

Digital Knowledge as Archaeological Spatial Praxis

Abstract. This paper extends on recent research in digital cultural heritage by arguing for an enhanced engagement with post-processual archaeology. While recent digital heritage projects have demonstrated an effective use of high end user interaction with elements adapted from computer games and interactive new media systems, the dominant trend in digital heritage remains highly dependent on deterministic and functionalist views of the past. This paper explores new research developments in interpretative or post-processual archaeology and their applicability to an interpretative digital cultural heritage. An interpretative digital cultural heritage privileges interpretation over information and affective experience over representation. From this digital heritage is conceptualised as archaeological spatial praxis where the past is not only visualized but also enacted and embodied.

Keywords: Interpretative archaeology, digital cultural heritage, phenomenology, visualization

1. Introduction

At a time when digital cultural heritage is still largely confined to visual simulations of the past, this paper identifies developments in digital cultural heritage that go beyond visualization. It focuses on the role of interpretative archaeology in transforming users' relationship to heritage and outlines how interpretative archaeological strategies might play a role in supporting a model of the past as dynamic and enacted by humans [1].

The aim of the paper is to show how reconstructions of the past that engage with current post-processual archaeological thinking can expand an understanding of the value of multi-layered interpretations of material culture. Rather than relying only on processual models, which discount the active engagement of the user in the construction of cultural meaning, post-processual archaeology presents the material culture of the past as interpretative, enacted by humans and embodied through performance. Thus post-processual archaeology provides a context for considering tangible and intangible heritage through new ways of thinking about the landscape context, a sense of place, and the embedded nature of user experience.

2. Heritage and archaeology background

Digital heritage has until recently been located in the scientific disciplinary areas of ICT, IT and virtual archaeology. Research has sat uneasily between technological imperatives, commercial interests and a focus on practical applications for tourism. Development has been largely dominated by technology solutions with a strong imperative to demonstrate successful products. Such an information approach drawing heavily on processual accounts of the past has failed to recognize more recent shifts in archaeological thinking and practice. Others such as Kenderdine, Champion and Gillings making the case for the multivocal or relational aspects of cultural heritage have determined these approaches inadequate and point to the disengagement of users [2-4]. Critics of contemporary digital cultural heritage production cite the dominance of homogenous accounts of the past [5] and the trivialization and fragmentation of historical meaning [6]. An example of this trivialization is the overly didactic or prescriptive nature of many information driven simulation models where archaeological and historical scholarship is reduced to simplistic interpretations of the past.

While the application of technology to cultural heritage has long been under discussion, theorization of the cultural, aesthetic and user implications are still being formulated. Recent discussions have drawn on the field of cultural theory and taken on a more humanities inflected form of debate. Examples of a renewed emphasis on digital heritage's contribution to cultural knowledge is the publication of *Theorizing Digital Cultural Heritage: A Critical Discourse* [[7] and recent papers emerging from a diversity of museum and digital archaeology context [3, 8, 9].

In order to contribute to a framework for theorizing digital cultural heritage the paper addresses the potential of interpretative archaeology for the creation of meaningful and historically relevant cultural engagement. The paper is in three sections. The first section deals with issues in cultural heritage

derived from a processual model. Secondly, the significance of interpretative archaeology for digital cultural heritage is identified. This research is then located in the context of arguments for greater cultural and historical relevance through hermeneutics, cultural presence, intangible heritage and phenomenology. Finally some formative ideas about the application of interpretative archaeology as applied to user experience are presented.

3. Problems in heritage visualization

Processual archaeology with its emphasis on scientific and deterministic categories has set the standard and remains the blueprint for the representation of the past in digital cultural heritage. The physicality of the object has been taken as the point of departure with photorealistic simulation as the marker of authenticity. The catalyst for this visualization has been towards improved ways for presenting existing knowledge to the public rather than a search for improved techniques for discovering new knowledge or opening up interpretation to the public [10].

