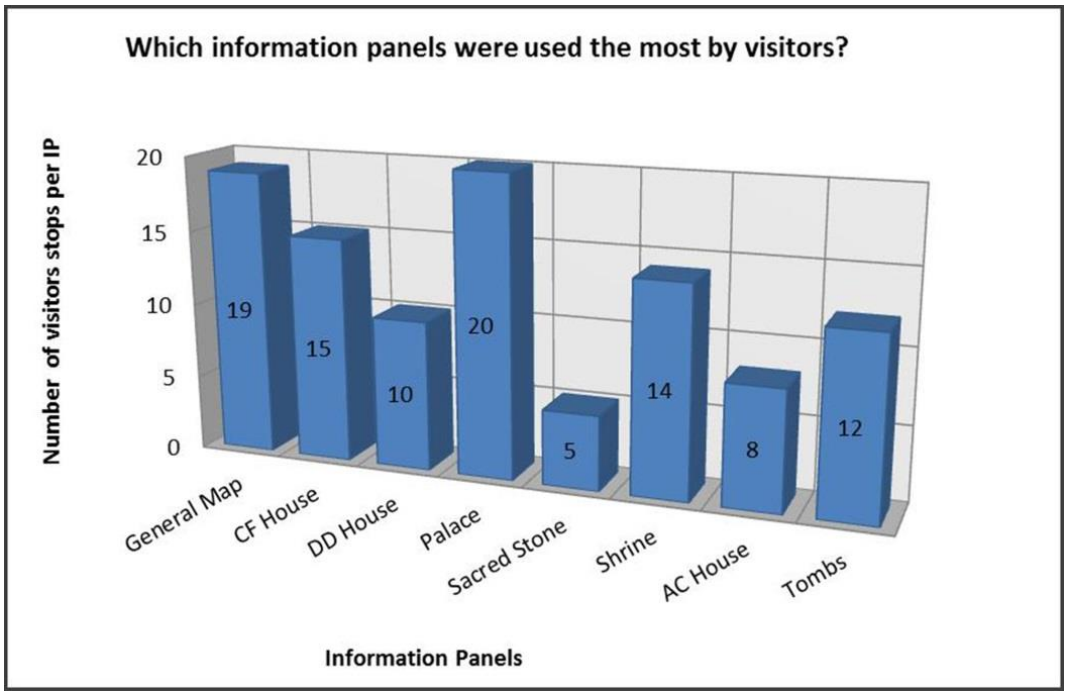


Figure 4.14 Graph illustrating the number of visitors that stopped at each POI location.

The notion that this hypothesis might not be valid in all cases, came from the literature review (Solomon 2008, p. 110) and observation sessions that I undertook at the archaeological site of Knossos, where visitors experience long queues and delays in order to access some of the most impressive areas of the site such as the *Throne Room* (see Chapter 6, section 6.2). In the case of Knossos, the relationship between visitor walking distance and duration of visit is not confirmed and thus, the empirical observations are verified. On the contrary, the fact that the duration of visit appears to be significantly related to the pace of movement, t^{25}= -.425, p<.01 (one-tailed), and that the area covered is not related to either the duration or the distance covered indicates that the designed alternative paths do not have the anticipated results and instead, the main site remains crowded and under visitor circulation pressure. In other words, if the alternative, peripheral paths were effectively used by visitors we would have had a significant correlation result between the area covered and the pace of movement.

In the case of Çatalhöyük (see Chapter 6, section 6.3), the respective analyses exploring the distance and duration of visit indicated a significant positive correlation, rs=.680, p< .01 (one-tailed). Nevertheless, the fact that the total distance covered accounts for 46,2% of the variability in visit duration remains a bit problematic because we know that the visitor paths are predefined and the visitors are guided throughout the tour; then arguably one would assume that there isn't enough flexibility in visitor movement. However, taking a closer look at the visitor tracks one can easily observe movement variation, particularly around tour guides' usual stops, such as the west and east vantage points at the South Shelter area (Fig. 4.15). In order to explore a bit further and verify those observations, I carried out a *Line Density* analysis which indicated that the higher values of line density appear at the parts of the *North* and *South Shelter*, where the tour guides stop to give their tour (Fig. 4.16). Another interesting result in the case of Çatalhöyük is that the pace of movement is significantly correlated with the duration of visit, rs= -.932, p<.01 (one-tailed), and in fact it accounts for 86.9% in the variability of duration. Further to the above, the respective regression analysis returned that the duration of visit can be predicted at the high rate of 89.5% by a model that uses pace and distance as constants. This result implies that the archaeological site of Çatalhöyük offers a very controlled visit which is positive in terms of managing tourist groups but it poses different challenges in terms of the restrained movement and its impact in visitor engagement.

[25] Note that I quote Kendall's tau, the non-parametric correlation, which is suitable for a small dataset (N18) such as the Knossos dataset.

Figure 4.15 Visitor tracks at Çatalhöyük, plotted on Google Earth map. On the *left*: South Shelter area. On the *right*: path connecting the North and South Shelter areas. The different colours correspond to datasets obtained at different field sessions.

Figure 4.16 Satellite image of Çatalhöyük overlaid with the Line Density analysis results of the GPS dataset (53 samples). High values (visualised with warm colours) indicate high density of visitor movement whereas low values (cold colours) indicate low density of movement. Background image © Google Earth.

4.3 HotSpot and thematic analyses findings

A first striking observation from the HotSpot analysis results is the six generated locations from where visitors captured between 54-77 images (Fig. 4.17). The first three locations (HS 50, HS49 and HS46) are generated at the northeast side of the settlement and along the eastern (with a NS direction) paved path of Gournia, while the other three (HS 13, HS4 and HS 7) are located around the palace area on the top of the hill. Based on the analysis and the resulting cluster hierarchy (Table 4-5), the most popular location of image-taking is to the north edge of the palace, near the identified remains of a bathroom. Equally high is the clustering value of HS 49, which is located at a vantage point from where visitors can enjoy a panoramic view of the settlement. Next in ranking are Hotspots 4 and 7, at the southeast corner of the court and the southwest corner of the palace respectively while 46 and 50 are at a close range from HS49.

In order to decode why those locations attracted visitors' attention the most I mainly pay attention to the results from the thematic analysis. Based on the latter, 42% of the images contained in HS13 concern views offered from this location towards the sea (to the north) and the surrounding mountainous landscape (to the south and east). The second (21%) and the third (19%) most popular themes in HS13 are the remains of a drainage pipe and other wall remains from the north area of the palace. Finally, a stone basin (10%) and the steps leading to the west paved street (8%) were the themes represented the least. At HS49 most visitors take pictures of B and C block of houses remains along the paved street (31%), panoramic views of the east slope of the settlement (27%) and instances of the circulation system of Gournia (27%). Finally, a stone basin located in *Ba House* is represented by 15% in the sample of images at HS49.

Table 4-5 Top ranking cluster hierarchy of HotSpots.

Ranking	HotSpot ID	ICOUNT
1	13	77
2	49	75
3	4	72
4	7	69
5	46	66
6	50	58

Figure 4.17 Instances from the plotted HotSpot analysis results, depicting the two areas with the six most popular image taking points. On the left: beginning of visitor tour at the northeast side of the settlement. On the right: palace area, on the hilltop and at the south of settlement.

Overall, a comparative examination of the most popular hotspots of the site shows that panoramic views of the site from HS50, HS49, HS46 and HS7 is the most represented theme, while the paved streets and staircases are the second most popular theme. Particularly, the fact that the settlement panoramic view theme (HS7/T1PV) from the southeast corner of the court is the most populated theme of HS7 reveals another vantage point of the site. The palace remains and views towards the sea and the surrounding landscape are the next most popular themes, while the house remains mainly in areas B and C are ranking high in visitors' preferences. Visitors also take many pictures of the information panels, possibly for keeping a record of the information, as well as the stone basins, a recurrent theme around the site. Interestingly, the hotspot analysis generated the significant HS4 in the southwest corner of the palace, very close to the *Sacred Stone* IP, which is one of the least used IPs of the site. The thematic analysis confirmed that visitors were more interested in taking pictures of the well preserved masonry at the southwest corner of the palace instead; the sacred stone POI is only the third most popular theme of HS4. Additionally, it is important to mention that the 'archaeological works' theme (AW), referring to either recent traces of excavation activity or conservation works, was also well represented in the data.

In terms of a general observation with regards to the distribution of the rest hotspot classes it doesn't come as a surprise that all information panels are in proximity to a generated hotspot. The latter are mainly first and second class hotspots (see red and yellow dots in Fig. 4.18), except for the recently placed *Tombs* IP which has a third class hotspot.

Additionally, all of first and second class hotspots are found along the eastern and western paved streets of the site (north-south orientation), as well as in the palace area, where some vantage points offering unobstructed views to the sea and the surrounding hilltops are accumulated. It could be argued then that those are the principal areas of the site attracting most of visitors' attention.

A further point that can be made from examining the thematic analysis results is that the first class hotspots do not necessarily contain the most populated themes across the site. Instead, they contain more well represented themes in comparison to second class hotspots, which usually present fewer themes. A characteristic example of the latter point offers the comparative analysis of the first class HS7 and the second class HS44 generated in proximity to *House Ac*. HS7 (ICOUNT 69) is comprised of six themes and its most populated theme counts 21 images. On the other hand, HS44 (ICOUNT 49) contains only three themes of which two are poorly populated and the third is one of the most populated themes in the dataset counting 32 images of *House Ac* and its features (i.e. its uniquely preserved mudbrick wall and the window hypothesis). The first inference drawn from this observation is that the first class hotspots reveal locations with a pluralistic range of themes that attract visitors' attention; hence, they constitute the prime locations of interest offering a multiplicity of stimuli for the visitor experience. A second inference concerns the visitor-led hierarchical significance of certain features of the site, which are unveiled through the adopted thematic analysis for the interpretation of image data. Stone basins, preserved features of the drainage system, house entrance thresholds, the mudbrick wall of *House Ac*, the *Palace's* L shaped stairway and the remains of the central hall's colonnade are some of the most popular themes that visitors chose to record.

Consequently, the hotspot and thematic analyses provide an alternative exploration of the things that visitors appreciate the most in an archaeological site and reveal its non-contrived qualities both of archaeological and natural interest. Additionally, the process of the aforementioned systematic analyses adds a particular hierarchy to the identified favoured themes which is based on visitors' collective engagement with the site. It could be argued then, that the hotspot analysis provides an additional layer of information with regards to visitor movement or rather linger behaviour, since it exposes the site's popular locations where visitors stop to observe, read and take pictures. In order to test the aforementioned hypothesis, I used the results from the *Popular Points of Movement Suspension* (PPMS) analysis (see Chrysanthi and Caridakis 2015), which provided the top 15 locations of visitor stops within the archaeological site of Gournia.

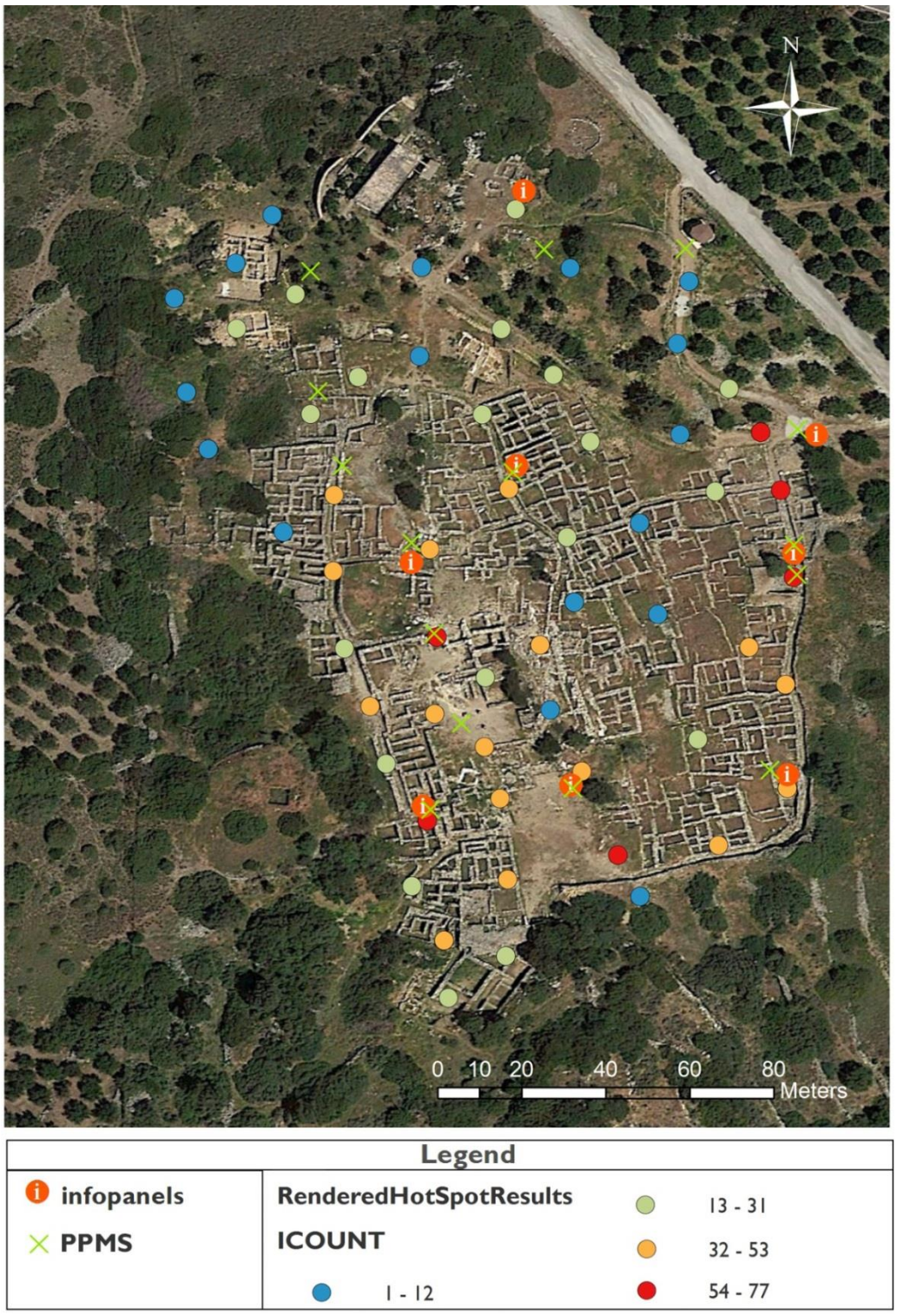


Figure 4.18 Satellite image of Gournia overlaid with the HotSpot analysis results as well as the location points of existing information panels in 2013. High values (visualised with warm colours) indicate large clusters of images whereas low values (cold colours) indicate small clusters respectively. Background image © Google Earth.

The results were plotted in ArcMap along with the hotspot analysis outputs for reasons of comparison (Fig. 4.18). Indeed, several PPMSs coincide with the site's POIs, as well as with first and second class hotspots but at the same time at least three first class hotspots do not align with any of the existing PPMSs. Nevertheless, it becomes evident that both of those analyses are complementary to each other and suitable to address the nature of the visitor-space interaction under investigation as opposed to the Orellana and Wachowicz (2011) approach. The latter approach is successful in identifying clusters of movement suspension related to a single known attraction of the study area each time, but it cannot address and interpret the multiple attraction vantage points existing in dense heritage spaces, such as archaeological sites. For this purpose, it is argued that hotspot and thematic analysis of the geotagged images prevail as a more compatible approach.

4.4 A synthesis of findings and assessment of the methodology

A point that needs to be raised - before attempting to provide a concise synthesis of the above findings - concerns the potential of the proposed visitor-centred approach to assess the configurational properties and qualities of the archaeological space through movement and interaction with its interpretative context. The proposed mixed methodology enabled a critical cross-examination of the findings pertinent to the complex phenomena involved in moving within and interacting with heritage spaces. It also attempted to identify, wherever possible and to a certain extent, the aggregated effects of the visitor-archaeological site interaction in order to reveal its strengths and weaknesses and provide an alternative, evidence-based and complementary assessment method for future planning agendas. In the following sections, I will highlight certain important contributions of the approach in understanding how visitors tour Gournia and proceed with a selective assessment of the methodology, which will offer a more complete account of the method's potential.

The approach sought to establish the interpretative and movement affordances of Gournia, whether those derive from the existing official interpretative media or manifest themselves in the unaffected dialogue between the archaeological remains and the visitor. In this investigation, both the qualitative analysis of visitor feedback and the time-space analyses offered complementary outcomes. On the other hand, although the different employed spatial analyses and the qualitative/quantitative analysis of visitor feedback successfully revealed certain qualities of the archaeological site, the processes of obtaining the

respective datasets differed in a fundamental way. To be more specific, visitor movement tracks and visitor-led images constitute a more spontaneous and synchronous to the experience interaction with the archaeological space, its features and surroundings. On the contrary, questionnaire and interview based feedback is asynchronous to the experience and therefore, different mechanisms of thought production prevail during the feedback process. Due to this distinct difference the results usually appear to be complementary, every so often versatile or even contradicting at times; a fact which ensures a rich, intriguing and multi-pronged interpretative approach.

The visitor feedback suggests that while information panels are well designed and well distributed around the site at the same time, they are found insufficient to satisfy the interpretative requirements of many. Leaving aside the growing demand for the employment of digital media – which could apply to the majority of heritage sites making use of conventional interpretative media –, the main complaint concerned the scarcity of on-site information. The contradicting visitor feedback on the existing information panels was partially explained by the spatial correlation analysis looking at how visitors used those media and indicating that not all information panels are used by all visitors. In fact, the time- space analyses conducted suggest that visitors make very idiosyncratic choices of movement since the site itself affords this movement behaviour. In doing so, visitors often do not encounter many of the existing POIs of the archaeological site. The problem appears to be exacerbated by the poor design of interpretation panels lacking spatial references, directional suggestions and interconnectedness between the existing IPs. Considering that visitor experience is affected by the mode of exploration and the utilisation of relevant interpretative resources they encounter or have at hand (i.e. information obtained prior to the visit, the archaeological site leaflet, different guide books and information panels), this ascertainment exposes a critical insufficiency of the interpretative affordances of the site, albeit with the provided conventional interpretative media.

The mixed-method approach also revealed certain qualities of Gournia that were most appreciated by visitors. Characteristic examples of the above offer the repetitive themes of stone basins, the drainage system remains, the new archaeological discoveries (both within the boundaries of the excavated settlement as well as in the extended area to the north, see Watrous 2012) and more importantly themes relevant to the Minoan's households and everyday life. This approach also raises the awareness that certain favoured themes of the site appear to be neglected in official interpretations. In the example of stone basins, the

analysis indicated that they are very distinct and appreciated features of the archaeological site. Rarely has a visitor the opportunity to experience *in-situ* artefacts used in Minoan everyday life and perhaps, this is why it appears to be such a popular theme. Thus, it is very unfortunate that although they are mentioned in the *General Map* IP in relation to the site's name provenance, there is no further information or hypothesis about their use. It also became evident that the natural setting of Gournia, the surrounding landscapes and the sea view, constitute very important aspects of the visitor experience. Their visual attractiveness is manifested in the plurality of images captured from existing vantage points and from different angles. The hotspot analysis was critical in highlighting those visitor-sourced vantage points which could be assessed, organised and utilised in the future, perhaps in the form of designing a subtle infrastructure for resting points.

On the other hand, the analyses also indicated and triangulated certain results pertinent to visitors' indifference or unawareness about certain designated POIs of the site such as the *Cf House* and the *Sacred Stone*. *Cf House* is never mentioned in visitors' free form responses and is represented in only 8 out of 66 images clustered in HS46. Similarly, out of 72 images taken in proximity to the *Sacred Stone* IP, only 15 are related to the POI. This is mainly due to other nearby attractions that captured their attention more as the thematic analysis of images suggests. Such observations may be fruitful in prioritising the update of existing interpretative media or redesigning interpretation to meet visitor needs and engagements.

In terms of the visitor movement, the descriptive statistical analysis of general movement characteristics provided the minimum, maximum and average values of distance and area coverage, pace of movement and duration of visit. Perhaps in the case of Gournia those variables are not very important for visitor management assessments. However, as I will demonstrate in Chapter 6 (see section 6.2), such assessments are very critical for archaeological sites presenting high numbers of visitors. The correlation analysis validated the hypothesis that visitor movement at Gournia is carried out in an unobstructed way and a successful regression model (i.e., ANOVA test) was put together to predict the average duration of a visit based on the distance covered and the pace of movement. Based on this prediction model, heritage experts can plan an optimum organisation of routes and interpretative media so that visitors experience the best of the site in the minimum amount of time and effort.

Certainly, it falls out of the scopes of this research to unveil the complexity inherent in the notions of 'visitor experience' and 'visitor satisfaction'. Moreover, the approach was

unable to capture the social interactions which no doubt play an important role in the way visitors move within archaeological sites; nor it intended to follow this route. Nonetheless, in relation to the latter and the impact of this interaction to their experience the study provided some important insights. The degree of freedom to move within the site and to use the paved streets of the prehistoric town – the same used by Minoans at the time – had a rather positive impact on the visitor experience. In fact, the prehistoric circulation system of Gournia was raised as one of the most favoured features of the site both in the qualitative analysis of visitor feedback and thematic analysis of images. The spatial analyses results indicated that these pathways function successfully as a route system for most visitors. More importantly, the comparative Line Density analysis demonstrated the ability of the approach to record the movement response of visitors to the on-site interventions such as archaeological excavation areas, placement of information panels and path construction preparatory works.

However, other areas with increased accessibility were identified and assessed as problematic for the visitor experience, his safety and the preservation of the sensitive fabric of the site. For instance, the second class HS24, generated to the west of the eastern paved street of the site aligns with the *Line Density* outputs and observations concerning the increased accessibility off the main path. Likewise, the dense flow of movement within the palace remains and the use of inappropriate shortcuts (i.e. narrow dead-end passage at the north of *Ac House* and steep path at the east of *Tombs*) are highlighted by the analyses. Outputs of the performed analyses enable such observations that are valuable for conducting evidence-based assessments for future accessibility and visitor management plans. Even at a conceptual level of designing archaeological walks, I argue that it is more effective to envisage the solution if you have identified and framed the problem. Finally, it became evident that many visitors missed out on certain information about the site that they wished to know about despite the fact that many of them were available on-site. Admittedly, providing information awareness in an effective manner in such complicated spaces is rather difficult to implement with analogue media; hence, this aspect of findings will be further addressed in the next chapter.

Assessing the methodology and envisaging future applications

Essentially, the formulated methodological approach enables Cultural Heritage experts to conduct broad assessments about the affordances of the archaeological space for visitor

movement and to monitor on-site interventions with respect to the changes they bring to the interaction and thus, to a certain degree understanding of the archaeological space. The investigation of this interaction is partly an investigation of how an archaeological site is perceived by visitors. But the perception of space, as discussed in Chapter 2, is an inherently perplexed concept forming an active field of theoretical and scientific debate. Therefore, this research approach chooses to explore and identify the tangible effects of this perception; 'the visitor intuitive movements, dwells, interests and opinions' as they are captured by the employed recording techniques (Chrysanthi and Caridakis 2015). In this respect, the proposed approach makes certain important contributions in comparison to relevant visitor-centred approaches described in Chapter 2, summarised in the following:

- Utilises and considers both synchronous and asynchronous to the experience feedback.
- The mixed-method approach enables the triangulation of qualitative and quantitative findings.
- Each analysis of the proposed methodology offers new, complementary and overlapping insights about the affordances of space for movement and interaction. It also offers contradicting results which should be welcomed for further investigation.
- It is designed to meet the requirements of archaeological sites with a diverse profile of movement affordances and it is particularly adapted to conducting high resolution observations at prehistoric sites presenting a dense palimpsest of remains.
- No prior knowledge of the officially designated POIs of the site is required. The proposed approach was able to reveal those POIs and add new ones based on the visitor assessment.
- Based on the results, it stresses that movement flexibility is of great importance to the visitor experience and thus, engagement with cultural heritage spaces. Visitor movement and lingering are highlighted as two important expressions of the visitor-site interaction, assuming a central role in the processes of assessing, planning and reassessing archaeological walks.

It is important to note that the obtained datasets were of satisfactory quality in all three archaeological sites despite the different environments they represented (i.e., high vegetation (pine trees) at Knossos and shelters at Çatalhöyük). In theory, the visitor-sourced data collection could have been implemented with the use of visitors' personal mobile devices through existing geo-tagging applications (e.g. *Geotag Photos*, available both on Android and iPhone platforms). Although, such applications have recently entered the mainstream adoption, and despite the increasing number of smartphone users, the fieldwork survey indicated that the majority of visitors carrying smartphones, didn't actually make use of them while on vacation due to the excessive roaming rates. To ensure the collection of spatiotemporal and image data however, it was decided to continue with the procedure as described in Chapter 3.

The European Commission's strategy advocates that ICT should be treated as goods - accessible and affordable for the common wealth of societies - above and beyond the notion of profit (EC 2015a). Also, Europe's Digital Agenda includes further investments in digitizing its cultural heritage and low roaming tariffs, a fact that will strongly facilitate cross-regional accessibility to heritage content *via* mobile phones (EC 2015b). Provided that these criteria are met, accessing or depositing location-based information *via* personal mobile devices is certainly pointing towards the future of interpretation methodologies for heritage sites.

The interpretation of the results enabled a discussion on how this methodology addresses, in an applied manner, certain theoretical and practical considerations discussed in chapters one and two. So far, two different ways of approaching visitor movement have been mainly discussed: the policy-based (manifested as practical implementations) and the visitor-centred approach. The notion that every time we physically intervene in an archaeological site we augment certain points of interest, and ultimately alter its entire perception, has also been discussed. Physical interventions therefore influence the way we explore the archaeological site. At once, the advent of novel presentation technologies has created a new paradigm in the way we perceive and interact with our world, namely the 'augmented space' paradigm, as Manovich has termed it (2006). The next chapter will introduce and discuss this phenomenon, its influence on presenting archaeological sites and the possible implications in visitor movement; adding a significant layer that needs to be considered in planning interpretative walks in heritage sites.

Chapter 5: Augmentation of places: a paradigm emerging from novel technologies

> …the Past is one of the most virtual of the realities we have to contend with. It's an untouchable phantom: a once-lived reality that comes to us in pieces and can be experienced only in retrospect. (Silberman 2005, p. 9)

So far, it has been ascertained that studying the visitor movement in archaeological sites reveals the configurational properties and the afforded engagements of such fragmented spaces with visitors. Apart from those insights and the notion that such approaches provide complementary assessment processes for augmenting those spaces in the eyes of heritage specialists, it was also demonstrated that movement participates in the overall experience and understanding of a place. The ability of visitors to explore such spaces following alternative paths provides different, complementary and overlapping readings of the archaeological site and its content, in a physical and intellectual manner. However, this visitor-space interaction also revealed another common problem situated in the inability of analogue-based media to satisfy visitors' requirements for interpretation and to render such spaces more legible. Feelings of engagement with the site, its long history and natural setting were expressed hand in hand with feelings of disappointment, confusion and suggestions for providing more information and representations of 'how you [heritage specialist] think it may be like'.

In this chapter, I discuss the implication of novel media in the presentation of heritage sites and identify the progress and directions of current research in the field. This chapter reviews the most significant literature concerning the augmentation of physical spaces with novel technologies. Keeping in mind the aims of this research, this chapter does not intend to exhaust the technological issues concerned but rather to frame this relatively new paradigm by summarising and bringing together a plethora of related work from different fields such as Human-Computer Interaction, Information and Communication, Architecture, Philosophy and Cultural Heritage Studies. Emphasis will be given on

literature referring to the advancements in mobile and outdoor systems with a particular focus on mixed-reality implementations in the Cultural Heritage sector. This will provide a substantial background for the conceptual framing and formation of timely and strategic questions for linking the 'augmented space' paradigm with on-site presentation strategies. This chapter will also explore - partly on a theoretical level and partly *via* specific scenarios - issues pertinent to archaeological walk planning methodologies.

