ABSTRACT

This paper investigates how digital media and screen-based navigation can be utilised to provide engagement with prehistory. In light of the importance of material remains and the increased pressure of tourism, it is important to find creative solutions to physical visitation that continue to provide meaningful experiences for visitors. Rather than revisiting the more familiar questions of digital preservation and conservation, the paper explores how computer game techniques can be applied to create compelling cultural experiences.

Rethinking digital interaction for cultural heritage is located in the architecture of Mnajdra, a Maltese Megalithic temple and recent work by game researchers and archaeologists. Focusing on the spatial structure of the oldest freestanding monument the paper proposes that the role of spatial navigation and praxis is central to an embodied understanding of the past. It extends on the phenomenologically inspired investigations on the Mnajdra temple by Christopher Tilly and David Turnbull to suggest that participatory knowledge emerges from the performance of movement in both physical and digital spaces (Tilly 2004, Turnbull 2002).

Using examples from computer game design, the paper argues that the inclusion of spatial navigation and visual perception are important for considering end-user interaction with digital heritage. Describing temple morphology and forms of user agency, the paper addresses how the visitor might interact with prehistory through the construction of interactive scenarios that create cultural and social presence. It demonstrates how gameplay techniques can be developed for an exploration of temple spaces that speak to and encourage a more phenomenological informed encounter with the past.

Such concerns are formative ones for the crossover between archaeology, heritage research and digital media. New knowledge in this area contributes to further understanding of the procedures international communities might use to construct new modes of engagement for cultural heritage. This research is also applicable to the development of protocols for sharing heritage material across international archaeological communities, museums and commercial ventures.

KEYWORDS
Navigation; virtual heritage; computer games; spatial exploration; aesthetics

1. INTRODUCTION

For prehistoric culture where direct access to material remains is threatened, denied or unavailable, digital media plays an increasingly important role. This role is often understood to be primarily one of conservation or high-end visualization. While the storage of historically accurate data is of enormous value for archival and research purposes the last ten years of virtual heritage has shown us that the creation of a digital simulation can result in a sterile empty geometry without any sense of social markings or lived history (see Gillings 2000).

Computer gameplay can offer a highly sophisticated form of interaction that moves beyond functionally detailing the monument or cataloging artefactual remains. As this paper argues, computer games can be usefully adopted to offer a socially captivating engagement with prehistory. This engagement is not only limited to the forms of representation but expressed through an embodied performative interaction with cultural history. Such an engagement introduces a different type of audience - a more knowledgeable and informed user who can play with and interrogate historical possibilities.
2. MEETING BETWEEN COMPUTER GAME SPACE AND CULTURAL HERITAGE

Techniques derived from computer games have much to offer meaningful negotiations of archaeological prehistory. While it is not being suggested that computer games can replace a direct encounter with the material remains of the past, techniques of spatial exploration, user challenges and experiential agency can offer cultural visitors a different form of site visit and a new type of historical engagement. The significance of space in computer games is understood here as: firstly, a form of representation, secondly as experiences of movement and thirdly as embodied presence (Lefebvre 1991). The first notion of space - representation is commonly ‘three dimensional’ - that is based on thousands of polygons that make up a Euclidian XYZ grid of geometry. The second notion of space – the users experience of movement is enacted through navigation of the digital terrain and played out in relation to attraction and resistance built into the geometry. The third notion of space – embodied presence brings together the perception of movement at the moment of encounter.

As Grima points out Euclidian models of space (common in computer games) are quite unlike the lived experience of space (Grima 2003). Based on a mathematical structure, Euclidian models of space present the representational world as objective and homogeneous. Yet considerations of space in computer games can be opened out to include Lefebvre’s other two spatial categories - perceptual navigation and embodied presence. Looked at from this broader perspective, game play can play a significant role in evoking an affective and participatory relationship to cultural heritage. Through navigation of the digital topography and the development of spatial memory players engage in a particular form of dialogue with the past. Turnbull writing from a sociological approach to scientific knowledge describes visitors to Mnajdra as marking, performing and creating meaning through the practice of movement (Turnbull 2002). He describes this as a ‘theater of knowledge’ whereby meaning is a matter of usage, of embodied performance. By extension and drawing on the considerable participatory and dynamic possibilities offered by digital media, users encountering the temple architecture as a ‘theater of knowledge’ are immersed in a spatially enacted engagement with the past.