Confined to a top-down perspective, models for digital representation have been derived from the archaeological spaces of maps and elevation drawings. Routinely translated into 3D architecture, space has been represented as quantifiable, objective, and geometric. As has been argued by Champion, Flynn and most strenuously by Gillings, condensing the real to a grided schematisation of digital space may be a poor record of a previously lived encounter between human and monument [11-13]. For instance traditional archaeological spatial knowledge systems such as the survey and grid have been used to design mathematical data sets for 3D heritage models. A survey of digital heritage projects published in 1997 reveals depopulated spaces derived from isometric architectural models of ancient sites, 3D reconstructions and the dominance of aerial views common to topographical maps [14]. Examples include Virtual Stonehenge (Robert Stone – Virtual Presence Ltd) and The Pompeii 3rd millennium project: the Time Machine (Santa Barbara: Studio and Pathways production). Models using game engines such as Prehistoric Çatalhöyük and Tintern Abbey have departed little from this visualist model, although the inclusion of digital avatars is often considered.

The epistemology underlying the traditional design of heritage considers space and human activity as separate from each other and divorced from society [1]. In these models space operates as a neutral surface or a universal backdrop separate from the social activities of prior inhabitants or current users. Given the debates about embodiment and user affect arising from interpretative archaeology it is timely to explore how the past might be constructed in relation to a different spatial model – one that pertains to a broader ecology of hermeneutics and embodiment. While accurate simulations of historical artefacts have a part to play in representing the past, digital cultural heritage research has been slow to acknowledge shifts in archaeological theory and practice from deterministic perspectives to interpretative perspectives.

4. Interpretative archaeology

Ian Hodder first coined the term post-processualism to suggest that knowledge about the past is subjective and individually framed and that the primary methodology for understanding the individual is interpretation. More recently post-processualism has been used interchangeably with the term interpretative archaeology. In this paper I use both terms - post-processualism and interpretative archaeology to refer to a notion of culture as adaptive.

Post-processual archaeology emerged in the early 1990s as a response to the scientific and comparative archaeology of processualism. Instead of the deterministic views of processualism - post-processualism sees spaces as always centered in relation to human agency and as part of day-to-day social activity [15-17]. Drawing on feminism, post-structuralism and post-colonial theory post-processualism foregrounds a concept of the past as subjective and relational [18]. Thus the fundamental concepts of post-processual archaeology are interpretation and context often associated with the idea of self-reflexivity and dialogue.

Interpretative approaches employ the conceptual, the way people make sense of the world [6]. They therefore try to bring the past to the human scale rather than considering it in an abstracted, detached way. An underlying assumption is that there are multiple perspectives and that the past is understood in relation to processes as much as things or categories. A starting point for the post-processual archaeologist is that in order to collect data and analyse it, the archaeologist must first decide which

questions they want to ask. Thus ideas about space, environment and the meaning of cultural artifacts emerge from these situated interpretations [1, 18]. This has had wide implications for the way that archaeology is being undertaken ranging from phenomenological approaches influenced by the writings of Merleau-Ponty, for instance, Tilly, Shanks and Thomas [1, 15-17] to Hodder's more hermeneutic or reflective interpretations of the past [6, 18].

5. Applications for Digital Cultural Heritage

Interpretations of the past that can be broadly described as interpretative archaeology – that is - landscape archaeology [19-21], hermeneutics [18], and phenomenology [1, 16, 17] have generally been absent from heritage reconstruction models. Considerations of human and social significance have only recently been explored by a handful of digital heritage designers. Examples include *PLACE-Hampi* by Kenderdine and Shaw et al which foregrounds the sacred landscape of Hampi as an active pilgrim site to enable user to inquire into the mythological and invisible embedded in the landscape [4]. Experienced within a large-scale stereo panoramic visualization environment the narratives thus evoked from the landscape are not only stories but are also embodied in contemporary ritual action.