5.1 An introduction about the augmented space paradigm

From the early days of human interaction with the natural and built environment, the augmentation of physical spaces - as performed through annotations for instance in prehistoric rock art, frescoes, icons, ornaments, sculpture, signs etc. - is witnessed as a diachronic practice of communicating information (May 1996; Champion 2011; Manovich 2006). Apart from visual augmentations, artificially generated sounds help us identify the surrounding space, even if our vision is blocked or disabled, and thus perform another kind of augmentation of our physical spaces. Sounds complement our vision with additional information and enhance spatial navigation (May 1996; Kjeldskov 2004). For instance, the notion of being in proximity to a port when one hears a ship horn, or the traffic lights' sound notifications while moving in an urban environment, are some of the examples illustrating the above statement. The advent of novel ICT however, has extended this notion and created a new paradigm. The term commonly used within academia and more recently amongst bloggers and the mass media, to describe this relatively new phenomenon is Augmented or Mixed Reality. However, there is some variety in how such terms are defined (Bimber and Raskar 2005) and the subsequent concepts underlying them, which will be briefly discussed in the following section.

5.1.1 Definition and meaning

Augmented Reality is a term generally used to describe real-time direct or indirect views of the physical world enhanced by computer-generated elements. However, formal definitions of Augmented Reality (AR) are still under discussion (Bimber and Raskar 2005; Liestøl 2011; Renevier and Nigay 2001). In relation to Virtual Reality (VR), some argue that AR is part of VR and *vice versa*. An essential difference between the two is the environment

that each is applied to, which consequently affects the interaction of the user with the environment. More specifically, VR immerses the user into a hermetic artificial world, whereas AR embeds synthetic information into the real environment. In other words, AR supplements the physical environment instead of completely replacing it (Azuma, 1997), providing an embodied experience, both physical and virtual, in a dynamic whole. Moving one step beyond this definition, not all synthetic additions to the real environment can be considered as AR, just the ones that can demonstrate a spatial relation and linkage to it. Another core element of AR systems is the ability to perform real-time augmentations.

Azuma has provided a widely accepted definition which is cited in the majority of relevant research resources (Azuma *et al*. 2001, p. 34, Champion 2011, p. 157; Höllerer and Feiner 2004, p. 222; Zhou *et al*. 2008, p.193). In order to avoid limiting the definition of AR by implicating the respective technologies used each time, Azuma describes AR as systems that share the following three characteristics: combine real with virtual elements, are interactive in real time and registered in 3D (Azuma 1997, p. 356). This definition seems to be successful in its generalizing purpose, as AR applications are not potentially limited only to our sense of sight, although thus far dominated by it. Any attempt to describe AR, keeping the vast majority of applications in mind, will result in the formation of a sub definition. Apart from acoustic AR, haptic AR already forms a special research direction (Jeon and Choi 2009).

Milgram and Kishino (1994) suggested a continuum of real to virtual environments, which they call the Virtuality Continuum (VC), where real environments are shown at one end and the virtual ones at the other (Fig. 5.1). In this continuum, AR along with Augmented Virtuality (AV) is placed in the general area of Mixed Reality (MR). The latter is defined as an environment in which 'real world and virtual world objects are presented together within a single display, that is, anywhere between the extreme of the virtuality continuum' (Milgram and Kishino 1994, p. 1321). In Milgram *et al*. (1994), the relationships between AR and the broader class of technologies within the spectrum of mixed reality are further discussed. Mixed Reality is preferred as an umbrella term, facilitating the purposes of certain surveys (Costanza *et al.* 2009), or in more theoretical discussions with regards to the subjectivity of the phenomenon (Champion 2010). Champion (2010, p. 157) prefers to use the term MR for describing both AR and AV, because of his belief that as technologies mature the user, who is the subjective interpreter of their environment, will not, despite the

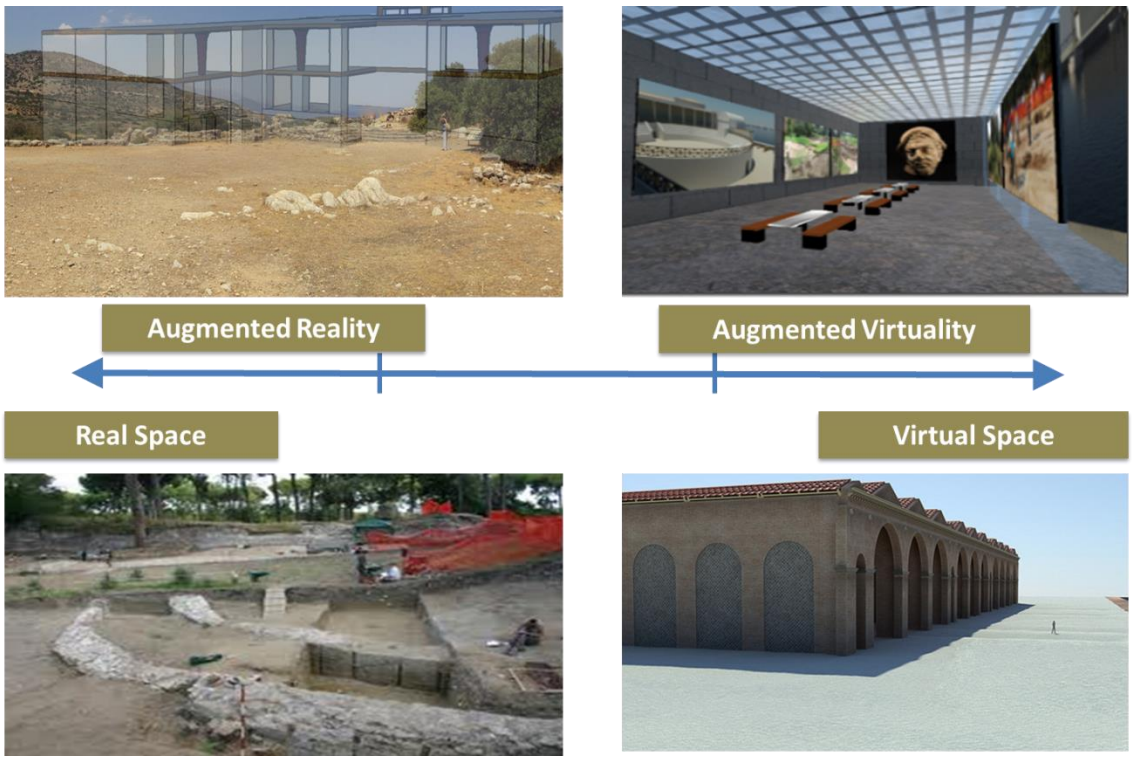


Figure 5.1 An image-based graph illustrating the Virtuality Continuum. On the *top left*: an augmented reality scene of the Palace at Gournia. On the *top right*: an augmented virtuality scene from the Portus Project, in Second Life. On the *bottom left*: an real scene from the Portus archaeological site. On the *bottom right*: a virtual reconstruction of the shipyard found in Portus.[26]

designer's intentions, be able to distinguish between such distinctive environments, as Milgram suggests.

However, he also admits that a distinction from a user's point of view is desirable; a user should be aware of the environment s/he operates in, and of what it is that s/he interacts with, be it the system itself or the real environment. A clear distinction between the two is critical from a designer's perspective too, in order to design accordingly the interactions taking place between the system, the user, the environment and the objects. The need of this distinction was also realised by Renevier and Nigay (2001), who explored the semantics of AR and AV while designing the MAGIC platform[27]. Acknowledging the difficulty of the research community to come to a consensus about the definition for AR, Renevier *et al*. (2005) define AR and AV as follows:

[26] Apart from the first scene that I have created, the other images are retrieved by the Portus Project, University of Southampton. Available from: http://www.portusproject.org/

[27] MAGIC stands for 'Mobile Augmented Group Interaction in Context'. The MAGIC platform refers to an AR mobile system that was designed using fieldwork archaeology as the application domain.

> Augmented Virtuality systems: Systems that make use of real objects to enhance the interaction between a user and a computer. Augmented Reality systems: Systems that enhance interaction between the user and her/his real environment by providing additional capabilities and/or information. (ibid, 311)

Kaj Grønback and Peter Krogh (2001) discuss Ezio Manzini's article 'The End of the Mechanical Age', which concludes that 'we are no longer confronted with a given taxonomy of materials and techniques, but with a continuum of possibilities'. Some prefer to use the terms 'pervasive' and 'ubiquitous' arguing that the 'notion of MR is an abstract idea of what information technologies' enhancement of physical objects does to our perception of reality' (Weiser 1993, cited in Papadimatos 2005, p. 10).

Manovich, realising the lack of terminology in describing the phenomenon of embedding digital information in built spaces, or retrieving location-based information through personal cell phones, introduced the term *augmented space* and its definition:

> …augmented space is the physical space overlaid with dynamically changing information. This information is likely to be in multimedia form and it is often localised for each user. (Manovich 2006, p. 220)

This term appears to be more appropriate than the term Augmented Reality when referring to the phenomenon of supplementing the physical built environment digitally, either by virtual dynamic reconstructions or by annotations. On the other hand, the term 'reality' is quite problematic, as it assumes there is an existing reality in the world 'in-itself independent of any subject inhabiting it' (Evans 1996, pp. 60, 215; Kirchhoff 2009). Furthermore, according to Lacan's views on the 'Reality Principle' (Lacan 1951, cited in Evans 1996, p. 164), even subjective reality cannot be reached since our perception of the world is overlaid with cultural constructs, which we subconsciously and falsely interpret as 'the reality'. However, it is admittedly a term hard to avoid at present. While it is suggested that as time goes by the term will become obsolete (Champion 2010, p. 159), certain scholars suggest terms such as 'aura' or 'aura recognition' (MacIntyre and Bolter 2004; Bolter *et al.* 2006; Shalom 2010) to describe how this novel paradigm affects our perception; adding perhaps to the terminological confusion rather than clarifying it.

A parenthesis on aura, reality and perception

What is particularly interesting however about the use of the term 'aura' is that it reopens the discussion about Benjamin's ambiguous exploration of the term - or to put it more accurately, his developing notion of aura in accordance to his evolving stance towards new

media (Hansen 2008, p. 338) - which has concerned numerous scholars for several decades. A brief discussion at this point is required in order to link the new cultural experiences created by MR technologies with certain facets of the notion of aura relevant to perception. Benjamin's stance on novel media of his time, such as photography and film, is observed in his attempts to frame their influences and the changes they introduced to the mechanisms of perceiving 'beyond the realm of art' (Benjamin 1968, p. 221). In this attempt he deploys the term 'aura', the meaning of which he moulds and extends beyond the common interpretation as an elusive substance which carries the condensed essence of the perceived object or individual (Hansen 2008, p. 340). Benjamin, in his most famous essay 'The Work of Art in the Age of Mechanical Reproduction', closely associates the notion of aura with tradition (in the making of art). He goes on to argue that the new reproduction techniques led to the loss of aura, the 'unique presence in time and space' (Benjamin 1968, p. 222) inscribed in cultural objects, and the authenticity of works of art (Malpas 2008). Much of the past debates on 'Benjamin's aura' were falsely concerned with the aesthetic colouring of the term, whereas Benjamin thought it important to point out that the decline of the aura will bring forth new modalities of perceiving (Hansen 2007, pp. 337-8). In envisaging the role of aura - even through its decline - as a perceptive mechanism of modernity, he uses an illustration from observing 'a mountain range on the horizon or a branch which casts its shadow over you' (Benjamin 1968, p. 222-3), where he defines aura (of natural objects) as the phenomenon of experiencing distance (Benjamin 1968, p. 222). A summative and clear phrasing of this notion of aura, as expressed by Benjamin himself in two different essays[28], has been put together by Hansen:

> Aura (is) understood as 'a strange weave of space and time: the unique appearance [apparition, semblance] of a distance, however near it may be' (or, 'however close the thing that calls it forth') (ibid 2008, p. 339)

Thus, the experienced distance - both spatial and temporal (Hansen 2008, p. 344; Malpas 2008, p. 22) - is the key precondition of an auratic perception, the synchronous obliteration of which, signifies a new modality for perception (Bolter *et al.* 2006). Weber even takes this reasoning a bit further when he argues that the decline of aura, whose constitutive elements are separation and distancing, is actually a prerequisite for perception (Weber 1996, p. 87). For instance, in the example of perceiving the mountain range one 'adjusts' the distance between the viewer's location and the mountain's, in order to sense or

[28] . The two essays of Benjamin that Hansen has used to configure the definition are:
The "Little History of Photography" (1931) and *The Arcades Project(* 1999).

'breathe' the aura of the mountain, and in doing this the viewer is in an interaction state with reality. In relation to the conditions of the new mode of perceiving, Benjamin observes that it is 'the desire of contemporary masses to bring things 'closer spatially and humanly', and the willingness of contemporary societies to accept reproductions as if they were real (1968, p. 223). Benjamin also, believed that media of mass reproduction impact the way we understand reality by stating that 'The adjustment of reality to the masses and of the masses to reality is a process of unlimited scope, as much for thinking as for perception' (1968, p. 223).

The above reasoning can be expanded by referring to the level of experienced reality, or the feeling of 'presence' *via* more contemporary media, such as virtual reality and three-dimensional films. Based on experiments, it has been noted that when the subjects experienced certain scenes of virtual reality, their physiological reactions corresponded to the equivalent real tasks in a real environment (Whitton 2003, cited in Bolter *et al.* 2006). Particularly in the case of telepresence, Bolter and his colleagues make an interesting observation:

> For Benjamin, aura is a sense of distance no matter how near, while telepresence is a sense of proximity no matter how far the subject really is from the physical location. (Bolter *et al*. 2006, p. 28).

As regards the more complex set of technological media, such as those creating 'augmented spaces', it could be argued that aura can return from oblivion as a perceptive mechanism and reappear in the perception of cultural objects, or places, which are constituted both by original and synthetic elements (i.e., computer generated representations) (Bolter *et. al* 2006). It could be argued that if a heritage site is engaging beforehand with its unique materiality, then embedding additional information or representations of historic events and aspects of every-day life that occurred in the past could achieve an auratic experience. Based on the discussion in Chapter 2 about interpretative heritage spaces, those kind of experiences would be situated, and thus, pertain to a certain physical place, while carrying the notion of temporal distance due to the interpretative contents about the past. While the above statement could be valid on the condition that the MR environment is adequately designed for an auratic experience (see Bolter *et al.* 2006), it could also be argued that the level and mode of engagement with the object of perception is equally dependant on the ability of individuals to sense this aura.

With the latter in mind, the discussion of the terms 'aura' and 'reality', was not conducted in order to favour one over the other, but rather to expose certain issues of perception in the

mediated and immediate understanding of culture. The boundaries between the perception of real and not-real have become blurred in ICT equipped societies, which have adapted to a trained and complex sensorium to perceive the 'real world' (Baudrillard 1995, p. 4). Thus, questions of subjectivity and reality in contemporary living can only be answered through the understanding of individuals' degree of engagement with technology (Dovey and Kennedy 2007). Perhaps mixed reality arrived at a stage when the 'augmented space' phenomenon has matured enough to be embraced as a seamlessly embedded element in the fabric of everyday life and the ultimate extension of human performance (Hale 2012). No matter how various disciplines define it, this new cultural and social experience was created as a result of today's societies' desire for perceiving more from the physical, externalising more from the internal and bringing in proximity and availability the distant and the intangible.

5.1.2 A brief background of the technologically enabled 'augmented space' paradigm

Georges Méliès, a French illusionist and filmmaker of the late 19th and early 20th century, is considered by some scholars as the patron of augmented reality. He was known for achieving many technical and narrative developments in the very early days of cinematography, which enabled him to create a new form in visual storytelling; enhanced reality in cinematography or the "the cinematic spectacle" (Wakeman 1987). As Papagiannis writes:

> Méliès imagined fantastical worlds in his films, where the marvellous reigned over the mundane, inanimate objects became animate and forms forever shifted, disappeared and reappeared—nothing was fixed or impossible. Through the medium of film, Méliès created enchanted realities (2011).

However, the father of AR is thought to be Ivan Sutherland, a pioneer in computer graphics. In the 1960s he developed the first AR interface by using a see-through Head Mounted Display (HMD) to present 3D graphics. It is worth noting that at this point, before the term was coined in, the phenomenon of combining the virtual with the real was referred to as 'hyper reality'. The use of half-silvered mirrors allowed the combination of computer generated images and real objects, and the head position sensors ensured the registration of the real environment and the virtual overlays (Sutherland 1968). In the following years research focused in interactive computing graphics, and by the early 1980s

the field of VR emerged, along with the belief that the creation of the ultimate simulation machine and was not far from realisation.

The term Augmented Reality was coined in 1990 by Thomas Caudell, a researcher at aircraft manufacturer Boeing. He applied the term to a head-mounted digital display that guided workers through assembling electrical wires in aircrafts. However, it was only in the late 1990's that AR was widely acknowledged as a research field, and several related conferences were held, including the 'International Workshop and Symposium on Augmented Reality, the International Symposium' on Mixed Reality, and the 'Designing Augmented Reality Environments workshop'. By the mid-1990s the development of computing and tracking devices became sufficient, and manageable in terms of size, to support registered computer-generated graphical overlays in a mobile setting. In the following years there was a substantial growth in the development of AR applications, which can be seen in the wide range of relevant literature and on-going projects.

Researchers realised early on the potential of combining real objects with virtual ones in 3D. The increasing interest in this research field lies in Augmented Reality's core element; the enhancement of the user's perception of the real environment a fact which increases interaction and performance in real world tasks (Azuma 1997). Therefore, instead of seeking ways to immerse the user in certain predefined environments, many saw the potential of AR systems as they function in the most immersive one; the real world. Conceptually, the level of interaction with a world that reveals more than it is possible to perceive with the human senses is theoretically limitless. Interactivity in tasks performed in a real environment provided both researchers and industries with a strong motivation for further AR deployments in a variety of applications. Azuma (1997) mentions six classes of AR applications that were initially explored: medical visualisation, maintenance and repair, annotation, robot path planning, entertainment, and military aircraft navigation and targeting.

At the beginning of the new millennium the initial enthusiasm for AR applications seems to significantly decline. This is closely related to the inability of existing AR systems to produce convincing end products, so that the research communities focused on the development of enabling technologies, the basic technologies required for building compelling AR environments (Azuma *et. al* 2001). Such technologies are tracking and registration, displays, real-time rendering and for mobile users AR wireless networking and interaction design technologies. At this point such AR systems are mainly found in academic and industrial research laboratories, with the exception of a few monitor-based

‘virtual set’ systems which are available from commercial vendors. Azuma also foresaw that new accomplishments in tracking outdoor HMDs will launch many interesting applications, which are emerging at the moment, such as navigation maps and visualisation of past and future environments. Nevertheless, the paradigm shifted towards various forms of enabling technologies as it will be presented in the following sections.

5.1.3 The fourth Machine Age in Cultural Heritage

It is assumed that we currently live in the fourth machine age (Grønback and Krogh 2001). The first was characterised by advances in motors, aviation and industry engineering, the second by the small machines entering every household and the third by the emergence of computers. Today, computers have exited the static desktop format and are utilised in our everyday tasks, providing us with information ‘on the fly’ while we interact with the physical world. Drawing on a somehow unequal, but nevertheless didactic comparison, these distinctive ‘ages’ are witnessed - with the expected delay and with the exception of the first age - in archaeology and cultural heritage. They are seen in the first machines utilised for a variety of material analysis in the labs and survey techniques in the field, the ever-expanding use of computer applications from the desktop environment to mobile and wearable devices, and more recently in the new prospects of mixed reality applications in Cultural Heritage.

In the Cultural Heritage (CH) sector, the stakeholders have shown a keen interest in the use of advanced Information and Communication Technologies to provide audiences and visitors with a more innovative and engaging interpretation of culturally significant sites or artefact collections in museums and exhibitions. However, *prior* to the advent of ICT in cultural heritage, and since the establishment of archaeology as a discipline, those in pursuit of the past were always trying to find ways to reconstitute and consequently augment the archaeological remains. An illustrative example is Arthur’s Evans reconstruction of Knossos in the 1900s. His extensive reconstructions at the actual archaeological remains ignited an increasing public interest for the Minoan civilization.

Despite his misleading reconstructions, and although these kind of severe interventions are illegitimate today, the didactic results are widely appreciated and protected (Solomon 2007). Another mode which has been used to augment the interpretation of monuments is the physical reconstructions built in proximity to archaeological remains. A characteristic

example is presented in the reconstructed prehistoric building at Çatalhöyük in Turkey (Figs. 5.1-5.2). Apart from fulfilling their experimental purposes in exploring prehistoric building techniques, they have been considered as valuable interpretative structures offering tangible and augmented experiences to visitors as alternative presentations of fragmentary Neolithic remains (Doughty and Orbasli 2007); albeit receiving much criticism on the fixed and falsified nature of interpretation they offer (Schmidt 1999, cited in Doughty and Orbasli 2007, p. 51).

Figure 5.2- 5.3 Experimental reconstructed house at Çatalhöyük.

A series of experimental and commercial ICT applications have flourished in the cultural heritage domain, a fact which is acknowledged by the ICOMOS Charters of Ename and London (Beacham *et al*. 2009; ICOMOS 2007) and illustrated by the European Commission reports (EC 2002). In the past decade, applications of MR in this field were considered as the most promising technology for reviving aspects of the past into our everyday lives. Cultural Heritage constitutes an attractive area – as potentially both inspiring and profitable - for the computing and mobile-phone industries to apply new technological advances.

A significant number of collaborative projects started to exploit the potential of augmented reality for developing new methodologies to assist research in interpretative archaeology and information dissemination in cultural heritage sites and museums (Champion 2011; Noh *et al*. 2009; Kenderdine 2010). Among these, some stress the importance of exploring

the visitor-heritage site interaction through standard ethnomethodological practises for informing the design of mixed reality applications (Ciolfi and McLoughlin 2011), while a few have undertaken user evaluations for assessing the interpretative value and the technological development of applications, particularly in museum contexts (Chrysanthi *et al.* 2013; Economou and Pujol-Tost 2007; Kenderdine 2010).

Whether this novel technology is used as an interpretative or as an information dissemination tool, the main idea is to enhance the user's perception of the physical environment with additional cultural heritage content in a meaningful way. Usually, such information involves the visualisation of past anthropogenic environments, buildings and artefacts, as well as textual and other media annotations. Sonification and haptic approaches have been less explored (Petridis 2006). In terms of enhancing the interpretation of a site, if a place is emotionally engaging to begin with, *in situ* augmented experiences certainly provide more stimuli for engagement and interaction. The following section serves as background of the available and evolving technologies enabling MR, illustrated by examples that were prototyped and tested in the CH domain.

5.2 An overview of technological components enabling Mixed Reality: examples from the Cultural Heritage domain

Today, the research fields concerned with augmented and mixed reality present a remarkable variety. Among the more significant for enabling MR is tracking related research, which represents the majority of cited papers in the field, interaction techniques, mobile and multimodal MR that are becoming more popular, display and real-time rendering (Zhou *et al*. 2008). As for the sectors where MR is applied, apart from the traditional fields mentioned previously, correspondent technologies are rapidly developing in two areas: advertisement/marketing and the industry sector. A substantial increase of MR applications in these fields has been created by an exponential growth of the smartphone market as well as the mobile internet computing. Mixed reality is more useful as a mobile asset, a fact which aligns with the requirements of the contemporary way of living. An attempt to summarise the current state and challenges of MR structure follows, organised around its basic components.

Tracking and registration

The consistent registration of the synthetic elements to the real environment, while the user is in motion, still remains one of the crucial challenges in the MR research field. Therefore, tracking and registration issues are essential for convincing MR applications. In terms of sensor-based tracking, today a great deal of attention has been given to optical tracking in comparison to mechanical, electromagnetic and acoustic. The combination of multiple sensors to provide robust or even ubiquitous tracking and dynamic data fusion has also been tested. Computer vision-based techniques initialised from exploring marker-based tracking, and progressed into feature and model-based techniques, providing improved robustness and performance. While marker-based tracking using conventional cameras is a low-cost alternative (Costanza *et al.* 2009), and offers new interface opportunities (Billinghurst *et al*. 2001), they are not suitable for large scale navigation which is usually required for outdoor applications (Zhou *et al*. 2008), such as in cultural heritage sites. For the latter purpose the preference is for the markerless tracking solutions. Despite the new potential that new technologies have brought in the field, such as the Global Positioning System (GPS), high quality tracking in large outdoors environments is still difficult to achieve and much of the research is invested in improving precision, performance, affordability and robustness of tracking systems. The new satellite navigation system of Europe, Galileo, now fully functional, was expected to improve the accuracy of satellite tracking within the range of 1m (Amos 2010).

Hybrid tracking systems, as described in Costanza *et al*. (2009), leverage the advantages of different tracking systems. The Hybrid Positioning System (XPS) introduced by Skyhook Company is a positioning engine that integrates a Wi-Fi Positioning System (WPS) with other complementary location systems in order to increase location tracking precision. The advantages of hybrid tracking systems for outdoor MR, combining GPS, inertial and computer vision sensing were acknowledged early on (Azuma *et al*. 1998, cited in Zhou *et al*. 2008). Overall, the recent advancements in the computer vision sector seem to have made a great contribution in tracking, with 'Object Recognition' techniques so far leading the way in 3D tracking (Lepetit 2008). Towards this direction, Metaio, one of the leading Augmented Reality software providing companies, recently announced the developing platform 'augmented city', which incorporates 3D object tracking and visual search in its free mobile development kit (Metaio 2012). Augmented city is also, Metaio's vision of providing, in a seamless way, all important information required by a resident or a visitor in order to experience a city. Finally, the sensor fusion approach is also reported to provide

accurate registration for outdoors mobile mixed reality applications (see Hol *et al.* 2006, cited in Liestøl *et al.* 2014).

Interaction

Another basic AR component is the interaction techniques employed, through which the end users interact with the virtual content in a meaningful and intuitive way. Tangible User Interfaces (TUI) appropriate physical objects to manipulate the digital information. The Kromstaff Replica of an 11th century carved ivory top of an abbot's crook, currently on display in the Museum of ENAME, is a characteristic example from the Cultural Heritage domain. The replica serves as a physical interface between the object and a virtual model implemented in Virtual Reality Modeling Language (VRML) as part of a Web3D based presentation of the object (White *et al.* 2007).

Gesture and audio interaction form multimodal interfaces, which are optimally modulated to custom gestural patterns of the user. In the case of multiple users collaborative interaction techniques are required. Despite the interesting implementations of collaborative AR in interactive gaming (Henrysson *et al*. 2005) and conferencing (Kato and Billinghurst 1999) few of them have been evaluated in user studies so far (Zhou *et al*. 2008). Game-based techniques in MR have made their appearance in heritage sites using HMD or cellular (Ardito *et al*. 2007; Ardito *et al*. 2009) output devices, as well as the appropriation of game engine software in MR heritage applications (see Champion 2011). However, relevant surveys have shown that locative game-based approaches have not been very popular amongst gaming communities (Tyler-Jones 2015).

Display technologies are another fundamental component in MR structure. There are three main display technologies: see-through Head Mounted Displays (HMD), projection based and handheld displays, and two distinctive fields that emerged from the various MR implementations: Spatial Augmented Reality and Mobile Augmented Reality.

Projection and stationary technologies

Today, the available spatial display technologies employed for AR applications are defined as Spatial Augmented Reality (SAR) (Bimber and Raskar, 2005). Spatial Augmented Reality is a research field, which brings spatial display technologies into the AR sector.

Spatial display technologies are the technologies used for integrating the displays into the users' environment. Such display technologies are mirror beam combiners[29], transparent screens, or holograms, as well as projectors. In comparison to head- or body attached displays, spatial displays offer many advantages, such as visible augmentations to more than one user. In projection based SAR, multiple head-tracked observers can be supported by a system that generates multiple arbitrary views. SAR displays also solve several problems that are related to visual quality (e.g., resolution, field-of-view, focus, etc.), technical issues (e.g., tracking, lighting, etc.), and human factors (e.g., cumbersomeness, etc.), but they are limited to non-mobile applications. For non-mobile AR applications, spatial display configurations could be equally beneficial, as they have been for VR.