Putting this in the local terms of a digital environment based on the Maltese temples, such questions as what went on in a Maltese temple? (Evans 1996) or is there any astrological significance to temple orientation? (Trump 2002) can be explored dynamically as the user navigates through the space. These questions structured into the game design demand environmental exploration, elicit the act of looking and call for an emergent knowledge based response. Rather than being distracted by the spectacle of interactive technologies, spatial praxis in a computer game landscape can vividly create an affective dialogue with a location. Questions of historical and archaeological importance can thus be enhanced by a dynamic spatial relationship between user and monument.

2.1 Maltese Temple space

The morphological and mythological schemas of the Maltese Megalithic temples embody the spatial principles of circularity and receptivity. A number of separate zones characterize the temples’ layout; in particular the trefoil arrangement of semi-circular or horseshoe shaped rooms. The spatial arrangement of the architectural features is interpreted as a part of an overall argument for sacred exchange and activity in which the people of Malta would partake. As John Evans one of the foremost authorities on Maltese prehistory concludes ‘their primary use was for ceremonial and ritual activities directed to the propitiation of supernatural forces and/or beings’ (Evans 2002).

Mnajdra South temple – Tarxian Period c 3,600-3,000BC
The most outstanding characteristics of the structure are the transitions between inner and outer, public and private, emphasised through doorways and portals, alcoves and altars, fire pits and libation holes, central apses and enclosed side chambers. V perforations and pits in the doorways appear to be designed to hold screens or bars. This means that the visitor may have been barred from seeing the whole of the space at one time. In fact temple morphology suggests a space for movement rather than ways of looking. Steps leading from one apse to another – from outer to inner temple space are raised – indicating an upwards movement requiring a type of efforting towards a higher level. These clearly demarcated zones cause a pause – a moment of contemplation in negotiation towards the inner temple.

At present the temples are open to the sky. Many archaeologists have proposed that the temples were largely roofed (Trump 2002, Evans 1996). Based on this, being inside the temple would be equivalent to being in an underground labyrinth like the Hal Saflieni hypogeum or the underground chambers of the Xaghra stone circle. The suggestion put forward by Evans and supported by Trump is that the temples are a natural progression from tomb architecture to Megalithic architecture, built above ground, instead of being hollowed out into the earth, for burial rather than for ritual use. This structural connection can be seen in the similarity between the underground multiple lobed chambers of the Xemxija tombs and the above ground circular organization of the temple architecture. The abundant use of ochre, spirals and the snake relief from Ggantija also suggests a connection with the underworld, chthonic cult of death and rebirth. Others offer different hypotheses on the temple organisation. Grima, for instance, applying a cosmological interpretation, proposes that while it seems likely the apses were roofed over the courts may have been open to the sky. If this model is accepted this would have led to a dynamic interplay of the light and dark at different times of the day and during different seasons (Grima 2001).

Mnajdra follows a circular or apse like pattern familiar in the other Maltese temples. Mnajdra is a three-temple site on an almost circular forecourt dating from roughly 3,6000 to 2,5000BC. (It should be noted that dates differ markedly in archaeology reports). One of the temples is three apse (trefoil) -the East temple of Gganitja period. The South temple and the middle temple are both four apse (cinquefoil) – from the early Tarxian and the Tarxian period respectively (Pace 2004). A trajectory through the temple complex permits an auspicious perambulation from one concave room to another – with connection between the temples via a large open area or forecourt. This large courtyard would facilitate ceremonies or large gatherings. Here the outer space or morphological of the temple landscape and its features is linked with mythological and ritual space. As Trump suggests processions, singing, dancing, and sermonizing are only a few of the activities that might have taken place there (Trump 2002).