An early example of projection technology in CH innovated by providing a solution on presenting multiple interpretations *in situ*. In 1997, the Time Frame kiosk prototype was conceived by John Sunderland, André De Clercq and Daniel Pletinckx, and technically implemented by IBM at the Ename Visitor Center in Belgium (Callebaut 2002). The system mainly consisted of a video camera, a computer system, two monitors and a touch screen, which enabled visitors to control a virtual model of Saint Salvator church superimposed over a live video feed of the archaeological site. The successive virtual reconstructions helped the visitors imagine the history of the site and the successive changes and alterations that took place. The virtual model adopted flexible visualisation techniques. For instance, the version that used semi-transparent attributes for the building's facades and a variation in thickness of the structural lines, indicating the degree of certainty for each part of the reconstruction, succeeded in delivering the cultural message of the site in a transparent and non-misleading way. Other versions of the model, using realistic visualisation techniques and providing access to objects and interior parts of the monuments, complemented the visiting experience. It is worth mentioning (although it is not an MR example) an equivalent system, called Time Scope3, which was also implemented at the Ename Center to provide virtual access via a flexible story-telling technique to the monument (Pletinckx *et al*. 2003). The system was based on information retrieved by the site's database which were broken down to 114 'nuggets'. The latter refer to linked autonomous information units from which the interactive stories are built

[29] Mirror beam combiners have been commonly used in spatial optical see-through displays as optical combiners of the reflected rendered graphics (which are projected on a plane) and the transmitted real environment. For more details on the function, configuration and variation of beam combiners see Bimber and Raskar, 2005, pp. 152-206.

according to the user's actions and interactions with the system. The output of the system was a big plasma touch screen and individual audio guides.

The combination of the commonly known concept of the tourist binoculars with augmented reality is first seen with the implementation of AR-Telescope at Sagalassos (Lutz and Schiendler 2004) and by the PRISMA project (Fritz *et al*. 2005). At Sagalassos, the 3DMURALE database project is one of the most effective attempts to organise visualisation data. The project developed a photogrammetric reconstruction method by calibrated cameras capturing and delivering high accuracy 3D data. The collected data are then processed in STRAT, a stratigraphic visualisation tool that enables multi-layered reconstructions based on the initial captured data of existing architecture and landscapes. The on-site interpretation is provided at certain stationary AR viewpoints using sensor-based tracked binoculars as the display interface. The fixed position of the telescope and the sensor based tracking system in combination with the familiarity of visitors with coin-telescope devices made AR telescopes a viable solution for outdoor CH applications (Stricker *et al.* 2006). The quality of the pre-rendered virtual models compensate for the loss of mobility.

In the Projects PLACE-Hampi and Hampi-Live, interaction and embodied cognition in virtual and mixed reality environments is the central drive. In PLACE-Hampi an interactive storytelling about the site, using events from Hindu mythology, is realised through several stereoscopic 3D panoramas of the site, with the embedded virtual elements projected on a purpose built installation enclosure. The storytelling is controlled by the user, who controls their virtual exploration around the site. Hampi-LIVE is implemented in mixed reality by making use of iCinema Centre's Advanced Visualisation and Interaction Environment (AVIE), offering advanced tracking and projection techniques as well as location-based sound (see Kenderdine 2010 for the configuration and detailed description of AVIE). As the visitor walks around AVIE s/he interacts in real time with animated monkeys (virtual agents), who seamlessly move around the landscape and historic features of a three-dimensional panoramic scene from Hampi, and whose movement and behaviour are generated by the visitor *via* advanced tracking and algorithmic computations. In the second scenario users interact with a virtual visitor to navigate around the scene, while their experience in the virtual scene are filmed as if they have been part of that virtual scene. In the end the visitor is shown the film where s/he just co-participated in a virtual scene; enhancing the feeling of 'presence' in the virtual scene. Kenderdine (2010, pp. 47-48) states that the project was influenced by the post-processual streams of Interpretative

and Symmetrical Archaeology to envisage and experiment on new modalities of engaging the public. The case of this project manifests the true potential and benefits of SAR in providing novel and effective modes of cultural heritage interpretation to the public via interaction in indoor environments; however, it also demonstrates the excessive efforts for bringing the 'real site' in proximity, availability and accessibility by virtualising the visitors themselves.

Mobile Mixed Reality

In terms of Mobile displays, Head Mounted/Worn Displays prevailed in the majority of convincing applications. The existing problems in this area involve optical, technical and human-factor limitations. As Azuma (Azuma 1997) had foreseen, new accomplishments in outdoor tracking launched applications such as navigation and visualisation of past environments and buildings. The Archeoguide, an Augmented Reality-Based Cultural Heritage On-Site Guide, was the first significant attempt to solve a series of interlinked technical issues. These include the interactive visualization issue, and the integration of many features users might expect such as guidance and navigation information, information personalization, access to objects stored at remote locations, life animation within an AR system (Stricker 2001; Stricker *et al*. 2009; Vlahakis *et al*. 2001). The wearable mobile units retrieved information from the site's server through a wireless network, and the site was equipped with a location tracking system which determines the position of the user's wearable unit. The reconstructions were based on VRML and displayed on a HMD. Both the Archeoguide and the 3DMURALE projects, tested in ancient Olympia in Greece and Sagalassos in Turkey respectively, formed one of EPOCH's showcases (Niccolucci 2005).

A promising prospective in mobile AR applications as mentioned previously offered the rapid developments in cell phone and Personal Digital Assistants (PDAs), which bring AR to a broader audience. Manovich (2006) used the term 'cellspace', a term coined in 1998 by David S. Bennahum, when referring to the ability of the user to access internet wirelessly, to describe the augmentation of physical spaces with data retrieved by a user using a personal communication device. Smartphones and PDAs, which are equipped with GPS hardware and cameras, and are available to both users and developers, are considered to drive the evolution of augmented reality. Tablet PCs were used in the development of the relatively early wearable prototypes (see Feiner *et al*. 1997; Höllerer *et al*. 1999).

Although such handheld displays provided more computational power and input options than phones and PDAs, they didn't have a commercial prospect, as they required heavy backpacks and consisted of expensive equipment. On the other hand, concerning today's affordable phones and tablets, there had been a debate, fired up by the traditional AR community, as to whether such implementations can be considered as true AR since such devices can't actually perform optical tracking (Jeon 2010), and viewing through the monitor was not subtle enough for convincing implementations. The recent advancements in computer vision, ambient intelligence and mobile internet have already attempted to end this debate, a vision expressed by on-going projects such as the Google Glass Project.

There is already a significant number of mobile augmented reality platforms and browsers (e.g. Layar, Junaio, Qualcomm, Android ARToolkit) and standalone applications (e.g. MixAR, Mixare, Junaio Glue, BuildAR) some of which have appropriated computer vision based AR techniques. The main problem currently identified by companies who have provided location based tracking solutions (GPS, digital compass, accelerometers) is the registration problem. As is noted above, from a user's perspective the virtual elements are not accurately registered in the physical world, but rather demonstrate the 'swim' effect. In other words they appear to be floating in space. However, markerless or optical tracking smartphone AR presents better potential of linking the virtual and the physical in a seamless way. They also, move away from solutions that require loosely connected to the world media - such as GPS and marker based tracking- in order to perform augmentations.

A recent example in CH, illustrating the new possibilities for creating MR applications, is offered by mobile developing platforms is the Berlin Wall application. The application was implemented by the developers of Hoppala and Superimposed using Layar's developing mobile platform. The concrete barrier built in Berlin by the German Democratic Republic, separating West Berlin from East Germany, and demolished in 1989, is viewed *in situ* once again through this application. The historic value of this urban area is enhanced by this augmentation. However, from a user's point of view, apart from common tourists, it would be interesting to ascertain the different emotional responses to this application from the residents of Berlin, some of which still have recent disturbing memories of Germany's division, and from visitors to the city.

Another well-known example is the London StreetMuseum i-phone app. The Museum of London developed an augmented reality smartphone application to disseminate its rich art and photographic archives.

Figure 5.4 A historic image of the early 19th century Georgian sugar warehouse which now houses the Museum of London Docklands, is embedded in real time view. Source: Museum of London.

The application utilises Google Maps and geo tagging to overlay POIs. The term POI here, describes data items linked to a geographic location or a visual pattern, and contains the type of content to be rendered by the MR application. The terms Layer and/or Channel refer to published groupings of related POI and virtual objects (Butchart 2011). In this case, the POIs are tags assigned to a geographic location, and visualised as digital pins embedded on the map and linked to the available content, mainly consisting of information and archive images of historic London. On activation, the application retrieves the user's location and provides an interactive map from the available POIs in a particular location. The first interaction option is to click on one of the POIs, an action that pops up a small window with the related image information such as location, author and date. By tapping on this window the actual image pops up, while with a second tap on the image, textual information appear embedded on the image. Another modality offered by the application is the 3D viewer, which enables the viewer to watch a live feed of the real environment with the linked image embedded.

As far as archaeological sites and movement are concerned, Sitsim, a research project led by Gunnar Liestøl, has been exploring situated simulations by using virtual environments which adapt to visitor movement. The SitSim platform is using the sensor fusion approach to register the virtual environment to the user's perspective with very satisfying results (see Liestøl 2012, 2014). The project has already investigated different objectives which vary from educational purposes to establishing augmented spatial narratives. More recent work

by this project in the *Via Appia Antica* in Rome, features an interesting interplay between time and spatial movement. In this, the user's physical movement along the Apian Way triggers the visualisation of several historical scenes from the history of ancient Rome (Liestøl 2014). Also, the interface allows general functions like snapshots of the real and virtual viewed environment.

Overall, such applications have successfully appropriated the capabilities of smartphone devices and location aware technologies – to the best of their ability – to disseminate virtual environments and textual information about historic and archaeological places, unknown to broader audiences. Additionally, such applications satisfy the notion of sustainability referred to in several digital heritage frameworks and charters, with regards to the need of viable solutions to heritage interpretation, particularly in the current economic climate. Nevertheless, while visitor movement and visual content interaction has been addressed, there are not many insights about how visitor movement is dealt with in such hybrid and mediated spaces. Also, although mobile screen resolution and graphics are improving in each smartphone and tablet generation, they still present serious limitations for outdoor daylight applications. Those refer mainly to screen reflections (Liestøl and Rasmussen 2010) and the small screens used as the viewing interface interrupting the overall experience and the assumed felt presence in the historic environment (Eve 2012). Certainly, such attempts are unrealistic in sunlit archaeological sites of the Mediterranean. The same issue was encountered also in my personal experience with the use of tablet screens at Gournia (during a small scale study that will be further discussed in the following part of this chapter) as well as during the tests of an early digital storytelling prototype at Çatalhöyük, even though the study took place under a sheltered area (for the early prototype phase of the application see Perry *et al.* 2014). Indeed, those known issues in the research communities are intentionally ignored in the belief that mobile display technologies will eventually improve. Other issues such as distraction from real life events and thus, safety issues also remain unresolved in current mobile displays.

Certain systems using projection displays *via* portable pico projectors (Wilson *et al*. 2010), such as the method demonstrated by the Sixth Sense Project (Mistry and Maes 2009), have shown interesting results for indoors implementations. Current pico projector market strategies are oriented towards integrating this technology with smartphones, and the first prototype of Microvision's ShowWX projector has already been integrated in iPhones and iPads. Future work might spur projection techniques for exploring full capabilities of this technology (Perritaz *et al*. 2009), thus, making possible the vision expressed by Manovich

(2006) that ‘in the longer term every object may become a screen connected to the Net, with the whole of built space becoming a set of display surfaces’. However, similarly to mobile phone displays, it is very difficult to imagine that projection technology might soon be suitable for convincing outdoor and daylight applications.

Additionally, real-time rendering is another basic element in building MR. In an ideal MR display, the user will not be able to distinguish the virtual elements from the real ones, and this requires fast, realistic rendering methods and consistency of virtual objects with the real environment. Some parameters of consistency would be occlusion, shadow casting and inter-reflection behaviour. A successful example of dealing with occlusion is illustrated in the virtual Pompeii project, where the user can see only the virtual character’s parts that are not obscured by physical objects standing between them and the user (Papagiannakis *et al.* 2005). The project LIFEPLUS explored the potential of MR in providing a high degree of realistic interactive immersion. This is based on 3D reconstructions of the ancient frescoes, where the visitors could see the animated characters acting a storytelling drama on the site of ancient Pompeii using mobile i-glasses.

A more recently explored direction of MR in cultural heritage is pointing towards adaptive instead of interactive systems. This approach aims to deliver more personalised mixed reality experiences to visitors by adapting the interpretative content of a heritage space to their physiological state, movement behaviour and engagement with the surrounding space or a specific artwork (Damala *et al.* 2012). Technologically, this direction is experimenting with a variety of sensors such as visual, acoustic and biosensors and the envisaged scenario is to assess visitor behaviour in order to suggest accordingly the desired interpretative content. Certainly, such approaches are still in a prototype phase but already a range of commercial wearables-recommenders based on biofeedback technologies are available on the market.

5.3 Augmenting archaeological walks: some theoretical and practical considerations

Despite the rapid technological developments, mixed reality applications have not been implemented in a sustainable and convincing way in cultural heritage sites. The improvements of enabling technologies have been rapid since this research initiated but the expectations and applications in cultural heritage of this paradigm have been decreasing

and it is estimated that the wider adoption of this technology will be delayed for about five to ten years (Gartner 2014). It could be expected that in the CH domain the delay until adoption will be more marked, since apart from guidelines, approval procedures and logistics incumbent upon contemporary cultural heritage management, many such projects have never exited the lab environment (Forte *et.al* 2006, Kenderdine 2010). In addition to this, a series of frameworks, architectures and scenarios generated for the application of mixed reality in cultural heritage sites are very generic or deterministically oriented to solve technical aspects of this paradigm (see for instance relevant publications in Ioannides *et al.* 2012), while ignoring certain fundamental research developments in the cultural heritage sector.

However innovative and promising these applications are, there is an increasing concern raised by researchers of ICTs in interpretative planning with regards to the anachronistic approaches employed to inform interpretation (Flynn 2008; Monod and Klein 2005). Essentially, the progress on a conceptual, methodological and practical level made so far in the field of interpretation in CH is disregarded by researchers who come to the field with technological innovation in mind, but apply outdated methods and ideas with regard to the discipline. Monod and Klein note that the mechanistic approaches underlying the European Commission reports bear critical issues for a beneficial integration of novel technologies in interpretative planning:

> …technological determinism, the lack of interpretative Archaeology research, and the lack of recognizing the implications past implementation of failures and interpretative information systems research. (Monod and Klein 2005, p. 1045)

Particularly, the 'dry' visual reconstructions of buildings and objects of the past for augmenting cultural heritage places have received some criticisms. The latter refer to an identified lack of exploring the performative and interactive potential of current mixed reality systems and visual outputs according to the post-modern directions of interpretative Archaeology scholarship (Flynn 2008; Kenderdine 2010).

On the other hand, the fragmentation of the discipline (i.e., academics, museum and heritage site administrators) itself and particularly the administrative role prevailing in heritage site services (i.e., conservation and protection of monuments and sites) do not have a joined approach in claiming a more strategic role in the digital developments (Silberman 2007b). In this frame, the scholarship has not yet provided any important theoretical or practically informed directions on how visitor movement can be dealt with in this relatively new paradigm of 'augmented heritage spaces'. As always, there is an

underlying jeopardy in the current situation; that technologies will be designed once again in the discourse's absence (Chrysanthi *et al.* 2012). While it falls out of the scopes of this research to provide insights about the role of 'augmented space' in enhancing the interpretation of heritage sites, I will attempt to discuss how this new paradigm can be considered in relation to visitor movement.

As it was demonstrated in Chapters 2 and 4, the engagement with and interpretation of heritage spaces are inherently spatial phenomena and tied to the affordances of spaces enabling movement and interaction. In the following part of this chapter, I will focus the discussion on notions pertinent to the interplay between visitor movement and the 'augmented space' that could offer some valuable insights on the topic. More specifically, I will discuss a small prototyping experiment to test visitor responses to visual stimuli in relation to their choices of movement. Further to this, I discuss the notion of non-guided pervasive experiences in relation to dynamic and adaptive ways of regulating visitor movement drawing from the discussions of the previous chapters and relevant work existing in the field of Human Computer Interaction.

5.3.1 Visitor response to MR visual stimuli in relation to movement: small scale prototyping

During the fieldwork season of 2012, alongside the visitor survey, I prepared a simple prototype of a mixed reality visualisation in order to conduct a small study on-site with real visitors. The aim of this study was to determine if and how, mixed reality visual outputs alone might influence visitor movement decisions. The visual approach was chosen to address critically the ascertained ocularcentric stance existing in the field of mixed-reality applications for heritage sites. Questions of why, as disciplines of a western culture, we insist on visual-based approaches for making knowledge about the past have been addressed elsewhere (Moser 2012; Thomas 2008). But questions of 'how different visual cues in archaeological sites (e.g. interpretative and directional panels, building reconstructions, recommendation symbols) influence visitor movement', have not been given much attention; especially, considering the amount of investment and efforts towards this direction.

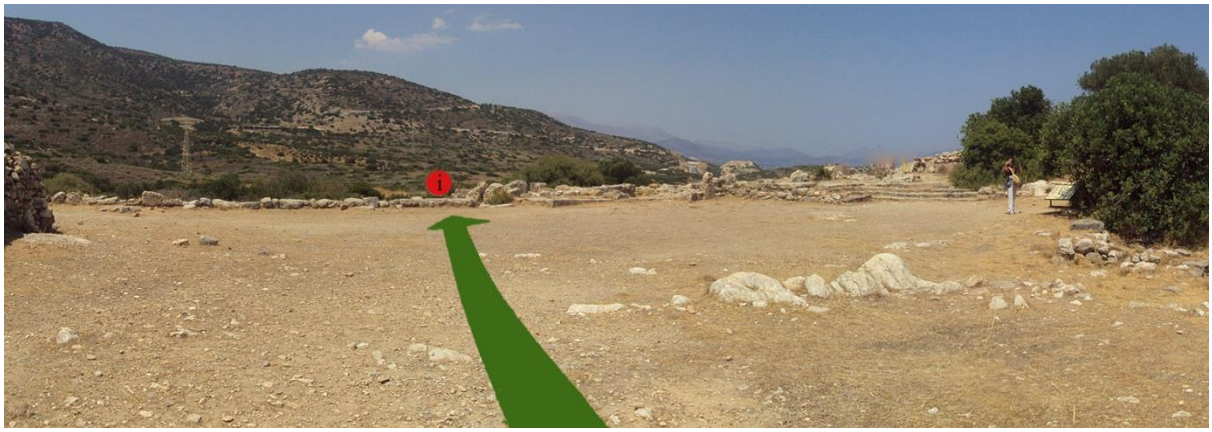
So far, this research has demonstrated that there is a strong relationship between the existing properties of physical spaces and interpretative media with visitor movement. For

this purpose, I chose to conduct the study in the court open-plan area, where the visitor movement analysis of the first collected data had indicated a large density and diversity of movement. While the data suggested that most visitors chose to explore the palace area, I wished to explore whether this behaviour could be influenced by a visual prototype that offered interpretation about the *Palace* and then suggested an alternative route. Influencing in a subtle manner the visitor behaviour, is a legitimate and desirable objective in the fields of heritage management and museum studies, and the reasons range from protecting sensitive areas of a heritage place to enhancing the visitor experience. The prototype consisted of four consecutive digital images. The first image was a view of a transparent 3D non-photorealistic reconstruction of the *Palace* which was embedded in an image of the current view of the *Palace* from the southeast corner of the court (Fig. 5.4). The second image was a repetition of the same scene with the addition of annotation signifying available information (Fig. 5.5) and the third depicted the existing information panel for the *Palace*. The last image was a simple view of the site annotated with a directional arrow towards the path leading to the *Sacred Stone* POI, and the respective information symbol (Fig. 5.6).

It is worth noting that the 3D model of the *Palace* was based on Jeffrey Soles architectural study (1991) concerning the archaeological evidence and arguments for the character of this central building at Gournia. In this, apart from the layout and the possible functions of the building's spaces, he also presents a perspective reconstruction from the southeast (ibid, p. 20). The 3D digital model was produced in Google SketchUp, on account of an experimental desktop-based augmented reality application concerning the presentation of Minoan sites and artefacts (see Chrysanthi *et al.* 2013). The production of the model accepted Soles' layout plan and reconstructed features of the southeast facades of the Palace without following an interpretative process in dealing with possible uncertainties as this would fall out of the scopes of the study (for the interpretative process and computer applications in archaeology see Chrysanthi *et al.* 2012). Google SketchUp provided the environment of a rapid process in creating a lightweight (also low-fidelity) 3D model of the structure. This approach was necessary in order to implement the scenes in the augmented reality development platform which could not afford a photorealist approach (see Chrysanthi *et al.* 2013).

Additionally, the model was embedded as a new layer object and was aligned with the viewpoint of an image taken from the southeast corner of the court. The inserted object was made transparent mainly for increasing the effect of the mixed reality prototype and

not for exposing the uncertainty of this reconstruction. In terms of the latter, it has been argued that the public generally prefer photorealism in representations of the past and do not share the discipline's concerns of uncertainty. Such issues have been extensively discussed elsewhere (see Callebaut 2002; Frankland 2012; Roussou and Drettakis 2003). The images were available in two mobile PDAs (i.e., two tablets running on Android and iOS respectively) of the latest technology at the time.



Figures 5.5- 5.7 The scenes used for the mixed reality prototype tests at Gournia.

Description and results of the study

For this particular study visitors were engaged at the southeast side of the court. Those who agreed to participate were given one of the mobile devices with the first scene and they were instructed to react to the scenes as they would have done with a functional application. They were also instructed to move to the next scene after their first reaction and continue in this manner until the scenes are finished. In the first scene they were informed that what they saw in front of them was the palatial and administrative building of the Minoan town. Essentially, visitors were given the opportunity to read the information concerning the *Palace* from the tablet and then they were recommended to follow the path leading to the *Sacred Stone* POI. Each time a visitor finished flicking through the images, s/he was prompted to continue their tour as s/he wished. I kept notes on the direction each visitor chose to move and waited at the entrance of the archaeological site for a quick debrief. During the latter each visitor was mainly asked about the next POI they visited after the study and why. From then onwards, a brief open-ended discussion was encouraged. In total, thirteen visitors were engaged in this study. As it was mentioned previously, the direct sun light made it very difficult for visitors to view the scenes due to the glare effect on the screens. The option to conduct the study a few meters away from the angle that the MR scenes were configured, under the shadow of a nearby tree was attempted twice with worse results. More specifically, the visitor was focused solely on the screen of the tablet without paying attention to the palace area ahead. The decreased perspective match of the scene made the visitors uninterested in attempting to match the scene with the real world view. It should also be mentioned that participants of this study were not engaged in the visitor tracking study.

Out of the thirteen participants, only three followed the suggested itinerary, one chose to move towards the south part of the archaeological site, while the remaining majority chose to explore further the palace remains. Concerning the reasons of their movement decisions, from those followed the suggested route, one reported that the suggested route just coincided with his chosen movement and the rest thought it would be good to follow a recommended itinerary. The most popular responses amongst those who followed the palace itinerary were pertinent to the area's easy access and their wish to explore further what they had just seen and read about. With regards to the latter, a visitor commented that the transparency of the structure felt like 'an intriguing ghost' calling her for exploration. In fact, quite a few visitors, while holding and adjusting the display to contemplate about the visualised structure in the first scene, they made – perhaps, unintentionally – small

bodily movements forward. It could be argued then that viewing embedded elements in real world scenes creates a kind of 'auratic' experience, such as defined by Bolter *et al.* (2006, p. 28). The subject can visually experience an added 'presence' in proximity to its real environment. The question remains, is this felt proximity causing or defining visitor exploratory movement and how?

During the study, two visitors asked if they could borrow the device to explore the *Palace.* As they explained, the map which was included in one of the scenes contained useful annotations for guiding and informing them about the remains. Another visitor, who also decided to explore the *Palace*, reported that the visualisation reminded him of Bauhaus architecture. This response brings in mind the notion about how reconstructions of the past are inevitably influenced by our contemporary way of thinking about social structures and aesthetics among other things (Lowenthal 1985; Silberman 2005). Finally, the majority of those participants reported that they visited the *Sacred Stone* POI afterwards.

Certainly, this study was too limited both in scope and the sample size to offer any significant results. Although, it suggests that the visualisation of the building in the scene overrides the other visual cues (i.e., information symbol and directional arrow), further investigation would be required in order to ascertain it. For instance, placing house structures in area E (west to the palatial remains) instead of the *Palace* in the mixed reality scene would have provided more comparative insights about whether movement decisions are influenced or not. Nevertheless, the study indicated that the use of visual incentives alone may or may not influence subjects towards a desired outcome. Which brings us back to the point that experiencing (a technologically enabled) reality depends on the degree that individuals are willing to interact with any given reality (see p.130). Further research on whether the level of fidelity in augmentations of past buildings (transparent or photorealistic) influence at all movement behaviour should also be considered. A type of information awareness was certainly achieved since the majority of participants visited the *Sacred Stone* POI in the end.

5.3.2 Background on pervasive non-guided experiences in Cultural Heritage

As it is demonstrated in section 5.2 of this chapter, there have been numerous projects developing digital guides at heritage sites, whether for enhancing visitor engagements with places or for navigation purposes. However, particularly the role of personalised and

pervasive digital storytelling was developed in the museum setting since the latter assumed a central role in heritage interpretation as a space created for this exact purpose (Bedford 2001; Johnsson 2006), as opposed to heritage sites. Current directions in museum studies also show that stories rather than exhibits are becoming central to the visitor experience and that pervasive and adaptive storytelling prevails (see Pujol *et al.* 2013). However, it would be wrong to assume that the same adaptability and interaction conceptual frameworks can effectively work in both the museum and the heritage site. Similarly, the interaction design should be configured according to the type of heritage site, its interpretative and conservation scheme. According to Ardissono *et al.* (2012), adaptation is an important component of personalised experiences in cultural heritage and refers to the different features taken into account during the visitor-heritage content and space interaction. Adaptation types which are important in the context of heritage sites are distinguished in: location-aware, which take into account the proximity to POIs of the site, and visitor-aware, which take into account individual or group modes and preferences for heritage interpretation.

From the first interactive context aware mobile guides (Cheverst *et al*. 2000) up to today's advances in AR guides for cultural heritage (Papagiannakis *et al*. 2008), we have established that it is possible to create systems that will never let us get lost in contemporary urban or historic settings (Jones 2011). Digital augmentations promise to provide an extended perception of the heritage space beyond its physical properties while purpose built sensors and algorithms commit to deliver interpretations adapted to our needs and preferences (Ardissono *et al*. 2012; Damala *et al.* 2012; Pujol *et al.* 2013). Nowadays, personal mobile devices are perhaps the most sustainable solution for cultural heritage sites that cannot afford to spend their funds on renewing outdated technologies and software. Systems utilising GPS tracking and location-based interpretation to deliver digital content on personal mobile devices have been used at several heritage sites (Dupuy 2014; Liestøl and Rasmussen 2010).

However, when it comes to experiencing places of historical, archaeological or natural values, is it possible to enjoy them by tapping on or viewing from small screens? Or in our efforts to make the most of our digitally equipped mode of living (and designing experiences), we end up losing the experience of 'placeness' in the process? More specifically, it has been argued that the developments in location-based services and pervasive computing tend to impose certain patterns in our interactions with places and influence the way we experience them. In this context, as Matt Jones aptly remarks 'there

is a danger that our sense of personal experience is weakened.' (2011, p. 30). Arguably, the feeling of being guided in an exhaustive way is not the answer for digital on-site experiences while the degree of guidance should rely on individuals rather than guiding systems (Massung 2012). Besides, as it was mentioned previously, mobile screens are not effective display solutions for heritage dissemination in sunlit environments, such as archaeological sites in the Mediterranean region. An interesting location-based application called 'noTours'[30] explores the 'augmented aurality' concept with sounds activated by the user's movement in a landscape or urban scape. Location-based audio narrations are an old concept in cultural heritage sites (see Massung 2012). I refer to this example however, since the application is developed on android platform and there is an available web-based Content Management System (CMS) for facilitating widespread developments for different purposes.

Apart from the feeling of being guided, the term of 'museum fatigue' has been explored as the condition in which, the more an on-going visit progresses the more visitor engagement with exhibits decreases (Davey 2005). Davey remarks that this condition is dependent on the interaction of visitor and heritage space attributes while admitting that it is an inherently complex endeavour to disentangle the exact causes of fatigue. Digital fatigue and 'clutter' of view has also been reported in relation to mixed reality wayfinding applications (Goh *et al.* 2011, p. 244). In the previous chapters, I already established that those experiences are primarily influenced and formulated by the way we move within a place according to the configurational properties, the tangible and intangible affordances pertinent to the content of the site and the surrounding setting. It is important then to turn the lenses to novel technologies and modalities of human-computer interaction that could be more effective in the frame of archaeological walk planning at prehistoric sites. A novel approach was offered by Robinson *et al.* (2010). In this approach, the user of a navigation and information system receives haptic notifications through a vibrating bracelet only when this is required. In their scenario, the user inputs a desired destination into the mobile system (i.e., mobile device) and then walks around the centre of Rome freely, enjoying the surrounding urban environment. Whenever the user is straying away from his course or there are alternative ways to consider, the system sends haptic notifications depending on the occasion, which he can ignore or make use of. The system is location-aware in that it utilises information about the destination, the accessibility network (i.e., streets) and user's position each time. Additionally, the approach is pervasive, situated on the subtle haptic

[30] See http://www.notours.org/.

notification system, and adaptive, in that notifications and suggestions are dependent to and controlled by the user.

Drawing from this approach and the results of the visitor analysis in the case of Gournia, I will describe two scenarios in order to demonstrate the contribution of this approach in establishing dynamic relationships between adaptability and pervasiveness of a non-guided experience and between movement and meaningful linger. For exploring the above aspects in the hypothetical scenario, I chose one 'real' visitor that provided a complete set of data (i.e., questionnaire, GPS and image data) and provide the real scenario as well. Therefore, the visitor-sourced data provide the basis for envisaging the augmentation of archaeological walks in a site-specific scenario. Emphasis for both scenarios is placed on the movement and linger behaviours. The exploration of the hypothetical scenario for envisaging the conceptual and technological parameters in designing human computer interaction is a common approach (Rodriguez-Echavarria *et al.* 2012).

5.3.3 Real and hypothetical scenarios of archaeological walks

Real data scenario (see Fig. 5.6)

A visitor arrives at Gournia with his friend. He is from Canada, 29 years old, well-educated and works as a senior manager. He did not have any kind of previous information about the site of Gournia, but because both he and his friend enjoy visiting heritage sites, when they saw the sign on their way to the beach, they decided to take a tour.

The visitor starts his visit from the ticket house and the first POI he encounters is the *General* Map IP. He lingers at this point for almost a minute and takes a picture of the map. He liked 'the explanation of the civilisations (phases) contributing to the site'. He takes a picture of one of the B block structures and moves to west of the site without following any of the available paths (i.e., ancient or dirty). He lingers and takes a picture from the C block of structures. Already he has seen some house structures and paths but there is a 'lack of images labelling the streets *versus* building areas' and cannot quite understand what he's looking at (Fig. 5.8-5.9).

He moves up the hill until he meets the peripheral path at the north of F block. He exits the path again and enters E block through and over the remaining structures and reaches the new excavation area. He takes a picture of the excavated house structures and newly

excavated paved street of the settlement. He thinks that ‘it is confusing what was the intention of the house and what was a walkway between houses’. He continues to move to the west in an area of bushes where he spots some structures covered by plantation. He takes a picture. He turns to the left where he finds a path leading to the peripheral path at the top of the hill, where he turns to the south. He then follows a staircase which leads to the second information panel he encounters since he started the tour. He reads and contemplates the POI for around 20 seconds. It’s about a shrine structure of the Mycenaean Period and some cult objects found including statuettes of Goddesses. He takes a picture of the IP and moves to the south but decides to go back to a vista near the shrine to take a picture overlooking the settlement.

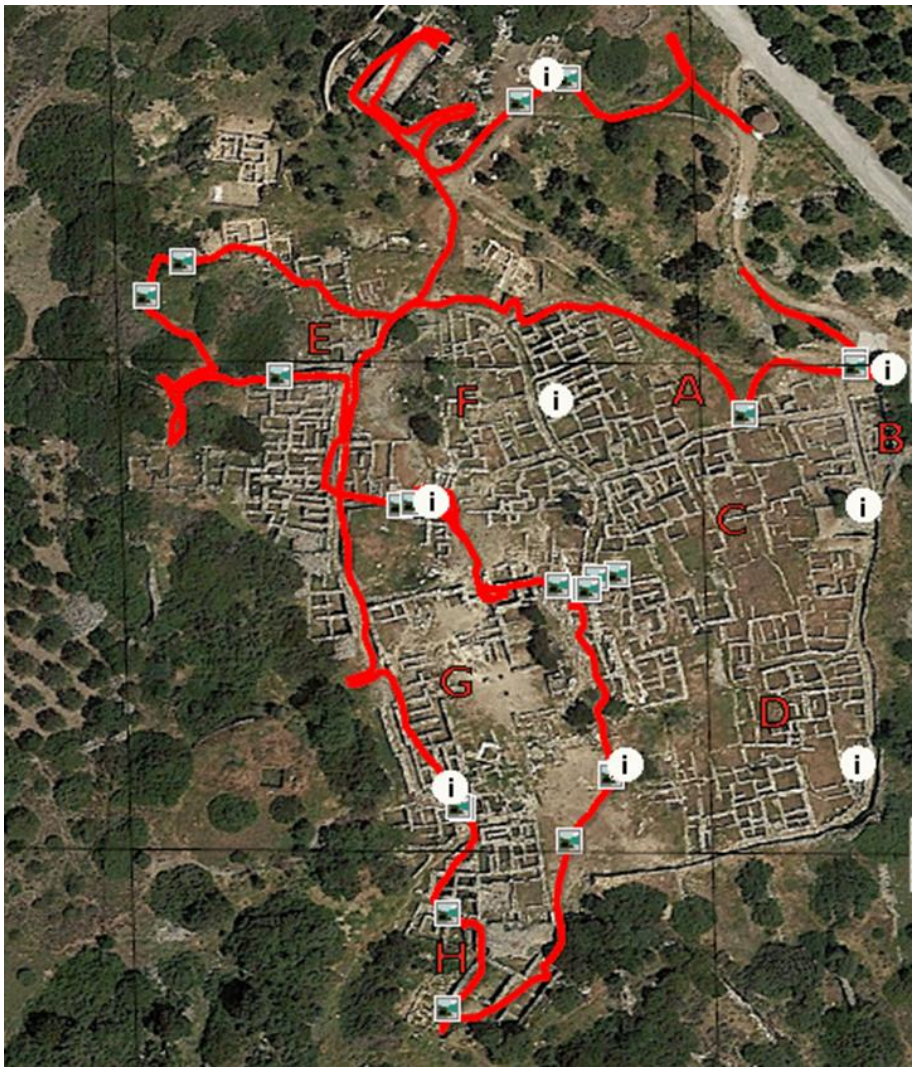


Figure 5.8 The survey data provided by visitor #49 (GPS tracking and geotagged images) plotted on the satellite map of Gournia. Background image © Google Earth.

Figure 5.9 One of the images captured by V#49 pertaining to house structures at Gournia.

He turns once again to the south and explores the northeast side of the *Palace* where he spots a hill to the south of the settlement. He takes three pictures and thinks that he would have liked to have 'access to the peak at the Southern end of the site (the highest peak in the immediate region)' which he believes 'it must have been a vantage point overlooking the sea passage'(Fig.5.10). Further south he passes by the *Palace* IP but does not stop. He takes a picture of the court and then another one to the south vantage point he had spotted earlier. He reaches the south most part of the archaeological site but realises there is no accessibility. Next he encounters a stone basin. He takes a picture. Then he walks through a path that leads to the *Sacred Stone* IP where he spends about half a minute. He follows the peripheral path west of the *Palace* to the north, stands in the west court for a while and continues north until he encounters the abandoned contemporary storage house where he lingers to explore for a while. Then he turns around and reaches the tombs area. He takes a picture and decides to take a shortcut to reach the entrance of the site instead of turning back from the main paths. In retrospect he would have liked to see some 'images labelling the streets versus building areas and an audio/smartphone app tour'. At least, he really 'liked the lack of ropes and railings and the resulting ability to explore'.

Figure 5.10 One of the four images captured by V#49 depicting a hilltop southwest of Gournia.

Hypothetical scenario

A visitor arrives at Gournia with his friend. He did not have any kind of previous information about the site of Gournia but because they generally like visiting archaeological sites when they saw the sign on their way to the beach, they decided to take a tour. They only have around thirty minutes to spend at the archaeological site because they have an appointment with their co-travellers to go swimming in a nearby beach. He is notified at the ticket house that there is a guide application working with personal smart wearables. It takes him one minute to download the application in his smartphone from the site's free wi-fi service and synchronise his smart bracelet and his earpiece. He is now ready to start his exploration.

The visitor starts his visit from the ticket house and the first POI he encounters is the *General* Map IP. He lingers at this point for almost a minute and takes a picture of the map with his smartphone. He liked the design of the map explaining the phases of the site and thought it was very informative and perceptible. Then takes a picture of one of the B block house structures and moves to west of the site without following any of the available paths (i.e., ancient or dirty). He lingers contemplating about one of the house structures in C block located in front of him. He is trying to understand how it might have looked like, to

identify the entrance and wonders what sort of activities took place in a Minoan House. He can't really see any distinct features apart from the remaining walls. Perhaps he should move on. He takes a picture anyway. The system responds to his consistent interactions with house structures (i.e., the lingering around the house structures and the two consecutive pictures in a short period of time) with a vibration. He responds by shaking his wrist. The principal narrator asks whether he would like to know more about the houses of the Minoan settlement. The visitor shakes his wrist and he hears a voice prompting him to turn left and follow the path to *House Ac*. As soon as he arrives, he hears a narration starting with the words 'You are standing in my home's courtyard…'. From the character's narration, he understands that this was a potter's house and continues to hear a story about his everyday life and work as well as a description of his house. The visitor also views a photorealistic reconstruction of the house at the existing information panel where specific POIs from the characters description of the house are annotated. The character of the narration changes. There is a sound of a potter's wheel turning. The new character, a traditional potter from a nearby Cretan village, speaks of the traditional profession he inherited from his father, while crafting a pot on the wheel.

Soon after, he hears his friend calling him from further ahead and telling him she found a recent excavation area and that she learned some fascinating details about archaeologists work. He is not so interested about this topic but he decides to go and join her company anyway. As soon as he moves away from the POI, the mixed-reality scene disappears and he puts his phone in his pocket. He exits the paved path and enters E block through and over the remaining structures. A narration is prompted without a notification this time. The new character tells him about the efforts of her conservation team to keep the site in a good preservation state and about the techniques they use. He shakes his wrist. He is not very interested in the details but he got the message. He tries to reach the new excavation area from a dirty path. He meets with his friend, takes a quick picture of the newly excavated house structures and paved street of the settlement and leave together.

On their way to the west peripheral paved street they exchange views on what each had discovered about the site. They explore the palace area when a vibration notifies him. He dismisses it, as he is now engaged in a new discussion with his friend about a hypothesis he has made about the hilltop he spotted to the south of the settlement. He takes three pictures and thinks that he would have liked to have access to the hilltop, which he believes it was a vantage point overlooking the sea passage. Further south they pass by the *Palace* IP but do not stop. He takes a picture of the court and then another one to the south

vantage point he had spotted earlier. He reaches the south most part of the archaeological site but realises there is no accessibility. The system also has not notified him for a while, so there is probably nothing to see there. He turns back to the north through a path that leads him to the *Sacred Stone* POI. He takes a quick picture and continues to the north. He receives a sound notification and responds. The system provides him with a map of his route indicating that he has passed by this area before. He is then notified of two possible areas he hasn't explored: the *Tombs* POI and the houses to the lower part of the town. He chooses to follow the second option as he would really enjoy finding out more about Minoan everyday life.

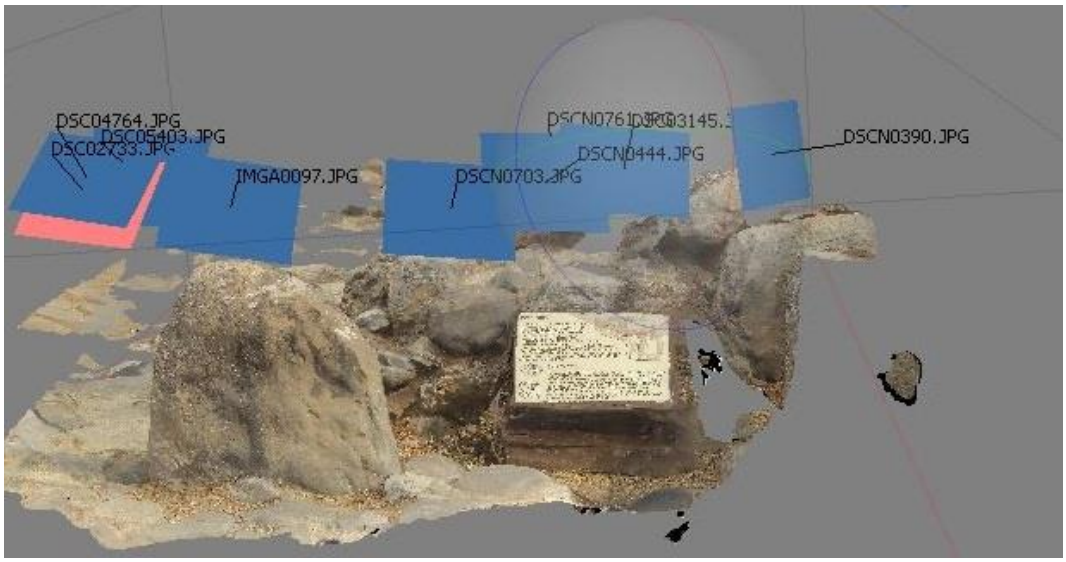


Figure 5.11 3D Photogrammetric reconstruction of the Sacred Stone POI from the visitor-sourced images at Gournia. Generated in PhotoScan with images collected at HotSpot 4.

At the end of the tour the systems registers the visitor's itinerary and captured images in his personal account of the supporting web platform. The visitor is also informed that he can visit the website in order to access his data and to provide his feedback. 'Great!' he thinks. 'I'm definitely going to raise the question of whether this hill was a vantage point for the Minoan settlers at Gournia and if it has already been investigated by archaeologists'. Heritage specialists draw together such collected data from time to time to assess the current state of preservation and interpretation of the site in order to update them accordingly (Fig. 5.11). The CMS offers them the possibility to proceed with any necessary updates whenever they see fit.

Discussion

In the real scenario, two aspects of the visitor experience are made apparent. Firstly, the visitor enjoyed exploring the archaeological site as which is manifested by his chosen itinerary and his feedback. However, at the same time, his chosen itinerary dismissed three POIs, i,e., *Houses Ac, Cf and Dd*, that were relevant to an aspect of the site that he wished to understand according to his feedback. The hypothetical scenario took those conflicting aspects of the visitor experience – which are encountered in most archaeological sites – into consideration, while at once it addressed a number of issues that are related to the subtlety of the system's pervasiveness and the adaptability of the system to visitor's interpretative requirements based on his interaction with the site (i.e., the linger time and images taken). The described hypothetical scenario has avoided to include visualisations as a digital component as a critical stance towards the current visual-centric approaches. It is also based on existing and realistic solutions both in terms of technological components and system architectures as it has been demonstrated in the previous sections. The utilisation of visitor image capture as an interaction modality with the system and computer vision techniques for content recognition are well explored concepts (Ancona 2006).

The scenario also took into account the value of social aspects encountered in heritage spaces (see McManus 1992), by proposing a non-intrusive user-system interaction. In this, visitors are made aware of existing active POIs of the site but the system allows them to decide whether they wish to engage in an interpretative experience about the site or dismiss it in favour of an occurring social event. The wrist gesture responsiveness or non-responsiveness makes interactions with the system even more subtle and unobtrusive to the visitor social experience and awareness of his environment. Such issues are of great importance for cultural heritage sites and have been extensively addressed elsewhere (see Elliston and FitzGerald 2012; Massung 2012, p. 180; Wakkary and Hatala 2007). But while the envisaged system has a subtle pervasiveness in recommending active areas for interpretation, it becomes intrusive in certain mapped areas where accessibility should not be encouraged. Still, the approach adopts an affective and interpretative stance to discouraging visitors from undesirable movement behaviours.

More importantly, the envisaged scenario refocuses the visitor experience on the interaction with the archaeological site and its tangible and intangible characteristics *via* an enabling mediator, the system. This interaction, manifested in the movement and linger decisions of the visitor, is facilitated and not defined by the system. Besides, the design of

interactions was influenced by a real world and evidence-based scenario so that it could be argued that the envisaged scenario took into consideration a two-way communication approach (Silberman 2013); both in an embodied and intellectual way. The design of the system, as it is implied in the end of the scenario, should enable post-visit engagements with heritage sites and community interaction deriving from the latter. Finally, the scenario hints that the envisaged system is contributing the necessary data not only for analyses such as the ones described in Chapters 3 and 4 but also for monitoring the preservation state of the site. Monitoring of the site or the production of 3D photogrammetric models from visitor-sourced images as data recycling approaches for multiple purposes are hardly new ideas and approaches in Computer Applications in the CH domain (see Ancona 2006). Further to the above, the scenario stresses the importance of adopting CMS approaches to current development of technologies for cultural heritage as it aligns with current practices of curating and interpreting heritage as on-going and two-way communicating processes.

5.4 Conclusions

So far, certain aspects of the technologically enabled 'augmented space' in the investigation of archaeological walk planning have been discussed. More specifically, the archaeological space was investigated in previous chapters by means of revealing certain digital footprints that visitors leave behind after their visit (i.e., GPS tracks and images). The followed mixed-method approach provided an augmentation of the visitor-space interaction in the eyes of the interpreter. In other words, archaeological sites are spatially represented by certain values and movement affordances revealed by visitors and thus, provide a different interpretation than expert-led and top-down assessments (cf. Deeben *et al.* 1999). In this chapter, archaeological sites were also discussed in the frame of mixed reality environments considering how digitally embedded elements and interactive modalities complement the tangible formation of spaces. This outlook raises critical questions on how movement can be dealt with, in such amalgamated spaces and how the latter can be constituted more affective to visitors. The augmented space paradigm was assessed as a potential composite and multipronged approach which enables interaction and on-going dialectics between the past and the present, the tangible and the intangible, the ephemeral and the diachronic properties of space. Nevertheless, the pace of the technological developments seems to outweigh the pace of our intellectual engagements in understanding such hybrid interpretative spaces (FitzGerald 2012) and the impacts on

visitor engagement with the physicality and content of archaeological sites. The under exploration of themes pertinent to the investigation of visitor movement and archaeological walk planning was also identified.

More specifically, this chapter discusses from a humanities outlook the notion of 'augmented space' and its contributions and implications in presenting heritage sites. The discussions on existing definitions and understanding of the 'augmented space' paradigm from a theoretical and technological perspective provide a necessary background and frame in order to explore the topic further in relation to its entanglements with the heritage sector. The literature review identified the progress of technological advancements and the respective solutions provided in the presentation of cultural heritage sites, personalisation of experiences and engagement of visitors. However, fewer examples were exploring the interpretative affordances of heritage sites themselves. At the same time, it has also addressed concerns about the technological drive behind those approaches rather than sustainable and realistic scenarios for current widespread utilisation of such applications in the cultural heritage sites. Such observations coincide with a shift of interest in certain research communities and forums for more heritage-centric approaches, and closer collaboration of computer scientists and heritage experts (Ardissono *et al.* 2012); and it is hoped that this shift will extend its concerns to the other research communities involved with the Cultural Heritage sector.

It was also made apparent that there is a persisting emphasis of such applications on visualisation outputs and interactions; arguably, deriving from the observed ocularcentric stance of knowledge production and dissemination inherent in the discipline (Chysanthi *et al.* 2012; Moser 2012). As far as archaeological sites are concerned, although several location-based applications have been examining 'situated simulations' for presenting past built and natural environments (see Liestøl 2014), the manipulation of the generated hybrid spaces for establishing a two-way communication and systems affective to visitor movement decisions and interpretative preferences has not been addressed extensively.

Perhaps, an interesting discussion raised in this chapter is the one pertinent to aura, distance and digital presence. The discussion initiated with the notion of an 'auratic experience' as a felt distance (as *per* Benjamin) or proximity (as *per* Bolter) (see this chapter, pp. 121-124). What both experiences have in common is that they are felt when the subject views the object in a state of stillness. Let us consider for instance the mountain range in Benjamin's example. In this description the subject is sitting and contemplating about the object in order to evoke the auratic experience. The same condition existed in the

small-scale study described in section 5.3.1. Visitors were not in motion while observing the MR scenes. It is also possible that V#49 lingered for a while, when he first thought that the hilltop was a possible vantage point for Gournia settlers (see real scenario in section 5.3.3). Moreover, in the two latter cases (i.e., small-scale study and real scenario) the effect of the experience led subjects to a motility state. More specifically, the subtle bodily reactions to the mixed-reality visual cues and the explicit directional movement of V#49 towards the south, in an attempt to discover access to the hilltop were both related to a desire of subjects to bring the 'auratic objects' closer; or better yet, the subjects were motivated to move. This brings back in mind de Vega's point, in relation to experiencing spaces, about 'a tight link between experience and the notions of potential and performance' (2011, p.45). This link is thought to be movement. Although, technologically enabled 'auratic events' could potentially constitute a desirable condition in cultural heritage sites, questions of how we can consider their integration in designing archaeological walks, and under which preconditions, are very critical and open to inquiry.

Moreover, it is hoped that the small scale study and scenarios presented in this chapter have shown certain research directions towards integrated approaches for planning visitor movement in archaeological sites. Questions of how visitor movement is influenced by interaction or adaptive design frameworks and techniques in different kinds of heritage spaces deserve more attention than they have received. As it was argued, movement and linger as principal indications of the visitor-archaeological site interaction are key factors in considering the pervasive and adaptive design of such applications. The conducted visitor survey at Gournia highlighted the locations of aggregated interactions such as lingering and taking photographs, which in the most parts coincide. Evidently, heritage specialists can use such information to update and reassess their interpretative programmes. More importantly, what is argued here is that mixed-reality applications ought to enhance the tangible and intangible content of archaeological sites by refocusing the interactions in the real places instead of immersing the visitor attention in virtual content and mobile displays. Therefore, haptic and acoustic mixed reality interactions prevail in the envisaged system.

On a more theoretical level, the application of mixed realities could have a twofold contribution towards the creation of a space 'in between', where interpretation takes place. Firstly, in theory and under the right preconditions it could provide a unique space for exploring heritage sites. Within this space, the physical present can coexist with a virtual past in the form of alternative projections in the same, perceivable by subjects, space and

time. This synchronous coexistence has the distinctive tendency to loosen the rigid boundaries between past and present and at once, to redefine them so that the visitor is not intellectually and physically misled. Furthermore, the constant interplay between the real space and the virtual inputs - whose adjustments depend solely on the subject's real world movements - fuels multiple readings of heritage places. Therefore, it contributes to the actualisation of interpretative spaces since different subjects generate versatile readings of space depending on how their movement, attention, affective stance and cultural-cognitive baggage influence responsive systems. The next chapter will discuss the significance of a physically 'augmented space' and conceptual design in archaeological walk planning. The arguments are unfolded in a discussion mainly focused on the cases of Knossos and Çatalhöyük.

Chapter 6: Conceptual planning of archaeological walks

> …[experience] cannot be reduced to mere information, to representation or to the simple evocation of a simulacrum substituting for absent presences. (Frampton 1983, p. 28)

An ostensibly opposite to the visitor-centred approach for addressing visitor movement in archaeological sites is conceptual planning, a primarily expert-led process. The term conceptual has been used in discourses pertinent to art and architectural design to describe the formation and expression of ideas at an abstract level which could well be part of the process to an end or the end of the endeavour itself. Conceptual planning or designing is usually a synthetic and non-linear process which allows for exploring ideas in a flexible and revise-able manner (Parthenios 2005). In the context of planning for on-site visitor movement, conceptual design could be informed by visitor-centric research but can also be used independently to envisage and explore novel ways of presenting cultural heritage sites to the public. This chapter will examine conceptual planning and design as an intermediate stage between management plans and final on-site implementations for regulating visitor movement in prehistoric sites, which appear deprived of visually impressive tangible remains and challenging in terms of their physical accessibility. Drawing from the late work of Dimitris Pikionis (Pikionis 1994; 2000) and Robert Venturi (2002), the first section offers a discussion on how contemporary architecture addressed certain conflicting values of the past and the present or dealt with unsatisfied interpretative requirements of heritage spaces. The topic will continue with a critical examination of the current state and relevant implementation at Knossos and Çatalhöyük. Finally, in the case study of Çatalhöyük a novel accessibility scheme will be proposed and argued on a theoretical and conceptual level. In both cases, while the conceptual and implemented interpretative agendas are critiqued in a constructive manner and as far as they influence visitor movement, it is not attempted here to investigate this aspect in depth or provide site-specific and holistic interpretative solutions, as this would fall out of the scopes of this research. However, the interpretative affordances of archaeological spaces will be sought in order to inform the conceptual planning of visitor movement.

Some methodological considerations

It is important to note some methodological considerations for the examination of the visitor movement in relation to the existing itineraries and paths at the archaeological sites of Knossos and Çatalhöyük. Apart from the literature review concerning the management of the sites, a series of observations were undertaken concerning the physical demarcation and function of existing pathways, the visitor movement and how it is conducted in relation to both the conceptual intentions of heritage experts and the actual movement interactions taking place on-site. Those observations were recorded through standard notes and images taken *ad hoc*. Additionally, a series of discussions took place with heritage experts and architects involved in previous and on-going projects of the sites. The discussions concerned the conceptual ideas that exist in public presentation strategies in relation to whether visitor movement currently reflects certain planning intentions or how visitor movement may efficiently be integrated in those strategies. Finally and more importantly, the visitor-centred methodology which is described in Chapter 3 was also applied in these case studies providing a complementary and evidence-based assessment of the visitor movement. More specifically, visitors were engaged in the questionnaire survey and the GPS data collection which provided valuable insights on how movement is conducted despite or in accordance to experts' intentions (Table 6-1). It is worth noting that the collected data were processed, visualised and analysed as *per* the processes described in Chapter 3. In the following sections the most relevant and significant results will be presented to strengthen the arguments as they unfold. Finally, draft sketches on existing plans were used to generate and disseminate the main concepts concerning visitor movement itineraries.

Table 6-1 Types of data obtained at the archaeological sites of Knossos and Çatalhöyük for the assessment of visitor movement in relation to the existing walkways.

	Collected Data/Number of participants				
Archaeological Sites	Questionnaires	Observations	Heritage Expert/Staff Interviews	Visitor GPS	Photographic Documentation
Knossos	Yes (15)	Yes	Yes (2)	Yes (18)	Yes (219)
Çatalhöyük	Yes (74)	Yes	Yes (4)	Yes (53)	Yes (225)

6.1 Reconciliation of conflicting heritage values through contemporary architecture

For many scholars it was Robert Venturi's seminal work *Complexity and Contradiction in Architecture* that paved the way to postmodernity in architectural thinking (Hearn 2003) although, design approaches that fell outside the mainstream modern movement had already been presented by modern architects. Dimitris Pikionis was one of the modern architects who assimilated both Western and Eastern schools of thought and critically addressed his concerns about the modern movement's principles mainly in his later works. Pikionis challenged modernism's insistence on the universal truths of functionalism as a design approach by integrating the local identity with the global, embracing the natural and cultural elements of places as the main guidelines of design, and favoring sentiment and contemplation over rationalism in his compositions. His aforementioned theoretical directions, which were greatly influenced by his contemporary artists (see Loukaki 1997; 2008), were expressed in his landscaping on the Acropolis's west side by connecting the Philopappos Hill to the Propylaia on the Sacred Rock of Athens[31]. The resulting landscaping was an amalgamation of romantic, modern and classical influences in the way he designed visitor movement at Philopappos Hill (Loukaki 1997, p. 325).

While his contemporary architectural doctrine (i.e., modernity) dismissed contextual elements (i.e., built and natural environment) in the design process, Pikionis respected the surrounding landscape as well as the existing traces of movement (i.e., dirty paths created by pedestrian movement) in his envisaged and implemented itineraries. His landscaping work intended a conceptual zoning between ancient and contemporary space, while it accommodated versatile use requirements of the area such as on-going excavations, protection of the Athenian classical assemblages and public accessibility (Loukaki 1997). More importantly, his paved paths are seamlessly integrated in the contours and natural materials of the landscape resulting in a dialectic relationship of nature and architectural work (Ekonomaki-Brunner 1991, cited in Loukaki 1997, p. 324), while in proximity to the classical monuments the paths become more geometric (Loukaki 1997, p. 322); still, harmoniously configured to counterpart the surrounding context. The aforementioned dialectic relationship is attested to several elements of this work: architectural recycling of

[31] Argyro Loukaki has extensively researched and published the work of architect Dimitris Pikionis. For an overview of his work and more specifically for his landscaping at Philopappos Hill see Loukaki 1997; 2004; 2008.