2.2 Spatial navigation

Taking this morphology into a games environment creates an immersive setting where local prehistoric cultural activity can be explored. Game space is occupied space and from this a user can investigate what might have happened and how people might have lived in relation to the beliefs and activities of an oral prehistoric context.

Games codify and limit computer game space and these structures set the rules for how the game might be played. In conquest games, play is about claiming territory, in exploratory games, play is integrated into a quest structure. For the co-joining of education and play, exploratory game space can be designed to include objects and monuments of spatial importance that draw out connections between material culture and archaeological theories. Temple reconstruction and an object inventory can be linked to a database of
archaeologically rich information. In this way visitors interact with world prehistoric cultures through a significant sense of psychological immersion in a space rich with cultural and social presence.

The movement through the space creates an understanding of the space. The environment can be designed as a phenomenological playing space that activates the body to negotiate the specifics of the temple design. For example, a view through the orthostats and trilithon entrances of Mnajdra can entice the user to move from the outer courtyard into the internal ritual space of the temple. Spatial obstructions can be designed that require users to adopt ritual ways of moving or bodily gestures such as crouching, bowing, sitting, dancing. Portholes offer resistance so that the user has to bend down when entering spaces such as the small side chambers or the oracle hole. Paths and obstacles can aid or impede navigation so that the user visits particular parts of the building such as the inter-mural rooms in a deliberate order or in accordance with a precise purpose. These specific bodily attitudes, spatial emphases and postural gestures are expressed in each unique moment-by-moment encounter with the temple morphology.

The architecture of the space is mapped with activities, challenges and affordances. Affordance is the ability of players to interact with objects and entities in the game world based on the probabilities associated with them. The challenge might be to interact with a prehistoric bowl or figurine by locating it in a position suggestive of ceremonial use – for instance moving it from the rubble on the temple floor to the pillar alter in one of the adjoining rooms of the south temple. In this way rather than being museum pieces, artefacts become components of ongoing cultural processes.

Tasks can be designed for exploring the manner in which the temples have been added to and altered in response to specific needs at different times. A challenge might be to position curtains or screens between temple levels to initiate particular ritual or ceremonial activities. As a test of skill using observation and logic – users could be required to locate door perforations, cloth or other screen material, and make links between symbolic and ritual patterns of usage. In this way users synthesise material evidence with archaeological interpretation. Further information could be sought from a range of source materials represented through the metaphor of lost records – such as – ‘the book of ceremonial suggestions,’ ‘the book of antiquities’ and ‘the book of symbols’. These books act as vehicles for showing early drawings, diaries and paintings that reveal different stages of archaeological investigation. For Mnajdra, the important plans of Dr Albert Mayr of 1901 and Ceschi’s reconstruction drawings of 1939 are an example (Stroud 2003). Other characters or ‘ghostly presences’ can be introduced as guides or vehicles for helping the user solve challenges or tasks.

Movement through the landscape is not linear - players create their own trajectories of curiosity. Significant archaeological features such as the figurines, libation holes and door jams can be used as attractors linked to game activities. As Alison McMahan outlines there are a range of ways that attractors function. In the game environment these might translate into: ‘mystery objects the user may want to examine, such as moving objects that attract attention (such as animation), objects needed for tasks, …….. objects that cause fear, alien objects that indicate the end of a level, sensation objects that attract attention through the
non-visual sense, awesome objects that impress by their size, and dynamically figured objects that relocate in space and time’ (McMahan 2003).

Such attractors tempt the user to do something, elicit the act of looking and bring critical attention to an artefact. Artefacts created as rotatable 3D objects can be analyzed, so that the details on the front, back, top, and underside of ceremonial bowls or figurines can be viewed. These details might illustrate an important historical theory about the artefact and can translate into winning points or higher levels of spatial access in the game.

![Six rotational views of figurine found at Mnajdra](image)

Space can dynamically update depending on the user’s action, skill level, and type of individualized response. From the completion of tasks and degree of interaction with digital artefacts a user description can be generated. Such a description enables different types of users, for instance, cultural historians and interested tourists, to have access to individualized modes of gameplay. The environment can also be responsive by shifting between time periods – such as from the present day to a prehistoric reconstruction. A record of interaction history generated by a game engine situates the user within the game space via maps, navigation reminders, inventories of artefacts and guides and clues embedded in the landscape.