Figures 6.1-6.2 Movement and stillness, traditional and classical. On the left: the traditional style of stairways embedded in the natural bedrock and following the contours of the ground. On the right: one of Pikionis typical vistas to the southwest of Acropolis. Source © flickr account: Λόφοι Φιλοπάππου[32].

ancient relics and neoclassical architectural features were placed alongside traditional elements in a modern synthesis; prominent urban and natural features were integrated in the conceptual design of pedestrian movement; and the clearly demarcated vistas were designed as static elements in a dynamic interplay with the 'chameleonesque', motility enabling paths (Figs. 6.1-6.2).

In essence, the establishing of a dialectic relationship between conflicting elements or requirements of a place has been mainly addressed at a conceptual, theoretical and practical level in the postmodern architectural discourse. The notions of 'accommodation' (Venturi 2002) and 'cultural layering' (Frampton 1986) refer to the desired design challenges of addressing the contradicting requirements of places with an existing identity, history and social use (as opposed to the abstract idea of spaces) by creating an inclusive dialogue between elements of the past and the present. In Hearn's words this is:

> …the practice of adaptive reuse, namely the willingness to accommodate conflicting cultural messages. Cultural layering occurs when a format clearly belonging to one building type is employed for a different purpose, or when blatantly incongruous period styles are juxtaposed in a single building or complex. (Hearn 2003, p. 362)

Robert Venturi's architectural design interventions at Franklin's Court in Philadelphia, offers yet another example of how contemporary architecture dealt with a different set of conflicting values in the cultural heritage domain from a postmodernist outlook.

[32] https://www.flickr.com/photos/filopappou/

Venturi's design outlook appropriated historical architectural references[33] as conceptual tools to provide design solutions in a culturally meaningful way (Hearn 2003, p. 309). His theoretical and applied work reinstated cultural meaning in architecture as opposed to the dominant 'abstract space' favoured by modernism, and his work influenced greatly the field of cultural heritage conservation (Matero 2010). In the 1970s, the Venturi-Rauch architectural firm and the archaeologists-heritage experts of the National Park Service were challenged with a number of contradictions, uncertainties and conflicting values in the conservation and presentation processes entailed in Benjamin Franklin's long-demolished house of the eighteenth century. Firstly, although the archaeological investigation of the whole complex had returned a satisfactory documentation of the ground plan of Franklin's house and print shop (deriving from the undertaken excavations), the typological and morphological features of the upper structure and interiors remained largely uncertain, despite the conducted historical research (Matero 2010; Otero-Pailos 2007). The material remains were very scarce and created a major juxtaposition with the adjacent buildings of the complex, forbidding any form of contextual dialectic of the historic built environment. On the other hand, the fierce critiques against the long-standing tradition of colonial heritage stylistic restoration in the United States (see Fitch 1990) demanded for a novel approach for the enhancement of the site.

The approved concept successfully addressed uncertainty in the reconstruction as well as issues pertinent to the legibility and tangibility of the historic values of the place. The reconstitution of the houses' volume was implemented by constructing the outlines of the buildings with a white steel frame while other documented features such as windows were also similarly represented. The interior character of the Benjamin's house (i.e., walls, accesses and use of rooms) was demarcated through the juxtaposition of the used materials (white lines on the dark backdrop of the ground) and the employment of didactic devices such as labels and concrete 'periscopes' from where visitors could view the remains of the cellar (Matero 2010; Otero-Pailos 2007) (Fig. 6.3). Further interpretation of the entire site and Benjamin Franklin was offered in the underground multimedia museum.

The conceptual design of Venturi's reconstruction provided an intuitive solution to the problem of uncertainty with regards to the architectural elements that once constituted the house and could not be verified by the undertaken archaeological and historical research.

[33] Robert Venturi, in his note to the second edition of *Complexity and Contradiction in Architecture* (1977), makes a disclaimer and admits that his propositions on historical references were misinterpreted as a dogmatic and reminiscent of a pre-modernist approach to architecture.

Figure 6.3 The Venturi-Brown 'ghost structures' in the Franklin Court, Philadelphia, PA. Source: flickr account dslrnovice[34].

On the contrary, the chosen approach manifests the building's uncertainties instead of attempting to 'objectify' them (as opposed to the mainstream holistic restorations) while leaving the contested and unknown parameters to visitors imagination (Otero-Pailos 2007). Instead of immersing the visitor into a disguised – perhaps, even falsified – past, it created the vehicle for contemporary meaning to travel back into the past (ibid, p. v). Furthermore,

[34] Under CC licence (some rights reserved). Available from https://www.flickr.com/photos/dslrnovice/

the buildings were physically augmented and offered the desired dialectic relationship with the surrounding historic neighbourhood as well as an embodied experience of the visitor. The latter can be described as an open dialogue created *via* the transparency of the structure and a free form visitor movement which allows for multiple readings of the historic space (Psarra 2009, p. 237). In other words, the heritage space is not assigned an interpretative programme that imposes the representation of movement as it would occur in a typical colonial building, based on the configuration of its spaces. In relation to the contemporary tendency of over interpreting heritage sites with digital and analogue media, Matero arguably poses the question:

> …are we losing the desire and ability to respond to the physicality of things and places, to see more, hear more and feel more, in deference to the aggressive revealing of invisible content at the expense of the physical place? (2010, p. 54)

The 'ghost structures' (as Franklin's House and his grandson's print shop are commonly called) provided a novel approach in the history of heritage conservation; although the particular approach raised some criticism as well (cf. Semes 2009, p.151). It is worth noting that a similar approach had been applied previously at Piazza Armenina, in Sicily. In this case, the metal frame which restored the volume of the Roman Villa and supported a transparent plastic cover functioned as a shelter for the fragile mosaics from environmental conditions (Fitch 1990, p. 195; see Mallouchou-Tufano 2007, for the description of the original planning). The design of 'transparent' shelters as a successful conceptual, aesthetic and protective apparatus has been widely used in archaeological sites ever since and currently most research is focusing on the sustainability challenges of such structures (see Çetin and İpekoğlu 2013).

From the above discussion of contemporary architectural interventions in the context of cultural heritage sites, two main points can be made. Firstly, that conceptual planning with cultural and topographical references can provide an invaluable methodological tool when considering the design of visitor itineraries and movement. Secondly, that the notion and application of a 'physically augmented heritage space', as portrayed in Venturi's ghost structures, provides important insights about the reconstitution of heritage spaces. In this, the tangibility of experiences in heritage places are restored, a dialectic relationship of the 'monument' and the surrounding built environment is established, while uncertainty is dealt with by refocusing on open-ended and embodied interpretative schemes. In the following sections, I will further explore and expand on those notions by a critical assessment of the current visitor movement in the prehistoric sites of Knossos and Çatalhöyük.

6.2 The visitor itinerary at Knossos

Today, the archaeological site of Knossos presents an amalgamation of archaeological remains, historical reconstitutions and contemporary interventions for the protection and presentation of the site to the public. The different lens adopted and used to reflect on the contested and contradicting values of Knossos by the scholarship has not only generated criticism for the perceived as authoritative and rational management of the site but it has also produced a debatable accessibility and visitor itinerary planning (see Hitchcock and Koudounaris 2002; Solomon 2007; 2008). Focusing on the latter aspect of the archaeological site, I will attempt to provide a selective assessment of the visitor itinerary by describing the conceptual schema it follows and presenting new findings concerning the conceptual and practical implications of visitor movement at Knossos. This discussion sheds further light on how certain contemporary interventions at complicated heritage sites attempt to address the conflicting values of accessibility and protection and while much of the attention is on the 'material' reconstitution, other interpretative affordances of the site are left underexplored.

Description of conceptual planning, implementations and assessment.

Today visitors are not getting 'lost in the labyrinth', as per the homonymous myth (Palyvou 1997, Solomon 2007, p.79 and 2008, p. 457). The heritage management plan apart from an extensive conservation programme handled today by the 'Conservation, Consolidation and Promotion of the Palace and Archaeological Site of Knossos' (UNESCO 2014), has focused also on the visitor management (Papadopoulos 1997). The latter identified and designated movement in three zones: the visitor's welcoming and facilities area, the main site of remaining and restored antiquities and the 'green' area around the main site (Karetsou-Ioannidou 2006; Palyvou 1997) (Figs. 6.4-6.5).

A long narrow path connects the visitor facilities area near the entrance with the main site through the *West Court* and an exit path has also been provisioned (Figs. 6.6-6.7). On a conceptual design level, three differently paced itineraries are provisioned within and around the palace (Fig. 6.8). The first consists of two sections and is conceptually assigned with a fast pace walking mode. This main visitor itinerary is linked with three open plan areas: the *West Court* (A), the *Central Court* (B) and the *North Theatre* area (Γ).

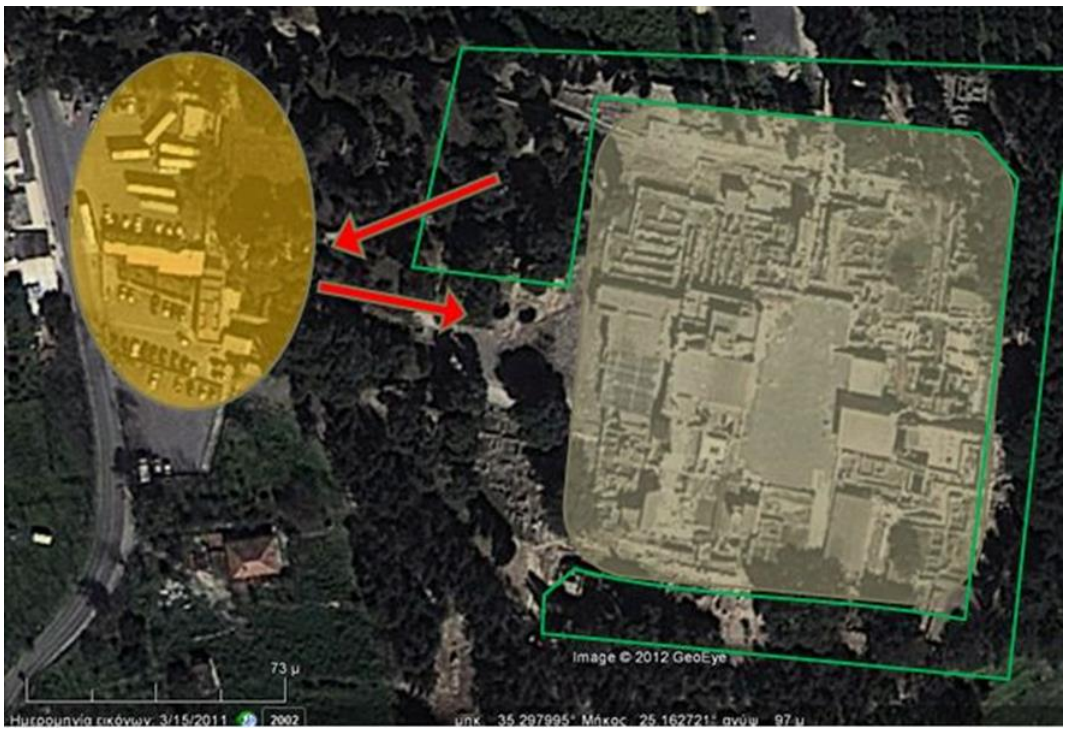


Figure 6.4 Schematic accessibility zones in Knossos. Background image source © GoogleEarth.

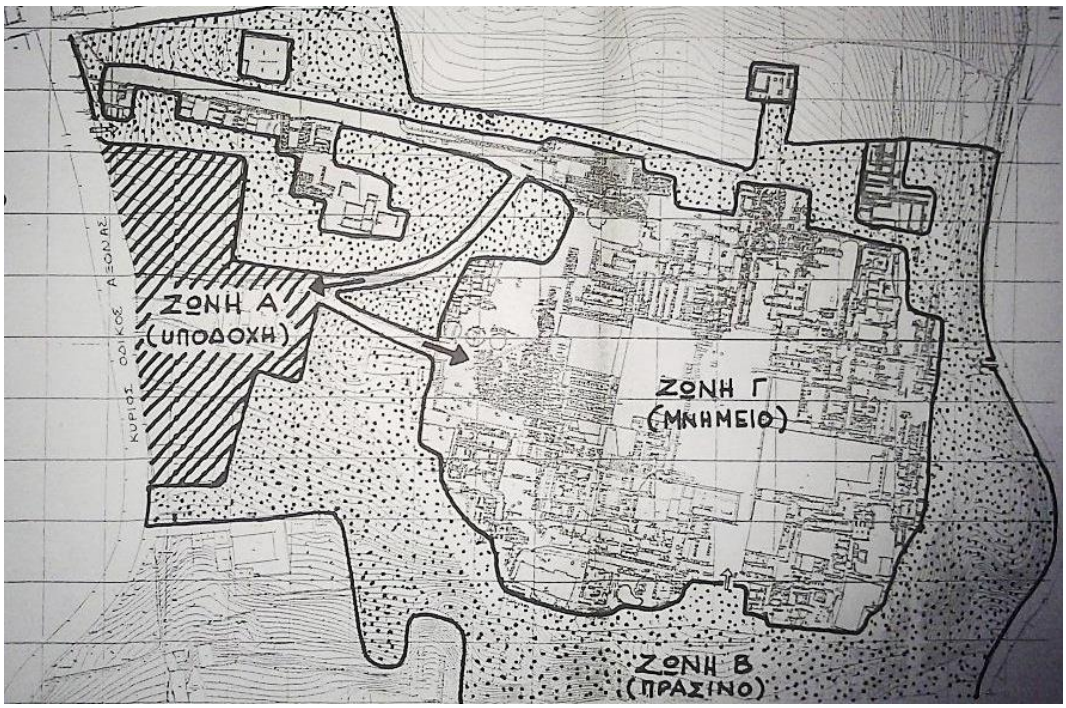


Figure 6.5 Accessibility zoning of the approved management plan. Zone A: entrance indicated by the dashed area, Zone B: green area indicated by dotted area, and Zone Γ: main monument indicated by the layout plan. Source: V. Ganiatsas' personal archive.

Around the Central Court the visitor has an overview of the exposed/reconstructed remains of the first floor and the ground level. Several guide books as well as the tourist guides lead tourists *via* the *South Porch* of the palace on the first floor, where the official reception and sacred spaces of the palace are located, known as *Piano Nobile*. Following from there visitors are usually led again to the ground level of the *Central Court* and suggest visiting the *Palace Shrine* as well as the *Throne Room* to the west side of the court. The second section of the main itinerary starts from the east side of the court. Visitors can pass by the *Loggia*, the reconstituted by Evans colonnaded upper landing of the *Grand Staircase*, which was used to lead to the *Royal Quarters* but is not accessible today[35]. Today, the visitor can view the east façade of the *Royal Quarters* by following a more recently implemented secondary itinerary which starts from the Loggia and continues *via* level connecting walking boards along the east side of the complex and turns to the north until it joins the pre-existing *Zatrikion Corridor* (see Zanon 2008).

Secondary paths provide visitors with the option to exit the main site from several points, and enter 'loop-like itineraries'[36] while slowing down their pace. The term 'loop' is used by the architects to conceptually denote the secondary paths which can be approached either from the main area of the palace or the green peripheral area from several different points of the site (see Fig. 6.8, also compare with Fig. 6.9). Thus, on a conceptual level they function as loops since the visitor can exit and enter the main site from two consecutive secondary paths. Many of the secondary itineraries are original (or reconstituted) features of the site such as pathways, corridors, streets and staircases and could potentially play a significant role in how visitors comprehend the Minoan palace and its links to the extended settlement, the town (Palyvou 1997, p.24). Finally, in the third peripheral itinerary movement is conducted freely in an area where people can enjoy the monument's ambience in the shade of comforting pine trees (Figs. 6.10-6.13).

Overall, the conceptual schema of this zoning starts with strict accessibility regulations and fast paced movement inside the main monument, and gradually *via* the secondary itineraries it becomes an almost unrestricted area in the third. The latter offers resting areas

[35] It was decided that the structural state of the *Grand Staircase and* its side walls was not suitable for tourist accessibility for reasons of safety. Besides, mechanical and material erosion was identified as a result of use by visitors for decades. Instead, the preservation and structural reinforcement of the feature was decided (see Palyvou 1997, p. 24; Zanon 2008, p. 124).

[36] The term 'loop like' secondary itineraries is used by K. Palyvou, the leading architect of the management project at Knossos in the 1990s (see Palyvou 1997, p. 25). The same term was used by Vassilis Ganiatsas for the description of the secondary paths during a personal communication. Vassilis Ganitsas was involved in the initial planning of this project as one of K. Palyvou's associates.

from where – as it is argued - the visitor can enjoy a view of the monument as well as the surrounding nature (Palyvou 1997). It should be noted here that interpretative panels offer interpretation about specific spaces all around the main site as well as important information about the undertaken and on-going conservation works.

Figures 6.6- 6.7-. On the *left*: a view of the narrow path connecting the visitor facilities area with the main archaeological site. On the *right*: a view of the path used to exit the main site.

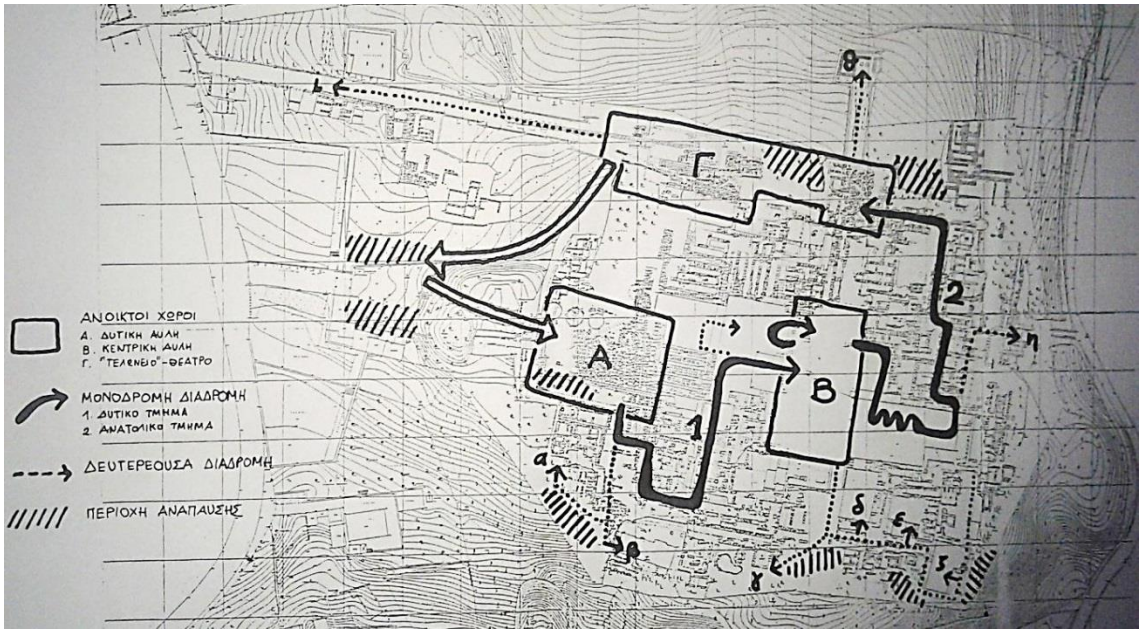


Figure 6.8 Conceptual plan of the visitor itineraries at Knossos as designed in the initial management plan. Symbols: square - open plan area, arrow –main itinerary, dashed arrow- secondary itinerary, parallel line pattern – areas of rest. Source: V. Ganiatsas' personal archive.

Figure 6.9 Conceptual plan with colour coded itineraries at Knossos. The blue dashed line represents the first floor itinerary projected on the ground plan. Red lines represent the two sections of the first and main visitor itinerary, yellow continuous lines represent the secondary itineraries while yellow dashed lines represent the possible loop-like choices of visitor movement. Finally, the green line represents the peripheral walk in the 'green' area of the pine trees. Background plan after Evans, edited by the author.

The interpretative panels address the visitor with phrases like 'In front of you is situated…' and include archival photos and reconstructions, spatial references of the visited location in relation to the overall site, as well as suggested itineraries in the immediate area to be visited (Fig. 6.14).

Figure 6.10. A view of tourists using the first section of the main itinarary (the wooden raised walking board on the background) and the alternative secondary itinerary (foreground).

Figures 6.11, 6.12, 6.13. Panoramic views of the site from several positions of the 'green' resting areas.

Figure 6.14 Example of an interpretative panel at Knossos. On the upper left corner there is a characteristic spatial reference offering orientation to visitors.

An assessment and discussion drawing from the conceptual plan and its practical implications

Conceptually, the visitor movement related interventions at Knossos attempt to keep a balanced approach of the conflicting values of the monument. The connection of the main monument with the rest of the archaeological site through two narrow passages (entrance and exit passages) provides an adequate space for the visitor to transit from the noisy commercial street and the crowded visitor facilities area to the visiting experience around the main site and *vice versa*, as the architects envisaged it. The intentions of this landscaping solution indicate that the monument is purposefully isolated from contemporary space along with its negative impact on the visitor experience (cf. Solomon 2007, p. 77). Besides, the negative effects of the commercialisation of heritage sites constitute a reality of heritage management that we cannot continue to denounce and criticise without actively addressing them in the management plans and practical implementations (cf. Silberman 2007a, Solomon 2008).

The conflicting demands for providing visitor access and protecting the archaeological or reconstituted remains were also addressed in this case. The demarcation of the visitor itinerary *via* standard rope railings and the configuration of visitor accessibility and

movement *via* raised walking boards in areas that had been diminished structurally and morphologically was a conscious decision to overcome such conflicts. In terms of the so called aesthetical integrity, Evans' reconstructions have already assigned modern characteristics to the monument (cf. Farnoux 1996; Hitchcock and Koudounaris 2002; Solomon 2008) and perhaps, today's acknowledgement that those interventions form part of the inherited values (i.e., value of historic restoration) of the site align and strengthen the arguments in favour of the contemporary interventions. The high numbers of visitors was also a primary factor towards the direction of severe interventions for regulating visitor movement (Palyvou 1997). In essence, this is a justified site-specific solution and perhaps, it would be difficult to argue for a similar approach at archaeological sites with no similar characteristics or historic intervention precedent.

Additionally, the conceptual schema of the visitor itineraries is attempting to reveal the character of the site by integrating the respective original (even if reconstituted by Evans) features of the monument (i.e., street, corridors, staircases and courts), and by constructing new pathways in parallel or by approximation to the original features, in cases that the latter did not qualify or were in need of protection. Therefore, the particular conceptual plan is a well-researched plan that took into consideration the original character of the site and integrated some of the original features related to movement in the reconfiguration of space. This type of conceptual planning and designing is not an entirely open-ended process (cf. Parthenios 2005) but involves a culturally, socially and archaeologically/historically informed process that requires addressing and incorporating rather conflicting values of the past and the present.

On the other hand, the public-oriented strategies of the project remain largely influenced by the on-going conservation programme while it appears that there are no substantial and accountable interpretative intentions in the current budgeting of the project[37] other than the provision of fourteen standard interpretative panels. The provision for an expansion of the visitor itinerary from the south side of the complex in order to link the palace with the surrounding revealed antiquities, which currently fall outside the fenced off archaeological site, as well as the production of fourteen new interpretative panels are the only relevant

[37] With the decision entitled '1st Amendment of the Act: Reconstitution-enhancement of the Palace and the archaeological site of Knossos', the Ministry of Culture through the Operational European Programme 'Competitiveness and Entrepreneurship' approved 920.000 Euro for funding the on-going conservation project at Knossos. The project has not been completed until today and to the best of my knowledge.
The decision is available at:
<http://ep.culture.gr/el/Documents/ΔΗΜΟΣΙΟΤΗΤΑ%20%20ΠΡΟΒΟΛΗ/ΕΡΓΑ%20ΕΣΠΑ/ΠΟΛΙΤΙΣΜΟΣ%20ΕΤΠΑ/ΒΛ40Γ-Π17.pdf>

future works. Certainly, this decision addresses partially the critique about the isolation of the palace in relation to its contemporary and spatially associated archaeological assemblages in the extended area (cf. Solomon 2008, p. 456), but it is still far from addressing the interpretative engagement of visitors.

The above concern becomes more evident in the case of the third 'green' peripheral walkway, which affords a slow-paced, less restricted movement and offers resting areas where visitors can stop and view the palace from a distance. Oddly in this accessibility area there is no provision for any kind of interpretative media. As a result, visitors at this area were observed to walk around meaninglessly and rest under the pine trees to avoid the heat and the crowded main itinerary (Solomon 2008, p. 456). More rarely they were observed to read from a guide book. At the same time, all the aforementioned activities occurred while the visitor was completely disconnected from the monument itself and the surrounding (or rather fenced out) physical environment. This disconnection may also be explained by the fact that from the 'green' area, the palatial complex offers a fragmented view due to its preservation and selectively reconstituted state (Figs. 6.11-6.13). In addition, the lack of interpretative media in the peripheral itinerary impact directly the way visitors move within the site. A characteristic example of this is reported by one of the visitors at Knossos (Vk#12):

> *I followed the peripheral path and spotted the structure with the black columns* [i.e., the *Kings Quarters* or else *Room of the Double Axes*]. *However, when I entered the main path in order to find it, I got lost and never managed to get there.*

As it becomes apparent, the peripheral itinerary affords certain visual cues that could influence and to a certain extend define explorative movement decisions around the main monument (Fig. 6.15). However, the lack of interpretative and directional prompts - even in the most standard form (i.e., interpretative panels) -, and the subsequent conceptual and physical lack of coordination between existing paths and interpretation may well constitute the site as a contemporary 'Labyrinth' for visitors; only in this case, there is nothing mythical about getting lost. While I was interviewing Rania, a tourist guide working at Knossos, we were distracted by a kid's complaints to his mother. They had just finished their visit. The mother approaches Rania and asks her if she could tell her where the Labyrinth was? When Rania explained in a simplified and direct way that the Labyrinth is the palatial complex they had just visited, the boy looked quite noticeably disappointed. The frustrated mother turned to her son and asked him if he wanted an ice-cream. The above examples suggest that visitors' understanding of and engaging to monuments is tight

both to the idea of movement, their baggage or expectations. For the aforementioned visitor, the *Kings Quarters or else Room of the Double Axes* remained a 'structure with black columns', while the desire of engaging with this feature of the palatial complex remained unfulfilled and thus, the visitor left the site with feelings of disengagement.

Furthermore, and as it was mentioned previously, one of the conceptual intentions for planning the connection of the main itinerary with secondary paths was to provide alternative and multiple readings of the Minoan Palace (Palyvou 1997). At the same time, it was thought that the alternative walkways would function as gateways for channeling visitor circulation away from the main monument; a fact which was expected to reduce the pressure put on the monument by visitor crowds[38]. However, as it was demonstrated in Chapter 4, the main site is still receiving most of the visitor circulation pressure and the alternative paths perhaps do not function as they were expected (Figs. 6.16-6.17, also see section 4.2.4). Certainly, it was not necessary to conduct any analysis to find out about the visitor queuing outside the *Throne Room*. The architects were well aware of this problem when suggested that the tourist guides should lead visitor groups towards alternative paths in case of encountering massive visitor flows in the court area (Palyvou 1997). However, this guideline has never really been effective based on the analyses and observations.

Nevertheless, in order to ascertain how exactly visitors used the peripheral paths in relation to the main and secondary paths, the GPS visitor tracks were further explored (Fig. 6.18). With this particular question in mind the eighteen obtained tracks were divided in four classifications (Fig. 6.19), in each of which the peripheral itinerary is: a) used across the majority of its length (three cases), b) used partially; one or two sections of the peripheral itinerary were used as part of a loop-like movement pattern, i.e., moving from the main site outwards to the 'green' area and entering the main site from a different secondary path (four cases), c) used only as a resting point; visitors exit the main site from one of the secondary paths, stay in a near-by resting point and then re-enter the main site from the same secondary path (three cases)and, d) is not used at all (eight cases).

Additionally, the exploration of data revealed that certain secondary paths were used more than others. For instance the most used paths according to the sample appear to be the elevated first section and the 'Zatrikion Corridor' which belong to the first and the second section of the main itinerary respectively (17/18). Also visitors made use of the *Carriageable Street* providing access to the Palace from the southwest corner of the

[38] From personal communication with the architect Vassilis Ganiatsas.