Space has situational value in relation to architectural acoustic properties. The perspective of sound can help to locate a body in space. In a reconstruction of the temple as a dimly lit or dark space the sound heard from another chamber but not seen or the deep reverberation from an adjacent inter-mural chamber could create a dynamic impact. The acoustic phenomena of the ‘oracle hole’ of the Hal Saflieni hypogeum reverberating in the side niches of the ‘Holy of Holies’ reminds us that aural as well as visual effects must have been important. In Mnajdra, the evidence of acoustic chambers ‘the oracle holes’ suggests a community focused around voice, singing, chanting or controlling the acoustic properties of the voice for ritual purposes. The oracle holes offer communication between the public part of the temple and the private part of the inner court and apse. As Trump notes the oracle chamber in Mnajdra opens into a small inner chamber behind designed to produce particular echoes and acoustic phenomena. He associates this with the possibilities of ‘offerings and confessions in one direction, advice, orders, talismans, healing, in the other’ (Trump 1990). It is easy to image how these reverberations would have had a significant impact on the acoustic resonance associated with ceremonial gatherings.

### 2. 3 Occupied space and presence

Games can be used to offer visitors a strong sense of presence. Presence can be characterized by the players’ involvement within the aesthetics of the game world and the challenges and interactive opportunities offered by gameplay. As Brian Massumi has argued this sense of presence is as much a function of proprioception and kinaesthetic engagement as it is of vision (Massumi 2002). Indeed, significant personal emotional investment and time is required to engage in the encounters and challenges demanded by computer gameplay. Such investment creates a psychological immersion so that in a successful game, the user suspends disbelief and feels that they are present in the game space – that they are ‘right there’.

This sense of immersion is an engagement with the spatial as a perceptual mode. This has been previously argued as not only as a culture of seeing but also as an experience felt through the body as it takes up particular modes of being (Flynn 2004). The specific spatial orientation demanded and evoked by the game space frames unique experiences of encounter. Types of user activity: question and response; intention and initiation; movement and stasis; direction and flow are experienced as a form of cybernetic exchange between user and digital environment. Such an understanding parallels recent discussions in archaeology and
the sociology of scientific knowledge, which highlight the performative aspect of cultural encounter (see Tilly 2004, Turnbull 2002). As Turnbull points out spatial categories emerge through the practice of movement so not only do people perform objects and buildings, but buildings also perform objects by containing movement and by making likely encounters. This aspect is in many way exaggerated in the processes of gameplay where the player inhabits screen space through simulated embodied perception and oscillating states of, for instance, contemplation, vertigo and distraction. Fundamentally then in a game environment, the relationship between the user and the spatial content of the game is dynamic and emergent rather then static and fixed.

2. 4 Non-material aspects

For cultural prehistory, secure dating, function, social and political context have been important ways of knowing the past. Symbolism, ritual, ceremony, religion and aesthetic considerations and values also play an important part in possible interpretation of objects and non-material aspects (Pace 1996). It is these abstract dimensions that can provide a sense of the past that moves beyond prescriptive models of historical knowledge to a more culturally responsive type of engagement between the artefact and the cultural scholar or visitor.

As established by Evans, the Mnajdra site may be described in terms of a religious and sacred space, especially in light of the use of ex-votos, fire and aural effects as indicative of ritual or worship (Evans 1971). This is placed within the wider morphological context of the adjacent Megalithic temple of Hajar Qim, the Misqa water tanks (perhaps cut to supply the needs of the temple) and Mnajdra’s close proximity to the Mediterranean and the rocky islet of Filfla. As Pace argues ‘The patterning of the monuments in geographic space is clearly a reflection of pre-historical cognitive processes rather than random choices of site occupation and settlement’ (Pace 1996, see also Grima on landscape archaeology, 2003).