Central Court (12/18), while the path running parallel to the *South Colonnaded Staircase* is used fewer times (5/18). Finally, it is worth noting that one of the least used paths appears to be the recently constructed secondary path passing by the east façade of the *Royal Quarters* and the *Olive Oil Press Workshop* which was apparently dictated by 'the experience of the monument' (cf. Zanon 2008, p.124).

It could be argued that the peripheral itinerary's conceptual planning overlooked a crucial factor: the opportunity to create a space of alternative interpretations of the Palace as well as an outlook of how the surrounding urban and landscape environment might have looked like based on the existing hypotheses and current research outcomes (see Branigan 2001). It is admittedly difficult to overcome the impression of Evans' 'concrete futuristic vision of a timeless legendary past constructed in a Victorian present' (Hitchcock and Koudounaris 2002, p. 42) by moving within the main palatial complex. As it was argued in Chapter 2, both the geometry of the monument, disclosing the cognitive, aesthetic and semantic properties of space, and the spatial configuration of the reconstituted palatial complex which is experienced through movement are significant factors for conveying understanding and cultural meaning (Psarra 2009, p. 239).

And Evans' imagined Knossos is what the visitors understand from their somatic experience by moving within the Palace. In a way, the physical manifestations of historic and contemporary interventions at Knossos, with which the visitor primarily interacts, have crystallised the perceived form and interpretation of the monument and leave little room for alternative readings. On the contrary, the peripheral itinerary could embrace the inherently detached space and the conceptually planed areas of linger and contemplation in order to provide alternative readings of the monument and engagements to the visitor.

Further to this point, in the case of the *Throne Room*, the observed lingering is certainly associated with an existing popular HS of the site. It is not, however, the result of an engaging or meaningful interaction. It rather constitutes one of the most negative experiences one can encounter at the archaeological site. Therefore, the notion of assessing and reconfiguring movement and lingering affordances in order to provide meaningful experiences in the frame of 'augmenting archaeological walks' resonates and supports the arguments presented in Chapter 5.

Figure 6.15 A view of the King's Quarters form the peripheral pathway. Visitor-sourced image.

Figures 6.16- 6.17 On the *top*: Visitors queuing and crowding at the northwest of the Central Court for accessing one the most popular attractions of Knossos, i.e., the Throne Room. On the *bottom*: Visitors sitting at the north peripheral area of the site, disconnected from the monument.

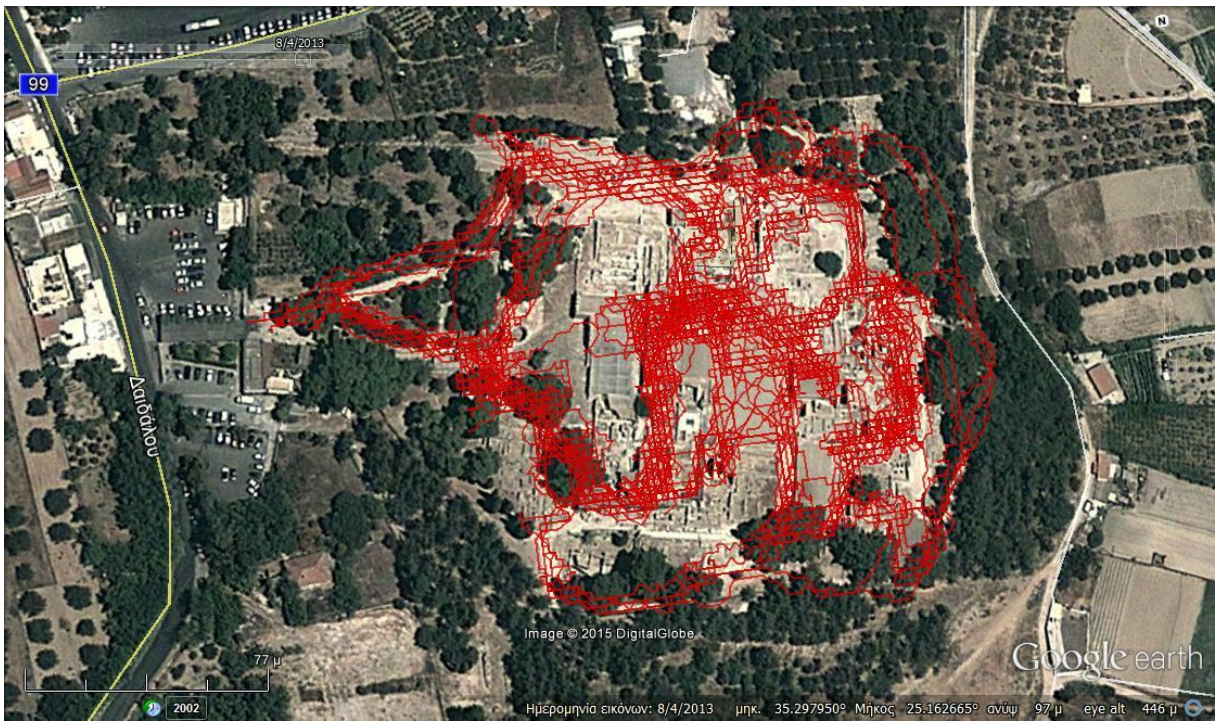


Figure 6.18 Satellite image of Knossos overlaid with visitor GPS data (18 samples) as well as the location points of existing information panels in 2013.

Figure 6.19 Classification of visitor movement in four categories depending on how visitors use the peripheral itinerary. On the top left: category (a), top right: category (b), bottom left: category (c), bottom right: category (d).

Without intending to provide any specific digital solutions, it is important to note that conceptual planning and interventions at Knossos would benefit a great deal from an integrated approach that considered digital interpretative schemes. Context and user-aware systems, adaptation and personalisation are well developed technologies that could provide the desired 'gateways' at the locations under pressure and alternative engagements at disconnected vistas. However, the main precondition remains unsatisfied as stressed in Chapter 5; namely, the interdisciplinary dialogue and asking the relevant questions. In this case, technology could potentially create various interactions at various locations around Knossos. The crucial questions however, in the context of archaeological walks planning are 'where should we create more engagements (given the current state) and what kind of engagements would those be (given the locations, the observed visitor flows and the interactions or the lack thereof).

6.3 The visitor itinerary at Çatalhöyük

This section offers an overview of the current state of the archaeological site in terms of existing visitor itineraries and offered interpretation spaces. This overview provides a necessary background to highlight the challenges posed at Çatalhöyük for an integrated interpretation and presentation programme in relation to visitor accessibility and movement affordances. Drawing from Robert Venturi's conceptual and intellectual work as manifested in the 'ghost structures' in Philadelphia, I will attempt to define the notion of 'physically augmented spaces' as opposed to 'physically annotated spaces' (i.e. spaces with interpretative panels) and discuss possible applications in the case of Çatalhöyük, as a proof of concept.

Today, the visitor at Çatalhöyük is offered interpretation at three distinctive spaces of the 'visitable' site: two spaces which are conveniently located near the entrance of the fenced archaeological site and the East Mound (Fig. 6.20). The experimental house is the first structure that visitors encounter from the entrance. It was initially built to explore the building techniques used in the Neolithic Çatalhöyük and was later incorporated in the interpretative programme of the site (Doughty and Orbasli 2007; Stevanović 2012). In the experimental house the visitor can experience and obtain a better idea of how a house might have looked like in the Neolithic Çatalhöyük as it displays commonly encountered features such as ovens, platforms, wall paintings as well as ordinary and decorative

replicas of religious and everyday life objects (Fig. 6.21). In addition to the first experimental house the architectural plans of three more houses (i.e. a replica of 'Building 77', a 'Vulture shrine' and 'Hunter shrine' types of houses) have been approved which will create a complex with different characteristics that will add to the narrative and presentation of the site, and the visitor experience.

The small Visitor Centre is built near the entrance of the archaeological site and in the front courtyard of the dig house. It provides key information about the history and content of the site through a series of exhibition panels and replicas of finds. The iterative approach adopted in designing, evaluating through visitor feedback and redesigning the interpretative programme ensures that the Visitor Centre remains flexible in synchronising its outputs with the on-going research at Çatalhöyük and making provisions for a more engaging visitor experience. In the long term (25 years) management objectives of the site is the implementation of an on-site museum suitable for protecting, accommodating and displaying fragile important features and finds such as wall-paintings.

The third space where interpretation is provided is the exposed archaeological remains under the respective North and South Shelters which are connected through a single one-direction itinerary (Fig. 6.20). The latter consists of consecutive dirty paths that link the areas of interest and are constructed by the removal of existing vegetation while in certain areas are rigidly defined by roping (Fig. 6.22). The project is monitoring the dirty paths as a gradual extinction of the vegetation around the paths has been observed. Every so often those paths are re-established in the same fashion by moving them a few meters away from their previous position in order to allow the vegetation sprout anew and thus, limit the negative effects that compacted dirty paths cause to the natural environment of the East Mound (Fig. 6.23). Besides, the visitor management policies of the Çatalhöyük Management Plan relating to the itinerary (UNESCO 2012, VIS05 and VIS07) specify that the latter should be maintained to provide safety to the visitor as well as an informative and engaging experience while remaining flexible for the necessary adjustments required by the on-going fieldwork and research.

The itinerary initiates from the entrance of the site and leads to the North Shelter area. As it was mentioned previously the area under the North Shelter is simultaneously one of the active fieldwork and accessible to visitors area[39].

[39] Particularly, Building 5 which is the first building that the visitor encounters, has been on display since 1999 under its own temporary shelter (see Hodder and Farid 2008).

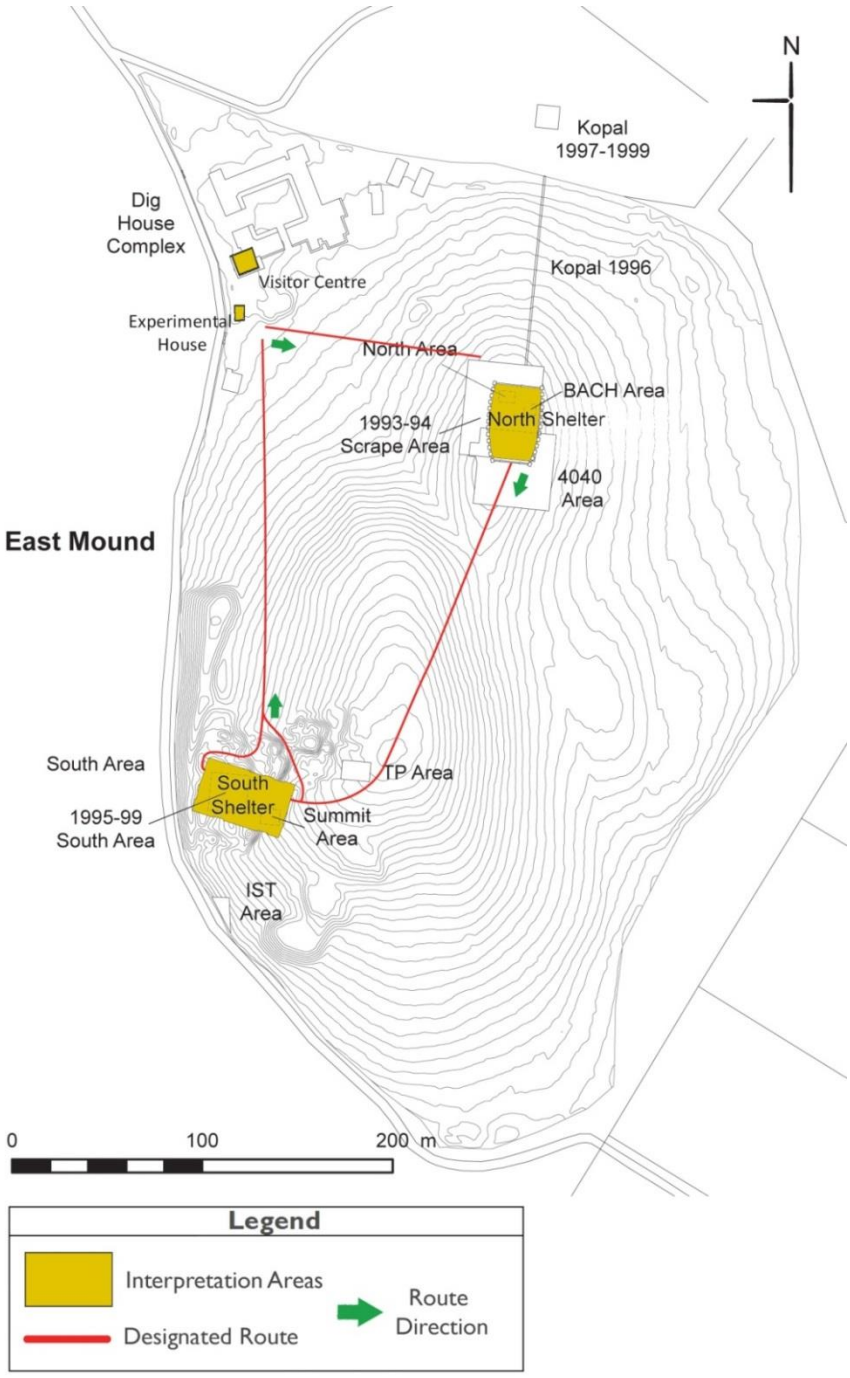


Figure 6.20 Isoline topographic map of the East Mound area highlighting the offered interpretative spaces, and indicating the visitor itinerary as well as direction of movement. Map source: Çatalhöyük Research Project Archive, modifications by the author.

Figure 6.21 Özgür Can Uslu, one of the trainee tourist guides, giving a tour in the experimental house at Çatalhöyük.

Figure 6.22 View of the North Shelter in 2013 and the first path that visitors encounter at Çatalhöyük.

Figure 6.23 Another view of the North Shelter in 2014 and the first path that visitors encounter at Çatalhöyük. Note that the left path is the newly established path divided by rope railing from the old.

Therefore, since 2008 approximately three major reconfigurations of the walking path has been implemented in an attempt to combine the different uses of space (Fig. 6.24). Today, the North Shelter area is accessible to visitors through a pathway system consisting of a dead-end raised board from metal which runs over the east side of Building 5 and a wooden walkway placed on the contemporary ground level that runs from the entrance across the western side of the covered area until it turns to the east-south, passing through a refuse area between two building blocks and finally leading to the South Shelter's exit. The latter path is made of interlocking wooden planking and further defined by low rope railings in order to prevent visitors from straying off the path. The itinerary continues on the East Mound to the South, passes by the TP and TPC areas (see Fig. 27) from where it leads to the east entrance of the South Shelter. Accessibility in the South Shelter is currently limited to the higher east vista area, a south view point outside the shelter's south side and finally in the west lower vista area (Fig. 6.25). From there the visitor follows the dirty path with north direction back to the entrance of the archaeological site. An alternative route which has been created mainly for facilitating fieldwork practicalities and links directly the TPC area with the final path towards the exit is also used by 'fast track' tourist groups who only visit the east vista of the South Shelter area (Perry *et al.* 2013).

Visitors at the East Mound are always accompanied by either one of the appointed guards or by a trainee tourist guide by the Ege University of Turkey during the summer seasons. Apart from the tourist guides, an on-site interpretative programme via information panels is also available for visitors. The aforementioned changes in the visitor movement as well as the content of the site from on-going works have dictated the redesign of information panels and their visual media in order to correspond to the buildings in proximity to the path, the visibility angle and the features that have been revealed. For this reason, the information panels are currently implemented in an iterative, flexible and temporary fashion using affixed to moveable metal frames.

The main conceptual schema for on-site interpretation on the East Mound was not the product of a post-excavation management decision but has been designed from the initiation and in parallel to the on-going Çatalhöyük Research Project as an integrated conservation and presentation strategy (Hodder 1998; Matero 2000). In other words, the archaeological excavation was developed and progressed hand in hand with the on-site interpretative programme. The two pillars of this conceptual interpretative schema are to provide an understanding of the multiple phases of the settlement and offer an interpretation of how a 'neighbourhood' looked like in the Neolithic. This was a decisive strategy for the future of Çatalhöyük which has contributed towards a worldwide recognition and to its inscription in the World Heritage List at the meeting of St. Petersburg in 2012.

The criteria based on which the site was ascribed uniqueness among other significant Neolithic sites of Anatolia refer to the aforementioned conceptual schema. More specifically, the site was acknowledged as a World Heritage Monument based on criteria (iii) and (iv), which refer to the unique testimony of a cultural and social transition moment in the Neolithic and the outstanding architectural and urban character of the site respectively (UNESCO 2012). Those criteria are met both on the basis of the abundant interpretative resources and media outputs produced over the years as well as on a physical level: criterion (iii) is physically manifested in the vertically excavated South area, where one can witness the different phases of the site, while criterion (iv) is met in the horizontally excavated North area, where the narrative can focus on the 'neighbourhood' concept and the architectural, social and everyday life characteristics at Çatalhöyük (UNESCO 2012).

Figure 6.24 Layout plan of the North Shelter area with the remains uncovered until 2012. The plan highlights the changes in the configuration of archaeological walks before 2013 and after 2014. The grey coloured line depicts the part of the path that has remained the same, the red represents the part of the previous path that has been made void and the green represents the established path in 2014. Also, the plan provides the previously existing (marked as 2013) and recent additions (marked as 2014) of interpretative panels designed by the Visualisation Team. Background plan: Çatalhöyük Research Project Archive, modifications by Ian Kirkpatrick and the author.

Figure 6.25 Layout plan of the South Shelter area with the remains uncovered until 2012. The plan provides the previously existing (marked as 2013) and recent additions (marked as 2014) of interpretative panels designed by the Visualisation Team. Background plan: Çatalhöyük Research Project Archive, modifications by Ian Kirkpatrick.

The renewal of interpretative resources that was implemented on the East Mound focused on narratives around those aspects of the site while incorporating findings from the applied visitor-centred methodology. It is worth noting that one of the new panels at the South Shelter focused on presenting the archaeological process and the methodological and technological tools employed by archaeologists at Çatalhöyük, which was one of the most represented themes in the visitor survey (see Perry *et al.* 2013).

6.3.1 Conceptual considerations of the visitor itinerary at Çatalhöyük

Since visitor movement has been dictated to a certain degree from the on-going fieldwork and research requirements of the site and although a great effort has been put on combining

those incongruous activities, the Çatalhöyük Research Project has been constantly reconsidering the conceptual and practical issues of presenting the site to the public. Today, the sequence of interpretative spaces that visitors encounter and experience at Çatalhöyük is as follows: first the visitor center, then the experimental house (soon to be four experimental houses), the North Shelter 'neighbourhood' and lastly the South area with the visible phases of the settlement. The conceptual schema of this process could be described as: interpretation in contemporary space – interpretation in a physically reconstructed space – interpretation in the space of physical remains, divided in the two aforementioned contexts. In terms of the conceptual sequence of interpretation it could be argued that there is no wrong or right solution and that there are good arguments in favour of the current or a reverse visiting process. The latter would start from the South area, in order to familiarise the visitor with the history of excavations (i.e., Mellaart's spoil heap), continue with a tour through the settlement's phases (i.e., remains under the Shouth Shelter), then focus on the domestic architecture and the narrative of a Neolithic 'neighbourhood' (i.e., remains under the North Shelter), which finishes with a visit to the morphologically crystalised interpretation of domestic architecture (i.e., the experimental houses). Finally, a visit to the visitor center would provide a more detailed and informative process to visitors, as an overview of what they previously experienced. Although, in the future, it is likely that the visitor centre will be made obsolete since the current direction of the Turkish Ministry of Culture is to incorporate the off-site presentation of Çatalhöyük in a separate section of the new Konya Museum[40]. Nevertheless, the suggested sequence would improve the current visitation state of the site for a number of reasons.

The first impression of the site is important to the overall experience. It has been argued that the configuration of heritage sites according to the demands of a thriving cultural tourism industry have resulted in a uniform visiting experience where visitor facilities and contemporary spaces override the interpretative nature of the actual remains (Matero 2010). At the same time, it is admittedly difficult to overcome the arguments in favour of development taking place particularly at heritage sites that have already attained a World Heritage status and are expected to accommodate general visitor needs (Feilden and Jokilehto 1998; also see Perry *et al.* 2014, pp. 178-180 for the increasing number of visitors at Çatalhöyük after the UNESCO inscription) or have created certain aspirations for boosting up the economy of local communities (Ganiatsas 2015). So far at Çatalhöyük,

[40] From discussions taking place between the directorship of the Konya Museum and the Visualisation Team at Çatalhöyük.

there are subtle contemporary infrastructures to support the on-going research and presentation of the site but still, the first spaces that visitors encounter are the contemporary visitor centre and experimental house rather than the actual Neolithic site. As it was demonstrated earlier, the same issue at Knossos was dealt with the 'transition' concept. In this case, the suggested sequence of the visited interpretative spaces may play an important role on mitigating the impact of contemporary development on the visitor experience, by firstly registering the actual Neolithic place in the overall experience.

A further argument is associated to the postmodern (i.e., postprocessual) interpretative approach to on-site narratives which enable multivocality, coexistence of conflicting heritage values and alternative interpretations (Silberman 2008). Arguably the tangible remains on the East Mound leave ample room for imagining for the reconstitution of the Neolithic remains and thus, offer an ideal ground for disseminating alternative interpretations for several aspects of the tangible and intangible aspects of the site without leaving a fixed impression on the visitor experience. At the same time, the following visit to the experimental houses can take place in the frame of the same narrative and can be instrumentally presented as one of the alternative interpretations. This approach also addresses certain criticisms which regard on-site experimental reconstructions as falsifications and fixed interpretation of the past (cf. Schmidt 1999, cited in Doughty and Orbasli 2007).

In other words, the aforementioned sequence is conceptually allowing for a more flexible interpretation of the remains and incorporates the didactic experimental houses in the embodied and multivocal interpretative approach of the site. Therefore, considering the sequence of the visit plays a significant role in catering for the visitor movement and experience, as it is tied to the idea of the overall narrative of the site while constituting the element that provides cohesion to separate events (i.e., stories about the site) (Cohan and Shires 1988). It should be noted that in storytelling, a place-based sequence is perhaps more constraining due to the rigidity of physical spaces than virtual spaces such as films, novels and computer gaming. Nevertheless, storytelling enables some flexibility in the sequence of presenting location-based stories about the site, with the interplay of kernel and satellite events (see Cohan and Shires 1988).

Finally, it's worth mentioning that the visitor feedback suggested that more interpretation should be offered about the environmental and topographical changes in the area since the Neolithic period and contextual comparison in relation to other Neolithic sites of Anatolia,

while other visitors feel that the path connecting the South to the North area should accommodate general interpretations about the site. This is an important point raised by visitors of the site, since the aforementioned path offers an ideal vista to the surrounding landscape from where visitors can be spatially oriented and receive interpretation about the distribution of other significant sites of Anatolia, as well as the environmental changes of the landscape as they overlook the current state of the plane from the top of the tell site (Figs. 6.26-6.27).

Figures 6.26- 6.27 Views of the visitor itinerary on the top of the East Mound.

Conceptual parameters for planning visitor movement at the South area[41].

Initiating the visitor tour from the South area aligns also with the envisaged concept of presenting the multilayered remains under the South Shelter as a 'walk up through time, from the earliest layers to the most recent' (Doughty and Orbasli 2007, p. 52). The main problem in this however, is providing an adequate accessibility arrangement in order to foster a better understanding of the aforementioned interpretative concept. As Vc#75 reports: 'I would have liked to get closer'. This is a characteristic reply from visitors when they are asked to provide their suggestions for enhancing the presentation of the site. Another visitor (Vc#4) referring to the South Shelter area remains, remarked: 'being close to the archaeology is very important to our experience'. The analysis of the visitor feedback also suggests that the granted accessibility to the revealed parts of the site and its content (mainly referring to the North Shelter area) was the most valued aspect of their experience at the archaeological site (see Perry *et. al* 2013, p. 292). Additionally, the Hotspot analysis of images captured by visitors in the South Shelter indicated that the lower vista presents three second class clusters of images, whereas the other two points of access (the south and east vistas) present one first class cluster each (Fig. 6.28). The interpretation of the results suggest that visitors take advantage of the spacious lower vista in order to move into different positions and capture instances of the view to the remains. The attempts of visitors to bring closer the distant space in the South Shelter is also evident in the extensive use of the camera zoom modality.

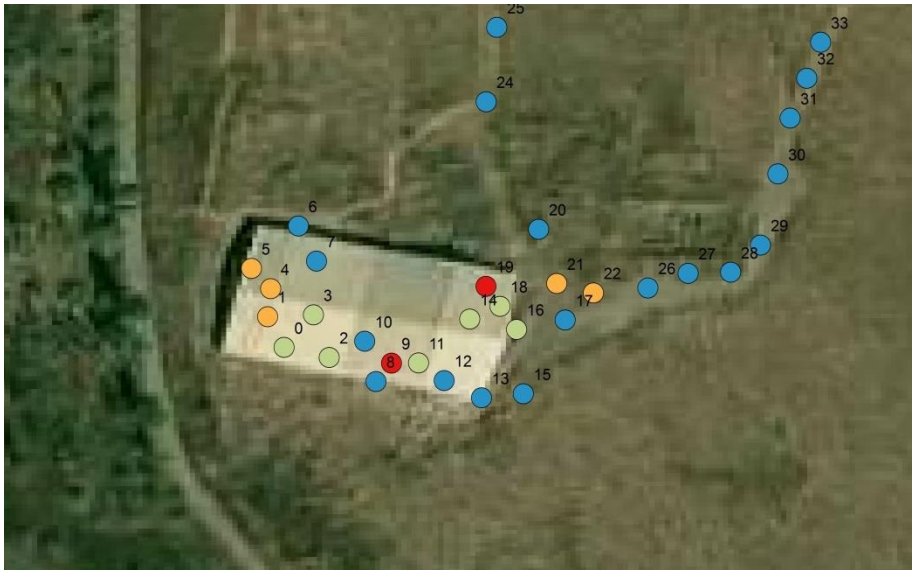


Figure 6.28 Hotspot analysis of the images captured at the South Shelter Area.

[41] For more information on the excavations and content of the site at the South Area see (Hodder 2005a; 2005b; 2007).

In the current state, the limited accessibility from the aforementioned three vistas offers a fragmented perception of the different levels (i.e., excavated phases of the site) and a 'loss of nearness'. The Neolithic remains in this area, even if the most effective analogue or digital interpretative media are employed, are more likely to remain illegible for visitors due to a twofold distancing inherent in the current state of accessibility. In the first occasion, visitors experience the past in its present form (time distancing) and in the second, to see and process what is 'there' from 'here' (space distancing). Certainly, the well-designed interpretative panels can provide through an interpretative approach, a contemporary experience about the past (Fig. 6.29). However, the space of interpretation becomes a mere backdrop in the overall experience instead of the experience itself through movement (Fig. 6.30).

In essence, the current visitor experience could be described as 'auratic' and perceptive based on the relevant discussion in Chapter 5, when one of the main arguments of this thesis is that movement and interaction assume a central role in visitor engagements with heritage places. Arguably, spatial distancing cannot be avoided with any means of interpretation and similarly spatial experiences cannot be evoked by any 'simulacrum substituting for absent presences' (Frampton 1983, p. 28). Professor Ian Hodder, acknowledging the benefits deriving from a somatic experience as well as the narrative potential of a 'walk up through time', has long been concerned about providing accessibility to the South Shelter area[42].