Micallef and others have hypothesised astrological significance in the alignment of the Mnajdra South temple apparent at the equinox, and the summer and winter solstices. At the moment of the equinox light falls directly through the centre of the trilithon entrance of the south temple onto the main altar of the inner chamber. The middle and East temples of Mnajdra have a southerly orientation with the South temple having an Eastern orientation and the research suggests it is highly possible that the temples were built in accordance with astrological patterns with Mnajdra South temple as some kind of solar calendar (Micallef 1992, Ventura et al 1993, Ventura 2004). A further case for the temple alignment is put forward by Ventura in relation to the pitted markings on the orthostats of the East temple (Ventura et al 1993, Ventura 2004). He proposes that the tally or pitted markings might indicate a mapping of the helical risings of bright stars such as Pleiades. Such astrological accounts can be understood in the broader cosmological sense in relation to seasonal patterns of access and the particular movement of participants in ritual and ceremonial gatherings at these times. Some of these mythological associations are still very much alive today with modern day pilgrims in the form of cultural tourists continuing to visit to witness the movement of light through the main trilithon of the South temple during dawn at the equinox and the solstices.

In order to convey the temple organization as a manifestation of a lived culture and to create meaningful cultural experiences for visitors, metaphysical or symbolic ritual elements need to be included alongside accurate archaeological evidence. Many games work precisely this way – by creating worlds of enchantment that conform to specific patterns of ritual exchange and symbolic representation. As Bonnano points out, for archaeology, the most one can aspire to is the construction of paradigms and archetypes (Bonnano 1996). In considering the application of game design to prehistoric culture, the Mnajdra temple is constructed as ‘lived’ prehistory – that is as a form of social organization where the morphological as well as mythological and ritual aspects of the prehistoric temple space is evoked.

3. CONCLUSION

This paper has argued for the recognition of human embodiment and the importance of perception as a mode of activity in relation to the material cultural of Maltese prehistory. It has positioned this against the established background of a scientific disembodied approach that presents a homogeneous model of the past. As Grima has pointed out a structure of scientific knowledge at the top and a knowledge deficient public at
the bottom can prevent the public from meaningful engagement with the past (Grima 2002, 2004). In reinser the primacy of the embodied perceiver the elemental participatory nature of knowledge construction is recognized. This can be an entry into an incarnate sensorial dimension where meaning is grounded in the relatedness of body, memory and artefact.

In the case of Megalithic culture, lack of direct knowledge and empirically verifiable claims can be considered an advantage in relation to the application of interactive media for cultural heritage. The questions that can be asked about objects from the past are diverse and the answers or analysis open up a world of critical reflection and historical knowledge that is inaccessible without them. The role of archaeological integrity and research is important to locate these questions within a knowledge base obtained from material culture. Such perspectives can be developed within a feedback mechanism to provide potentials and options – representing prehistory as an interpretative - that is an organic and changing process affected by time, cultural perspective and social relations rather than a fixed and homogenous account. At the same time as retaining archaeological integrity, digital scenarios of probability can be played out or ‘performed’ by the user in a culturally specific space. At the overlap between empirical knowledge and observable evidence lies the space for user interpretation and personal inquiry. Such an approach to cultural heritage then is not primarily concerned with data base models of archaeological information, historical facts or detailed mapping systems but with scenarios of probability.

As Trump suggests in relation to Mnajdra: ‘We would dearly love to people it with its original worshippers, dancers, processions etc.’ (Trump 2002). With interactive media we can do just that and learn about prehistoric Maltese culture through a dynamic engagement with the past. From our knowledge of the compelling quality of computer games, a game based environment is a powerful mechanism for creating a sense of engagement and offers a pedagogically sophisticated tool for learning. Task related activities offer a user driven model of archaeological investigation for exploring the context of temple culture, the provenience of artefacts and for interrogating the manner in which the temples were occupied. It also offers a way to explore the intangible cultural heritage aspects of ritual, ceremony and other social practices. Rather than focusing only on high-end visualization and archival issues, the use of games methodology coupled with archaeological data can be tailored for different user groups and sets of cultural knowledge. In this way a process is created by which the temples as dynamic knowledge spaces are co-created between expert groups and users.

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