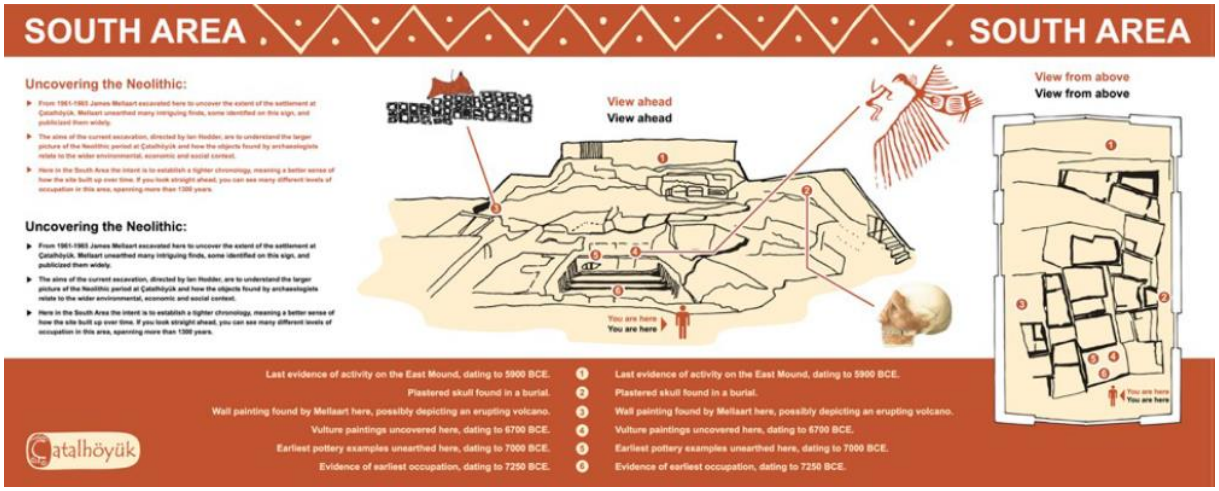


Figure 6.29 The new information panel for the lower vista of the Shouth Shelter area. Source: Çatalhöyük Archive Report 2013, p. 302, designed by Ian Kirkpatrick.

[42] From personal communication with Professor Ian Hodder at the site of Çatalhöyük.

Figure 6.30 A view of the South Shelter area from the lower vista.

Drawing from Venturi's 'ghost structure' concept, as well as the interpretative character of the site, I will discuss on a conceptual level how visitor accessibility, embodied experience of the heritage content and protection of the site, as ostensibly conflicting but equally accountable values of the site can be reconciled. As discussed earlier, due to the different levels created from the excavation of the area, the only practical means of providing accessibility to visitors is to consider raised walkways. Doughty and Orbasli (2007) have point out that raised board walks often create a false impression of the configuration and level of structures and in result they influence the perception and understanding of archaeological sites. Therefore, one ought to think about the morphological and configurational character of the site in order to envisage a suitable concept of raised walkways. The latter string of thought points to one of the most fascinating facts about central Anatolian streetless settlements, which is that people moved within those neighbourhoods across the created 'roof-scape' (Düring 2013). A counter argument for proceeding with an investment in the presentation of the South Shelter area would perhaps consider that the archaeological remains at Çatalhöyük are in a fragile and often illegible state and therefore, their current state offers limited potential for presentation (cf. Sullivan and Mackay 2012). However, the excavated phases of the site are very distinct and constitute a unique case of presenting the developments of the Neolithic cultural and social transition *in situ*.

The conceptual parameters for planning and designing[43] the visitor walkway at the South Shelter area are summarised as follows:

- Provide access in proximity to remains through continuous walking boards that follow as much as possible the excavated levels of the settlement.

- Utilise the concept of 'a walk up through time'. To achieve this, the visitor walkway will initiate from the lower vista and follow an itinerary that will provide access to buildings that are representative of each phase until the higher vista. Access can be facilitated by a combination of ramps, walkways and platforms (Figs. 6.31-6.32).

- Contemporary movement planned at the estimated height of buildings' roofs. Based on the study of experimental reconstructions, this height is approximately 2.50 m from the existing floor levels.[44]

- The physical augmentation of the 'roof-scape' can be represented by a combination of the visitor walkway, platforms and additional lightweight frames hovering over selected revealed buildings, in the form of art installations (Figs. 6.33-6.34).

- According to the investigation of visitor movement at Gournia and based on museum studies, spaces that enable a generative mode of visitor circulation are more effective in encouraging exploration, multiplicity in knowledge making processes and 'social co-presence' (Psarra 2009, p. 14). Thus, it is desirable that the combination of platforms and walkways enable variation in visitor circulation patterns and the intended 'walk up though time' concept is implied and not imposed by the design.

- Use of transparent surfaces and frame structures for enabling the visibility of remains and creating areas for digital projection.

- Apart from the physical augmentations, selected facades of those frames can be used as mixed reality projection surfaces for portable devices, thus, enabling a

[43] Although it was never intended to discuss in this research any technical details or provide a feasibility study of the design concepts, it is worth noting that in a discussion of this concept with Myrto Tsitsinaki, Civil Engineer, MSc Preservation of Monuments and Sites, it was asserted that there are indeed technical solutions for the implementation of the parameters described here.

[44] Based on a measurement report for the construction of the experimental houses by Sheena Ketchum. Source: Çatalhöyük Research Project Database.

digital augmentation and interpretation of the site. Although, spatial projections enable shared experiences, the design of those interactions ought to take into account the dynamic relationship between moving and lingering on the visitor walkway in order to prevent queuing.

Certainly, the aforementioned conceptual approach of visitor movement in the South area does not assume nor seek to stablish an in-depth understanding of how people moved in the settlement in order to attempt a recreation of past movement in the present or *vice versa* (Turnbull 2002). It rather constitutes a culturally informed scheme for creating movement affordances and embodied interaction with the physical space instead of treating it as a visual backdrop (cf. Mosler 2009). The act of orchestrating visitor movement based on the intended interpretative affordances of space may be utilised as a performative apparatus of the 'walk up through time' concept; as a live scene of this very concept for the observer in the lower vista who has a panoramic view of the site. As Turnbull (2002, p. 137) aptly remarks 'if space is performative, it has a history, and if knowledge is performative it is spatial.' To extend Turnbull's aforementioned notion, by enabling a performative visitor-space interaction through movement we enable meaning-making about the past.

It could be argued that the suggested approach is responding to the emphasis on the material value of remains (Araoz 2011) with a radical materialisation of place. However, what I argue here is that the physical augmentation of certain heritage spaces, particularly the prehistoric for the reason mentioned in Chapter 1, is a necessary response to the reality of places ascribed contemporary values (i.e., social, cultural, local). Thus, this approach chooses to utilise materialisation for meaning-making about the past, without using specific visual conventions for representation (cf. Moser 2001) and by embracing uncertainty in the reconstitution of structures (transparent materials and frame structures). At the same time it attempts to overcome the traditional conservation practices which prioritise the aesthetical integrity of physical remains – albeit, the latter being products of contemporary interventions, i.e., excavation – over interpretation.

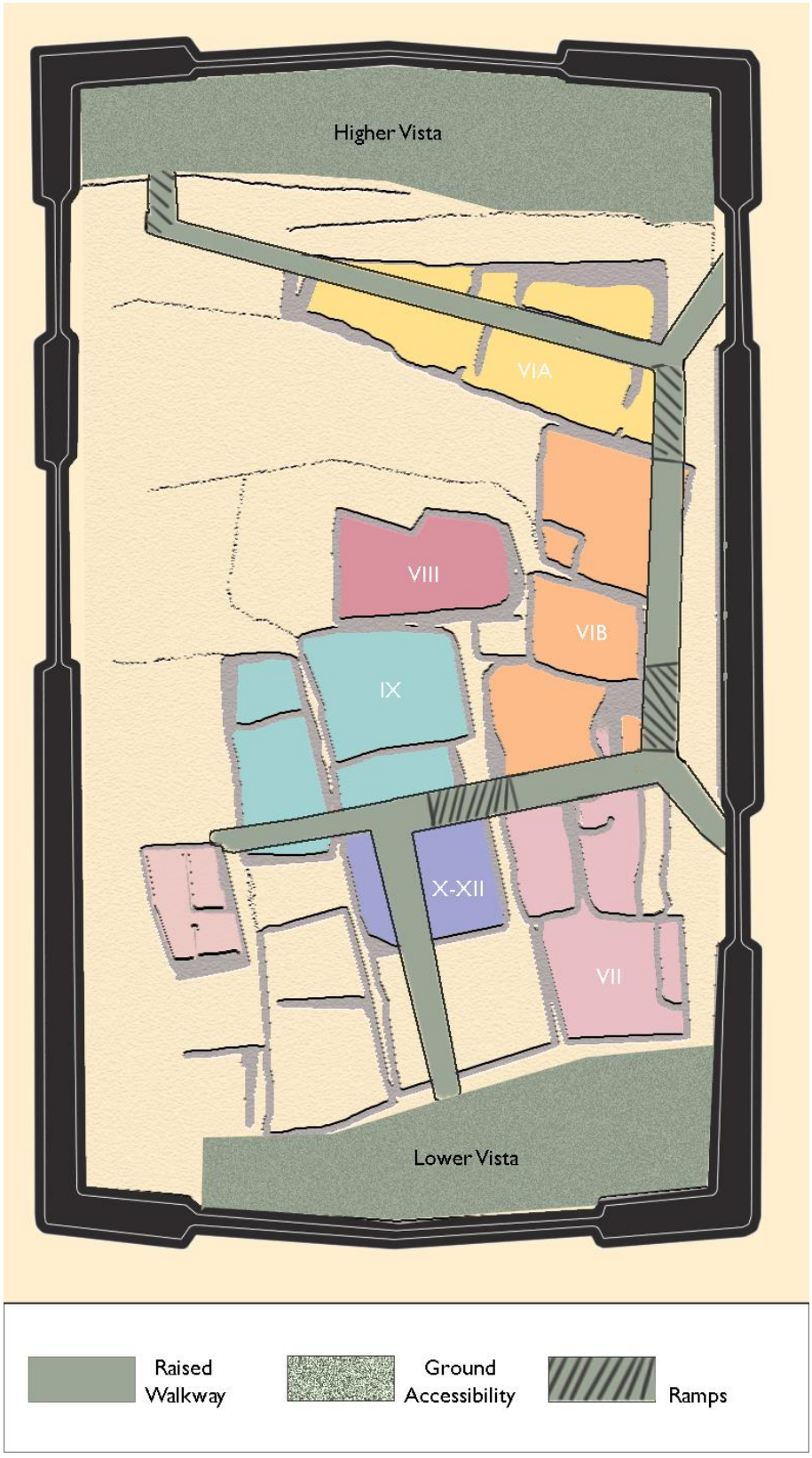
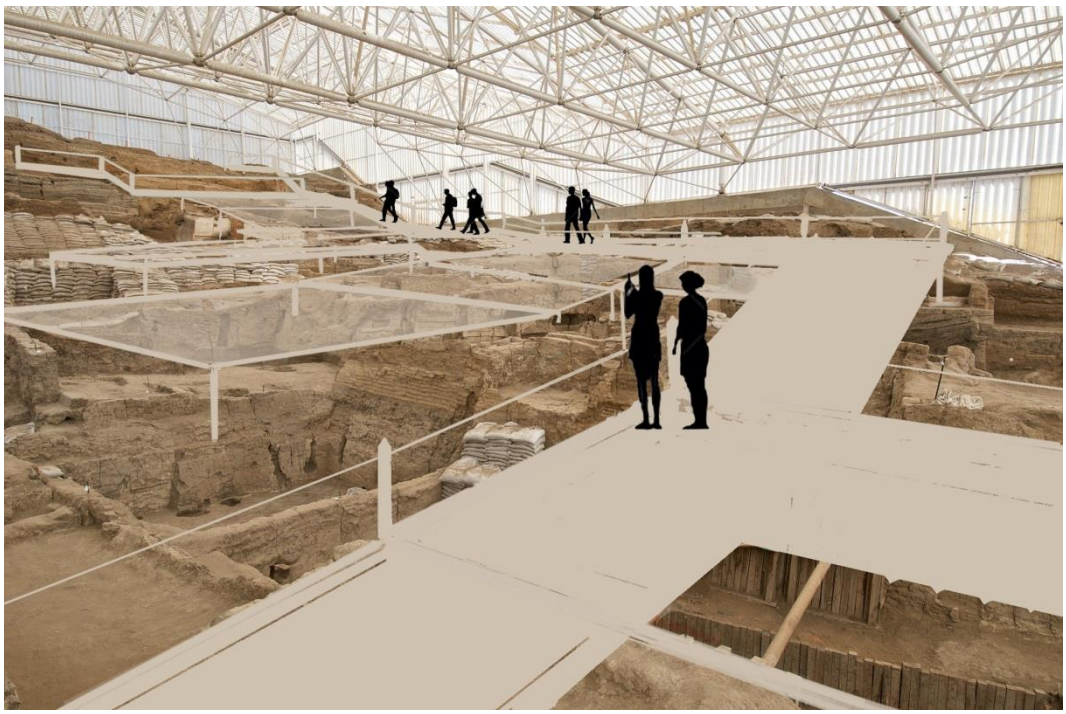
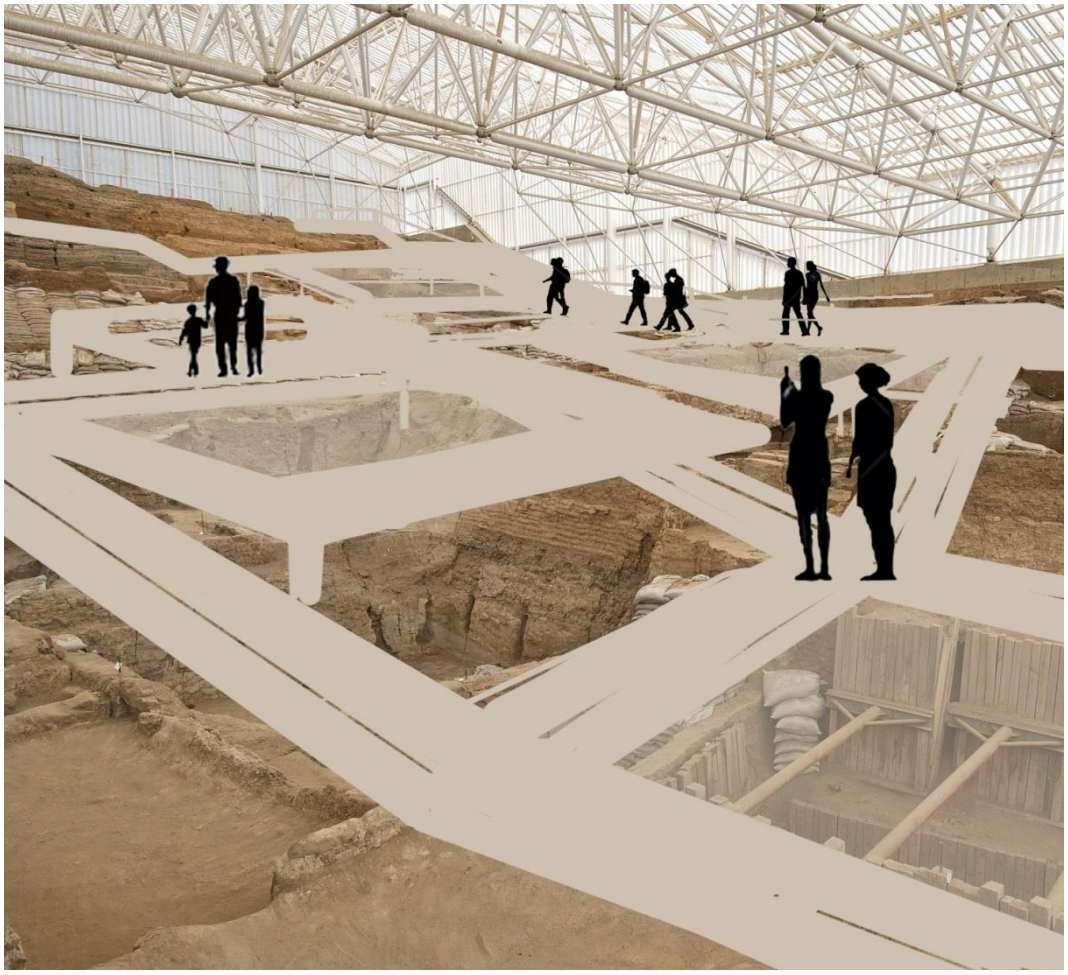


Figure 6.31 Conceptual plan of the proposed visitor walkway and accessibility areas. Notice the colour-coded phases of the settlement (as were interpreted in 2013) in background plan. Adapted by the South Shelter GIS Plan of 2012.

Figure 6.32 Conceptual plan of the proposed visitor walkways, platforms and accessibility areas. Adapted by South Shelter GIS Plan of 2012.





Figures 6.33-6.34 Perspective sketches on photograph as a proof of concept for the proposed raised walkways and platforms. Background image courtesy of Jason Quinlan.

6.4 Conclusions

In this chapter, I provide a discussion on conceptual planning as a valuable methodological tool for addressing visitor movement in cultural heritage sites, which can be informed and used in parallel to the visitor-centred approach. This investigation initiates from a critical discussion on two architectural interventions in the broader context of heritage places. What characterises the aforementioned architectural interventions is that they are contemporary works with cultural references, pertaining to the past and the present and therefore, they are ideally configured to reconcile conflicting values of heritage as well as to communicate cultural meaning. In the case of the Philopappos Hill, cultural references were appropriated for creating a dynamic relationship of movement and stillness. The paths and vistas created a place that is in a dialectic relationship with the past and the present, manifested in the contemporary movement along ancient traces and the designed vistas overlooking the ancient and contemporary urban features. On the other hand, the 'ghost frame' structure approach demonstrated that visually impoverished heritage spaces can become places of heritage, memory and engagement with the past through a 'transparent physical augmentation' design.

The latter conceptual design enabled more open-ended, elusive but at the same time somatic interactions and engagements with the heritage site (Matero 2010). Such approaches address effectively the visual ocularcentrism that dominates the interpretation of the built environment in the western cultures (Frampton 1983, pp. 28-29) and the frame in which the archaeological discourse constructs and disseminates knowledge about the past (Moser 2001; Thomas 2008). The potential of movement and interaction with the heritage spaces assume a central role in both cases. It is therefore postulated, that cultural and contextualised references, as employed mainly by the post-modernist architecture in the context of heritage sites, provide good examples for dealing with heritage spaces.

In the following sections, I critically engage with the current state of visitor itineraries in the cases of Knossos and Çatalhöyük and provide further arguments on the topic, which derive from the respective constructive assessments. In the case of Knossos, the conceptual plan of visitor itineraries is presented and assessed as an important methodological tool for heritage site management, offering the desired reconciliation between accessibility and protection requirements of the site. At the same time, the visitor-centred assessment of movement highlighted the areas where the designed walkways fail to function as intended. Based on the assessment, Knossos also exhibits limited considerations for a dynamic

relationship in designing movement and stillness. It was demonstrated that on a conceptual level, movement is regulated by connecting the main itinerary with secondary paths, while the whole circulation system is linked to open plan areas and peripheral vistas. Although the architects envisaged that this scheme would provide a desired variation in the visitor flow and circulation, in reality this principle alone was not enough to influence the visitor movement in a satisfactory way. The reasons for this were identified and associated mainly with the lack of provisioning for an integrated conception of movement, interpretative content of the site and media that would prompt visitors to follow different stories and therefore, make more use of the peripheral walk in a meaningful way. In the current state, the peripheral vistas offer fragmented views both towards the palatial complex and the surrounding landscape while there is a complete lack of interpretative media. Additionally, open areas such as the court are utilised as intermediate spaces for moving and queuing before accessing other spaces, rather than places of meaningful lingering.

In the case of Çatalhöyük, I raise the importance of linking conceptual planning with the interpretative character of the site where the site's content and the notion of 'augmented space' play an important role in reconsidering the visitor itinerary. The current state of visitor movement is critically examined based on observations of the interpretative nature of the site, the visitor interactions and the provided feedback. Accordingly, the sequence of the current circulation is offered an alternative view without dismissing the existing state, while the lack of accessibility and legibility of the remains in the South Shelter area are raised as the most important issue in terms of visitor movement and on-site experience. Drawing from the physical configuration and interpretative nature of the area, the concept of a 'walk up through time' and Venturi's 'ghost structures', I discuss on a conceptual level some design ideas that not only could render the area accessible to the public but could eventually offer a more creative, performative, embodied and meaning-making approach for its reconstitution. The conceptual parameters are entertained in a series of draft sketches on plans and perspective images of the area as a proof of concept of a purposeful 'physically augmented space' for enabling visitor movement in proximity to the remains and according to the interpreted phases of the site.

Overall, it becomes evident that culturally (i.e., historically and archaeologically) and socially informed conceptual planning is an important intellectual and practical endeavour in the process of rendering archaeological sites both accessible to visitors and protected. But what is also evident from the above discussion is that such informed conceptual plans can provide intuitive solutions for visitor movement provided that they acknowledge the

interrelated notions of movement and interpretation as well as their practical implications. It is not in the intentions of this research to engage in the possible modes and content of alternative interpretations at Knososs and Çatalhöyük, but nevertheless, the arguments provided here highlight the importance of integrated interpretative programmes and informed conceptual plans for planning visitor movement.

Chapter 7: Conclusions

7.1 Situating AHM today in broader movements

Before delineating the methodological and theoretical contributions of this thesis in planning archaeological walks and dealing with visitor movement in poorly preserved archaeological sites, I will provide a brief discussion on how the conservation and management of cultural heritage sites has been addressed until today. This discussion is conducted in relation to the broader movements and paradigms that influenced architectural and heritage discourses. The discussion initiates with modernity's emphasis on rationalism and functionalism, continues by denoting the postmodern frame in which the current theoretical debates of cultural heritage are conducted while the reality of heritage management is driven by marketing and business strategies that entrepreneurs, local governments and communities push in hope of economic revenues. Finally questions of what remains relevant today and thus, effective for dealing with cultural heritage sites will be raised. While this critique does not aspire to provide a clear direction or frame of yet another 'cultural heritage paradigm' it provides some considerations of the meta-modern paradigm in cultural studies that might pave the way for possible directions of dealing more effectively with visitor movement in archaeological sites.

In the early 20th century, the influences of the ground-breaking Modern Movement in Architecture were manifested in the renouncement of any association with the physical environment or the existing cultural and historic context (Hearn 2003). Instead the prevailing virtues of functionalism were received and adopted in the theoretical and applied field as the only rational approach to an effective architecture and therefore a much desired reformed society (Jacobs and Appleyard 1987, p. 113). One of modernists' assumptions was that:

> …there is a single right way to go about designing a building, one that, if faithfully followed, will lead inexorably to the right solution to the problems posed by the functional program. (Hearn 2003, p. 305)

This stance, that dominated the architectural thought and production of all scales, led modern architects to disregard the notion of contextual architecture and assume that their compositions would be eventually integrated with the surrounding built and natural environment through a self-evident and existing logical order (ibid, p. 70). Before

modernists, this assumption was admitted as a task difficult to master with rationality. Even Viollet le Duc argued that 'locus participates [in architecture] as a unique and physical place (Loukaki 1997, p.309). In this framework, the selective preservation of historic buildings, significant ancient sites and memorial places is closely associated with shaping the national identity and preserving the memory of 'a favourable past' (Silberman 2015), while massive demolition and clearance projects take place paving the way for modern development that aspired to address the challenges of the new era (Graham 1998 and 2000). Heritage Management was developed in 1970s under the influence of processual archaeology that was just establishing its 'scientific credibility', and whose intellectual rhetoric of the rational and objective aligned well with the bureaucratic operating modes of state institutions (Smith 1994, 1996). At the same time the museum became the interpretative consumption machine of the newly reformed, urbanised and globalised society (see Walsh 1992).

Certainly in the post-modern era, the international conventions, declarations and principles for cultural heritage and heritage tourism have provided a holistic framework and guidance for future actions taken in order to ensure the protection as well as the presentation of culturally significant places. However, the field of AHM seems particularly susceptible to a *cul-de-sac*, if it does not address in synergy and effectively the existing contradicting principles. 'Planning accessibility with appropriate permissions and restrictions in visitor movement', 'catering both for visitor experience and protection of archaeological sites', 'planning for archaeological walks and ensuring the aesthetic integrity of the remains' are only a few of the antithetic pairs pertinent to and encountered in this thesis, which co-exist as one entity in the Gadamerian sense (Gadamer 1986, p. 28, cited in Ganiatsas 2015) and ought to participate in a fragile equilibrium; that is to articulate and represent the values both of the past and the present (Ganiatsas 2015). According to the post-modern frame of thinking one would think that – at least on a theoretical level – the discussions in cultural heritage and architectural studies are still conducted in a postmodern frame:

> …a post-modern outlook accepts that the logic of a truly satisfactory solution may lead beyond purely rational formulation, tolerating ambiguities that result when competing truths come into conflict. (Hearn 2003, p. 305)

In reality and practice however, it could be argued that it is rather pragmatism and rationality prevailing in most interventions for regulating visitor movement until today. The relevant heritage management plans, whenever they include any reference to archaeological walks are largely dominated by endless logistics and measurable action proposals; albeit necessary to ensure the protection of heritage sites. Let us also consider

the ingrained influences of the conservation movement in managing cultural heritage sites (see Chapter 2, p. 42). Today, conservation still prioritises protection over interpretation (Cunliffe 2006; Demas 2002; Silberman and Callebaut 2006) and assumes that heritage values are found mostly on the material form and the scientific accuracy of treating it instead of using it as the foundation for an essential heritage interpretation and enhancement of heritage values (Araoz 2011; Matero 2000; Otero-Pailos *et al*. 2010). Once protection is the key priority in archaeological sites then it is arguable to infer that on-site inventions for visitor movement are implemented with a functional programme in mind. This is evident particularly in the Mediterranean tradition of dealing with heritage sites, where conservation and restoration have a long rooted tradition (see de la Torre 1997; Jokilehto 1999; Loukaki 2004; Mallouchou-Tufano 1998).

Vassilis Ganiatsas (2015), discloses and rejects the assumed 'neutrality', 'objectivity' and subsequently, the prevailing values of protective interventions (i.e. maintenance, preservation and restoration) over equally demanding contemporary values. Drawing from Gadamerian hermeneutics, he argues that today the underrated dialectics between contested heritage values ought to initiate anew and that conservation should be considered more as a creative practice rather than a mere technical implementation or a self-fulfilling theoretical endeavour. Furthermore, Ganiatsas argues that:

> Preservation should be a practice deploying intensions, choices and interpretations, as well as an overall stance, an idea or an aspiration that could resolve all conflicts of values. (ibid, p. 33)

Indeed, when societies choose to preserve ad hoc physical remains of the past they inevitably accept (or better yet, ought to accept) to render them accessible as well as socially relevant in their new role, .i.e., to become places that accommodate the vibration of a 'representational space' (Lefebvre 1991) and communicate the meanings of its intangible and tangible elements in an embodied manner (Loukaki 2004, p. 156; Lowenthal 1985, p. 245). In this, the tangible and intangible elements of heritage places do not assume to obtain self-evident values but ought to remain in an on-going dialectic state with each contemporary society (Araoz 2011; CE 2005; Silberman 2013, p. 29; Thomas 2006, p. 23).

What is argued here is that although theoretical discussions in the heritage discourse have been incorporating the postmodern directions of thought, it is rather worrying that we haven't seen sweeping changes in the way cultural heritage sites are preserved and presented to the public; and more specifically, in synergy. Although the twofold function of archaeological walks as main interpretative vehicles and instruments of the protection

strategies in AHM has been acknowledged (see Chapter 1), the latter prevails over the former in the conscious efforts of addressing and implementing archaeological walks. The justification of the *modus operandi* for the designed paths is limited to appropriate materials used, the accessibility and the protection offered to the rigorously conserved material remains, while the valuable process of conceptually and intellectually linking the interpretative programme of a site with the design of the 'interpretative physical vehicle' (i.e. archaeological walk) is usually ignored or loosely implied. Even in cases such as Gournia, where the prehistoric paved streets are used for the visitor movement, visitor movement is lacking any association with the interpretative programme as it was illustrated in Chapter 4.

While the postmodern era of thinking, fuelled up by the plethora of goods, ideas and a pluralistic mode of being on a social, political and economic abundance (Vermeulen and van den Akker 2010) acted as a fertile condition in AHM for spending our resources on preservation and expanding the 'paradigm of heritage interpretation' in novel but also ever-deconstructed technological and theoretical directions (Silberman 2013), it also became an unrealistic condition for choosing, acting and moving forward. The encompassing definitions of culturally significant places, the endless listing of objective, subjective and often contradicting values assigned to material and immaterial heritage could be part of the problem (Silberman 2015). Perhaps, this is due to the fact that the postmodern was 'merely the 'catchphrase' for a multiplicity of contradictory tendencies, the 'buzzword' for a plurality of incoherent sensibilities'(Vermeulen and van den Akker 2010, p. 4).

In fact, while academic circles were preoccupied with such debates, in certain regions where the neoliberal politics prevail, new stakeholders armed with marketing and business oriented strategies alongside multimedia and design experts entered the realm of heritage management to profit from a newly born industry (Hall and McArthur 1998; Silberman 2007a, p. 180). This growth and 'economic experience' doctrine, which still dominates the interpretation and presentation strategies of major archaeological sites, generated the 'sustainable heritage' paradigm; a view on heritage management that is largely modulated by economic factors (see Silberman 2007a, 2015), which prevail in today's societies in crisis. As it was argued in Chapter 5, the 'augmented space' paradigm applications seem to be completely separated from the realities inherent in cultural heritage preservation, accessibility planning and certainly lacking any considerations of how the visitor mixed-reality understanding of heritage spaces is linked with physical movement. Thus, the postmodern (i.e. postprocessual) intellectual debates in heritage management - even if

today seem to have exited the 'discursive introspective loop' (cf. Smith 1994, p. 300) – find it difficult to surpass or influence the rational tradition or the business strategies adopted by state institutions. Vermeulen and van den Akker (2010) describe in a concise sentence the characteristics of each modern phase and define the current direction from the perspective of cultural theory and philosophy:

> Indeed, if, simplistically put, the modern outlook *vis-a`-vis* idealism and ideals could be characterized as fanatic and/or naive, and the postmodern mindset as apathetic and/or skeptic, the current generation's attitude - for it is, and very much so, an attitude tied to a generation - can be conceived of as a kind of informed naivety, a pragmatic idealism. (ibid, p. 5)

This current attitude described by Vermeulen and van den Akker refers to a metamodern frame of thinking and dealing with our various practical affairs with the world. This frame is pressing for consideration in the heritage discourse as its outlook suggests more informed action with fewer resources. It is perhaps more capable of putting forward universally informed actions emergent from local and case-specific exemplars (Ganiatsas 2015) and preserving the archaeological/historic fabric and values of the past by providing pragmatic and contemporary social programmes. At the same time, this attitude is more inclined to admit that we may not satisfy all the rightful conditions of the discourse but also that the postmodern deconstruction and agony of the discipline in keeping the balances will inevitably lead to inertia; otherwise it is possible that yet another exogenous to the heritage discourse paradigm finds the space to pave the way and lead developments in the field.

The above account of how AHM has progressed in relation to broader theoretical and social developments is unavoidably conducted here in a precipitate manner. However, it provides a necessary background and valuable arguments in framing the current state and implying a direction forward. Particularly in the way archaeological walks can be dealt with, there is much scope in new theoretical and methodological directions in the intermediate considerations after policy making and management plans, and prior to relevant on-site interventions. Then the aforementioned conflicts and ambiguities along with the conditions of on-going dialectics and oscillation can create an ideal 'in between' space where we might search for pragmatic and creative solutions.

7.2 Archaeological Walks pertaining to practical, methodological, conceptual and digital considerations

This research aspired to move beyond disciplinary boundaries to think critically on a theoretical and methodological ground the way visitor movement is dealt with in challenging archaeological sites. The latter are addressed neither as remnants of formerly functional and social spaces nor as 'non-places'; that is of not having a present. In order to address the main question of this thesis, 'What does it mean to plan for visitor movement in archaeological sites in today's technologically enhanced society?', I approached contemporary movement and interaction with archaeological sites as the main vehicle for revealing those spaces' existing reality.

In this outlook the subsequent questions 'Can observations of the visitor movement-archaeological site interaction contribute to archaeological walk planning and how?', and 'What are the influences of physical and digital affordances in our interactions with cultural heritage sites? How can this notion be explored at a conceptual level?' were addressed. This research explored and proposed a technology enabled and visitor-centred methodology for assessing movement in archaeological sites, discussed and envisaged possible implications of physical and digital affordances constituting such spaces, as well as the underlying conceptual and methodological implications. This research pointed to and drew arguments from an interdisciplinary theoretical viewpoint pertinent to movement and heritage spaces, leaving aside the complicated and overly charged notions of visitor perception and experience. As I have argued, this thesis attempted to overcome the inherent notions of subjective and objective realities in the process of engaging with archaeological sites. It is therefore important to delineate the resonance of this research aimed to explore the 'in between' space in addressing visitor movement.

In the case of archaeological sites, visitor movement and locations of interest are defined by expert value placing processes. Usual practices of designating paths and areas of interest involve several contemporary structures (usually fixed interpretative and directional panels, walkways and kiosks) and infrastructures (i.e., visitor facilities), which may enhance or may diminish the archaeological site. A similar top-down approach has been ascertained in designing digital applications for enhancing the visitor experience in cultural heritage sites. Interpretation and points of interest are similarly designated by experts for the visitors to consume. In both cases the result is a closed interpretative loop both for experts and visitors. As it has been demonstrated, this closed loop is caused by the

inherent issues of a long-standing tradition in AHM and subsequently, the relatively new digital heritage applications follow similar paths. For instance, 3D acquisition of archaeological sites, aiming at their digital preservation and application of conservation strategies is by far the most common and developed technological application for archaeological sites. Based on the acknowledgement that archaeological walks constitute the vehicle for both protecting and presenting archaeological sites to the public, in order to address the main thesis question, a different outlook is needed. The latter ought to shift the attention in a process where the visitor-site interaction informs expert-led planning and *vice versa*.

As it has been demonstrated, the way we move within and interact with archaeological spaces is largely defined by the pace, the dynamic interplay between movements and lingering, the chosen paths, and our processing of the proximate and surrounding elements of such spaces. The aforementioned characteristics of movement transform spaces into places of experience and meaning. It has also been argued that places can afford multiple readings depending on the dynamic relationship developed between the characteristics of space, the moving bodies and the narratives assigned to places. The constantly changing equilibrium of those elements create the preconditions for the generated multiple realities of spaces. Thus, even though spaces are intended to represent certain meanings, the different subjects experiencing those spaces through movement provide multiple, ever-changing and often synchronised readings. The latter also reveal certain recognisable patterns of space through the aforementioned interactive relationship of multiple subjects with the same space. This approach also reveals the properties and configurational characteristics of those spaces which cannot be defined only by top-down assessments. In essence, this approach provides a novel outlook in thinking about archaeological walks.

It could be argued that the recorded multiple movements, lingers and interactions as manifested in the obtained tracking and photographic record revealed a different reading of the archaeological site. Emotions, intentions and more generally the complicated mechanisms of perceiving and experiencing were intentionally left underexplored, in order to focus on the reality of bodies moving in particular spaces. This approach provided a more democratic procedure for informing planning with physical and digital media. Technologies have played a substantial role in this, witnessed both in the employment of recording devices and computational methods of analysis, as well as in the envisaged dissemination systems. Nevertheless, they did not assume a central role in thinking about this research topic. Overall, a hybrid space of dialectics is created between subjects (i.e.,

visitor and expert) and objects (i.e., archaeological site and technological systems) which ensure that both visitor and expert-led values of those places are augmented. In this, the rigid boundaries between subjective and objective in planning archaeological walks are loosened and perhaps, the sought 'in between' space (i.e., physical and digital reality) is found.

7.3 Recurrent themes and contributions of this research

It is important to stress here, that both explored visitor-led and expert-led approaches contribute in a complementary manner in thinking and planning archaeological walks, as it was demonstrated in Chapters 4, 5 and 6. They also occupy the intermediate phases of planning between policy-making and actual implementations, which were identified as very crucial for determining this aspect of AHM; albeit, usually following expert-led processes and being left conceptually underexplored. Also, what became evident throughout this thesis, is that the influence of physical and digital affordances of spaces are almost never taken into account collaboratively in planning and designing archaeological walks. Stressing and highlighting the importance of exploring both in addressing visitor movement was perhaps one of the important contributions of this thesis.

The contribution of the visitor-centred approach was to provide a mixed-methodology for an effective assessment of the visitor-site interaction. As it was demonstrated throughout this thesis, such assessments pertinent to how visitors move within a given space and which POIs influence this interaction can provide valuable insights for informing archaeological walk planning at a conceptual and practical level. More specifically, the qualitative and quantitative visitor feedback identified certain post-visit accounts of their experience and the things that visitors valued the most from their visit. This feedback was juxtaposed with data obtained during the visitor-site interaction; in other words with synchronous to the experience feedback. This twofold visitor feedback was explored in an aggregated manner in Chapter 4, in order to expose certain general patterns of this interaction and the potential offered by the current state of the sites for movement and linger. In Chapter 5 (see section 5.3.3) however, it was also made evident that this approach can provide high resolution observations in terms of how visitors moved and what they enjoyed or missed out to experience in retrospect.

The latter exploration, also offered a robust method for envisaging novel media-enabled scenarios. The real data offered high resolution and site-specific observations for the creation of 'personas', types of visitors at Gournia. The approach of profiling has been typically explored in building more personalised and adaptive digital storytelling in heritage spaces, such as museums (see Ardissono *et al.* 2012; Pujol *et al.* 2013). Visitor surveys and observations are typically used as a way to approximate possible types of visitors and their preferences on a general level, while profiling and adaptation techniques are further used to optimise the personalisation based on visitor choices or behaviour (Pujol *et al.* 2013). Through the employed visitor-centred approach, such visitor personas are not only created on the basis of demographics, questionnaire type of surveys and observations, but on the basis of real interactions with the site, its features, content and surrounding stimuli. Such site-specific observations provide a useful source of high resolution data and reveal several issues of the visitor movement and interaction with archaeological sites as it was demonstrated and addressed in the hypothetical scenario (see section 5.3.3).

In terms of the implications of novel digital media in augmenting archaeological walks a number of issues were identified and constructively critiqued. Firstly, it was identified that during the past decade, research in this domain has been focusing mainly on visual but also on a diversity of multimodal mixed reality prototypes and the development of enabling technologies. This direction has certainly offered novel technological solutions in envisaging more engaging interactions and knowledge making about the past. However, it is argued that our intellectual engagements with practices that digitally intervene in already complicated places do not align with the fast pace of the aforementioned developments (FitzGerald 2012). This is a critique that gains ground in more recent publications in the digital archaeology scholarship (see Huggett 2012; 2015). Moreover, issues of sustainability of the 'augmented space' paradigm in cultural heritage sites and user engagement with the physical aspects of such places are raised. More specifically, questions of how such digital interventions in places impact the way we intellectually form associations about their past and present realities while we physically traversing and interacting with them, are emphasised in the arguments of this thesis which pave the way for further research.

While the literature review provided both a background in the formation of the above questions and some directions forward, a small-scale prototype study and a scenario-based exploration of novel media attempted to address on a conceptual level only a fraction of

the implications in visitor movement and planning. The prototype study, implemented to address the visual emphasis of such applications in tangible places, returned little insights but raised important theoretical and practical concerns about 'auratic experiences' in the context of the discussion unfolded in section 5.1.2. The rest of the arguments developed in Chapter 5 build on previous discussions concerning Benjamin's term of 'aura' (see Bolter *et al.* 2006, Hanson 2008) and consider the hypothesis that digital 'auratic experiences' which are viewed from a still position, may create incentives for movement. It is argued that if this hypothesis is valid, then it may be possible to manipulate visualisations of past environments or objects within real scene views in order to prompt desired movement behaviours. This outlook generates an interesting interdisciplinary field of intellectual engagements with and future research on mixed-reality visual applications in the fields of information and communication, HCI and AHM.

Further, the envisaged scenario addressed the current limitations of (the otherwise sustainable prospects) mobile mixed reality in relation to small screen interactions (i.e., reflection and distraction from the real environment) which diminish visitor experience. What is argued here is that digital enhancements of archaeological sites ought to refocus the interactions and the visitor 'gaze' on the physicality of remaining archaeologies and augment their intangible extensions. This way a substantial shift from 'augmented space' to 'augmented place' is sought. As it has been argued, location-awareness and adaptation are perhaps two of the most important elements of novel technologies on a conceptual level. Those two elements are considered as principal in the subject's interaction with space and technological systems. In the envisaged scenario, the subject's intuitive movement within the site, or better yet the subjective reading of the existing place, primarily defines the interactions with the system. Location-based digital interactions and augmentations of open-air heritage sites is a very challenging field of research; even more so than in museum-based interpretation, where such applications have been purpose-built developed and flourishing for a while (Ardissono *et al.* 2012).

A common occurring theme throughout this thesis was the ascertained dynamic relationship between movements and lingers and its role in thinking about archaeological walks. Concerning this relationship in the visitor-centred methodology, it was demonstrated that the latter revealed the hotspots of aggregated dwelling interactions of visitors with the archaeological site. In some cases, such as Gournia the results are more impressive and meaningful than others, such as in the case of Çatalhöyük. In the case of Knossos this relationship constituted a conceptual and practical design approach of the

conservation programme. However, the visitor movement analysis indicated that this element of design was not part of an integrated approach in the conceptualisation of the visitor itinerary. More specifically, it lacked the twofold conceptual and practical linking of interpretation alongside protection and accessibility in implementing the network of paths (see section 6.2) in an effective way. Additionally, in the case of Gournia, where there was no prior knowledge about visitors dwelling areas, this relationship revealed the two most popular locations of lingering, namely, at the low panoramic vista of the town and the hilltop area of the palace. Such information can significantly inform the interpretative planning process and related implementations, and make them relevant to character of the site, the visitor flows and/or the conservation strategies. It is therefore argued that integrated approaches to planning visitor accessibility with the notions of movement and linger in the context of AHM plays a principal role.

Conflicting issues in archaeological walk planning, such as those identified throughout this thesis, were also addressed. The pertinent arguments exploring this aspect of planning archaeological walks suggest that those contradictions are inherent in the nature of regulating visitor movement (i.e., protecting, providing access and presenting the site to visitors) (see Chapter 1). In Chapters 5 and 6, those tensions are addressed as mutually dependent factors rather than conflicting notions of archaeological walk planning, and offer a constructive dialogue towards resolving them. More specifically, one of the reasons for addressing visitor movement in archaeological sites is to attempt a reconciliation of recognised contradictions. In the case of Gournia, the free form movement within the site identified areas with increased accessibility, a fact which in the long-term causes deteriorations and erosions to fragile structures and materials of the site; even if the latter does not suffer from excessive visitor flows. The envisaged pervasive system responds with subtlety to the visitor interaction with the site, it becomes more intrusive when the visitor interacts with sensitive areas, while overall it responds in an affecting and interpretative manner.

In Chapter 6, the discussion is drawing from a broader context and examples of conflicting heritage and cultural values to demonstrate how conceptual planning and contemporary architecture has addressed them. Besides, architecture is perhaps the principal field of Arts that has been very efficient and creative in doing just that in the postmodern era. A number of different conflicts related to access, protection and presentation are debated within the frame of commonly contested social and heritage values. In the case of Çatalhöyük, the visitor itinerary is discussed in relation to the orchestrated archaeological research and

conservation schemes, which resulted in a rich interpretative conceptual and practical manipulation of the East Mound for constructing and disseminating the Neolithic place. The on-going research, thus far, has kept those interpretative plans in a state of hibernation. As it has been demonstrated, the archaeological site remains largely illegible and particularly the South Shelter area is mostly inaccessible. The notion of informed conceptual planning (i.e. planning based on the visitor-centred data) at the South Shelter area is applied for envisaging access, movement and a 'physical augmentation' of the area itself (see 6.3.1). The interplay of novel media in a shared somatic and performative experience of Çatalhöyük preconditions the physical augmentation of the current illegible and inapproachable space.

Ultimately, the aforementioned themes and contributions of this thesis highlight its principal focus on the role of the physical body in structuring the understanding of complicated heritage places such as prehistoric archaeological sites. This could be considered as only one of the unexplored conventions that cultural heritage scholars and practitioners ought to start delineating and establishing for cultural heritage sites following the example of museum studies and archaeological visualisation (see Moser 2001; 2010). Future research instigated by this thesis could also expand on each of the three interrelated aspects of this thesis namely, understanding the visitor-heritage site interaction, the implications of mobile interpretative technologies for visitor movement and experience, as well as exploring informed conceptual design for presenting heritage spaces. While each of these strands of research can benefit from further in-depth analysis, at the same time each should take into account the implications of the other two. This thesis has also demonstrated that there is tight link between the research fields of Cultural Heritage studies and Human Computer Interaction which deserves more attention than it has received until today. In this thesis a number of research topics have been initiated towards this direction which merit further investigation such as:

- Can we design novel technologically enabled experiences that prompt and enrich our outward physical engagements with open-air heritage sites and how?
- Can digital visualisations impact the way we physically traverse and interact with heritage sites and how?
- How can the identified interplay between movement and linger in conceptual planning be used in designing digital experiences?

Today, the main preconditions for ‘augmenting archaeological walks’ remain unsatisfied as stressed throughout this thesis; an opening up of the interdisciplinary dialogue and reversing the community’s research questions from ‘how can we do this with more guidelines, better conservation techniques and technologies?’ to ‘what can we do to effectively and meaningfully augment cultural heritage sites and the visitor experience and how?’. Whether this question can be addressed by new theoretical directions and active engagements with heritage (Lekakis 2009; Smith 1994) or informed creativity and creative solutions (Ganiatsas 2015), it should be able to convince all relevant research communities and the state institutions for a strategic shift in dealings with heritage. Likewise, our discipline’s fierce criticisms to architectural and computer science communities involved in cultural heritage applications should be conducted from an informed standpoint of the different theoretical, epistemological, practical and creative outlooks that each field has to offer to our shared heritage. In this dialectic, we all ought to participate with our unique and versatile disciplinary insights in order to construct knowledge about the past and new meanings for the future. And to conclude with paraphrasing Deleuze from the Fold (1993, p. 104), if there is a finality in this process, it is only what these dialectics are effectively producing.

Appendices

Appendix A

General information about the visiting process

A. Did you have any previous information of the archaeological site?

1. Yes **(Go to Question A1)**
2. No **(Go to Question B)**

(Only if you answer Yes at Question A)

A1. From what sort of resources did this information come from?
(*You can give **more than one** answer*)

1. Internet
2. TV
3. People that have visited the site previously
4. Books/Magazines
5. Other resources
9. Don't know/ Don't remember

B. Which way are you visiting the archaeological site?

1. Individually
2. With group
3. Friends/Family

C. What interpretative resources did you use to navigate around the site?

1. Guide
2. Guide book
3. On-site information panels
4. Nothing. Wondered around the site along predefined paths
5. Used smart phone for getting information from the internet.
6. Other

General visiting assessment

D. Could you mention **three (3)** things that you **liked the most** about this archaeological site?

1. ……..
2. ……..
3. ……..
9. Don't Know/ Don't Answer

E. Could you mention **three (3)** things that you **liked the least** about this archaeological site?

1. ……..
2. ……..
3. ……..
9. Don't Know/ Don't Answer

Accessibility assessment

F. How would you describe the intra site accessibility?

1. Extremely Satisfying
2. Very Satisfying
3. Neither Satisfying Nor Disappointing
4. Very Disappointing
5. Extremely Disappointing
9. No Answer

G. Which of the following parts of the site you would like to visit but were **not accessible**? (If you give an answer go to Question H. If you do not go to Question J)

1. Antiquities located off the main walking paths
2. On-going excavation area
3. A spot from which you thought you could enjoy an overall view of the site or the surrounding landscape.
4. Other (please specify)……
5. None

(Only if you answer at Question G)

H. Were you informed of the reasons why you couldn't have access?

1. Yes
2. No

I. Were you provided with any other kind of interpretation of the non-physical accessible parts of the site?

1. Yes
2. No

Comment on the spatial perception of the site

J. In a scale of zero (0) to ten (10, place yourself depending on how much aware you were each time of your position in the site; zero (0) means completely unaware and ten (10) means completely aware.

0(Completely Unaware)
1
2
3
4
5
6
7
8
9
10(Completely Aware)

K. Generally speaking, how easy is this archaeological site to get around?

1. Very easy
2. Fairly easy
3. Neither easy or difficult
4. Fairly difficult
5. Very difficult
9. Don't know

L. How well do you think that the on-site provided interpretative resources (paths, information panels etc) enabled you to navigate around the site?

1. Very well
2. Fairly well
3. Neither well or bad
4. Fairly bad
5. Very bad
9. Don't know

M. How well were you able to identify the ancient structures and understand their use?

6. Very well
7. Fairly well
8. Neither well or bad
9. Fairly bad
10. Very bad
11. Don't know

Comment on the aesthetical appearance of the site

N. Please give a score in a seven point scale when thinking the following:

	Very Bad						Very Good
Preservation state of the site	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Conservation and maintenance of the site	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Contemporary structures and plantation	**1**	**2**	**3**	**4**	**5**	**6**	**7**
The coexistence of contemporary structures with the monuments	**1**	**2**	**3**	**4**	**5**	**6**	**7**

General Personal

O. How well do you feel the on-site interpretative resources met your needs?

1. Very well
2. Fairly well
3. Neither well or bad
4. Fairly bad
5. Very bad
9. Don't know

P. Try to think for a while what the site is missing in terms of interpretation. Please give (3) things that first comes to your mind?

1. ……..
2. ……..
3. ……..
9. Can not think of anything.

DEMOGRAPHICS

Gender

1. Male
2. Female
9. No Answer

Age

1. 15 -24
2. 25- 34
3. 35 – 44
4. 45 -54
5. 55 -64
6. 65+
9. No Answer

What's the <u>highest</u> level of education you have achieved?

1. Not completed primary (compulsory) education
2. Primary education or first stage of basic education

3. Lower level secondary education or second stage of basic Education
4. Upper secondary education
5. Post-secondary, non tertiary education
6. First stage of tertiary education (not leading directly to an advanced research qualification)
7. Second stage of tertiary education (leading directly to an advanced research qualification
9. No Answer

How many years of education have you completed?

1. ……..
99. No answer

Country of origin

1. UK
2. France
3. Germany
4. USA
5. Greece
6. Turkey
7. Other…….. (Please specify)

Which of the following best describes your current work?

1. **Traditional professional occupations**
   such as: accountant – solicitor – medical practitioner – scientist – civil/mechanical engineer 01

2. **Modern professional occupations**
   such as: teacher – nurse – physiotherapist – social worker – welfare officer – artist – musician – police officer (sergeant or above) – software designer 02

3. **Clerical and intermediate occupations**
   such as: secretary – personal assistant – clerical worker – office clerk – call centre agent71 – nursing auxiliary – nursery nurse 03

4. **Senior manager or administrators**
   (usually responsible for planning, organising and co-ordinating work and for finance)
   such as: finance manager – chief executive 04

5. **Technical and craft occupations**

such as: motor mechanic – fitter – inspector – plumber – printer – tool maker – electrician – gardener – train driver 05

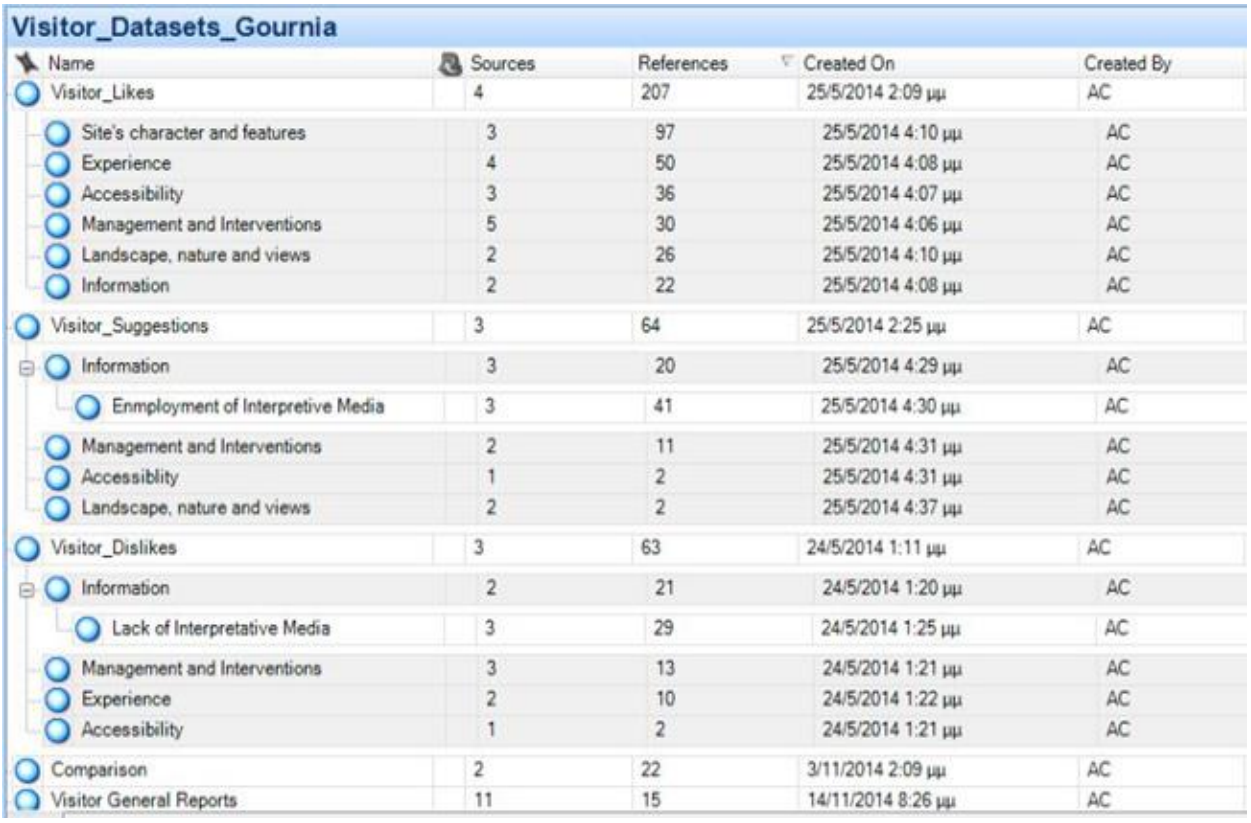
6. **Semi-routine manual and service occupations**
   such as: postal worker – machine operative – security guard – caretaker – farm worker – catering assistant – receptionist – sales assistant 06

7. **Routine manual and service occupations**
   such as: HGV72 driver – van driver – cleaner – porter – packer – sewing machinist – messenger – labourer – waiter/waitress – bar staff 07

8. **Middle or junior managers**
   such as: office manager – retail manager – bank manager – restaurant manager – warehouse manager – publican 08

9. **(Don't know)**

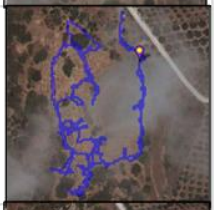
Appendix B



Visitor_Datasets_Gournia

Name	Sources	References	Created On	Created By
Visitor_Likes	4	207	25/5/2014 2:09 μμ	AC
Site's character and features	3	97	25/5/2014 4:10 μμ	AC
Experience	4	50	25/5/2014 4:08 μμ	AC
Accessibility	3	36	25/5/2014 4:07 μμ	AC
Management and Interventions	5	30	25/5/2014 4:06 μμ	AC
Landscape, nature and views	2	26	25/5/2014 4:10 μμ	AC
Information	2	22	25/5/2014 4:08 μμ	AC
Visitor_Suggestions	3	64	25/5/2014 2:25 μμ	AC
Information	3	20	25/5/2014 4:29 μμ	AC
Enmployment of Interpretive Media	3	41	25/5/2014 4:30 μμ	AC
Management and Interventions	2	11	25/5/2014 4:31 μμ	AC
Accessiblity	1	2	25/5/2014 4:31 μμ	AC
Landscape, nature and views	2	2	25/5/2014 4:37 μμ	AC
Visitor_Dislikes	3	63	24/5/2014 1:11 μμ	AC
Information	2	21	24/5/2014 1:20 μμ	AC
Lack of Interpretative Media	3	29	24/5/2014 1:25 μμ	AC
Management and Interventions	3	13	24/5/2014 1:21 μμ	AC
Experience	2	10	24/5/2014 1:22 μμ	AC
Accessibility	1	2	24/5/2014 1:21 μμ	AC
Comparison	2	22	3/11/2014 2:09 μμ	AC
Visitor General Reports	11	15	14/11/2014 8:26 μμ	AC

Appendix Figure 1. An instant from the NVivo workspace with all classes of nodes expanded. Here subclass 1 is highlighted.

#visitor	duration (mins)	distance (km)	GPSpoints	#photos	log-pattern
v1	40	0,96	1300	65	
v4	75	0,92	811	14	
v5	35	0.96	1080	64	
v9	24	0,92	750	22	
v10	35	1,11	1069	20	
v12	84	2,26	2550	13	
v16	36	0,91	1078	115	
v17	21	0,98	630	20	

Appendix Figure 2. An example of variables derived from the GPS and image data.

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