A review of recent literature in digital culture heritage points to an emerging concern with the evocation of such culturally embedded perspectives. A number of researchers argue that many users do not want a past that is already fixed and prescribed, but one that is open to interpretation [4, 9, 22]. Interpretative archaeology provides an approach that foregrounds human agency and processes of contextual analysis and as such presents a number of approaches that have relevance for digital cultural heritage. Four areas of significance can be identified as: - the embedded context of interpretation (also known as hermeneutics); cultural presence; intangible heritage, and embodied experiences of the past. These are each briefly discussed in turn. Other issues pertinent to an interpretative digital heritage, such as the cultural specificity of users and multi-vocal accounts, are outside of the scope of this paper and will be taken up elsewhere.

5.1 Hermeneutics

First, let us turn to hermeneutics. Paraphrasing from Hodder, hermeneutics involves understanding the world not as a physical system, but as an object of human thought and action [6, 18]. It involves getting at the public and social structures of meaning through which people make sense of the world. Rather than starting from objective analysis of the material, a critical hermeneutics considers the social context in which the artefacts are embedded as the central focus of interpretation. From this, the world of the interpreter is of significance in understanding cultural history and thereby objects offer a chance for a reflexive experience of the past [21]. As Hodder explains, by way of a critical hermeneutics interpretations are situated historically in the past and refracted in the present. From a critical hermeneutics perspective then we can only understand the world through asking questions of it.

As pointed out above, digital heritage has more commonly assumed a position of objectivity in relation to re-presentations of the past. Digital reconstructions have been authenticated through a mainly visualist approach associated with claims to artefactual authenticity. Stoddard and Chalmer's 3D model of the Maltese hypogeum is one such example where simulations of soot, smoke and lighting details offer a detailed imaging of a prehistoric site that is divorced from human agency [23]. Accepted as the full picture of the past, such a purely visualist approach has limited user engagement and foreclosed on further critical engagement with what is often a contested and fragmented archaeology discourse. In response to this, a few designers of cultural heritage environments are seeking a hermeneutic approach as a way of encouraging a contextual analytical process with the past. In this approach authenticity is not solely a property of form but a process and a relationship between the past understood in the present. Instead of a factual presentation of the past, a contextual analytical process enables a dialogue between the user and digital representations of material culture. As Gillings maintains rather than treating heritage models as objective simulations that always try to replicate the source as faithfully as possible, VR models should be seen as constructs that can never be wholly authentic [3]. *The Remixing Çatalhöyük Project* takes up the challenge by focusing on the open-ended nature of interpretative archaeology [24]. Following Hodder the project focuses on the fluidity, reflexivity and ephemerality of the archaeological process. Produced by Tringham, Ashley and others *The Remixing Çatalhöyük Project* mixes video-walks or peripatetic video with a deep archaeological and media database to re-contextualize and recombine past and present.

5.2 Cultural presence

The second area under discussion in interpretative digital heritage theory is cultural presence. Presence is defined in the ICT field as the user's experience of being in a certain environment, even when the user is physically located elsewhere [25]. A number of writers suggest that presence from digital experience can be evaluated by its approximation to real-world presence [26]. Thus the sense of "being there" in the virtual environment can be thought of as a heightened experience that mirrors perception of the real world and as has been argued by Waterworth media have the ability to produce a sense of presence equivalent to that experienced in the physical world [27, 28].

For digital cultural heritage researchers, there seems to be an acceptance that presence is an important aspect of creating a compelling sense of an environment. However this sense of presence can be devoid of historical relevance or cultural context. In ICT discussions on presence Lombard and Ditton have argued that presence is the 'perceived illusion of non-mediation' [29]. This assumes that the more detached from the real world the higher the level of experienced presence. On the other hand digital heritage researchers have argued that cultural presence rather than presence *per se* is more relevant for digital heritage design [30]. Cultural presence is understood as more than just the sense of being there — quoting Champion (2006, 2): "A sense of cultural presence, when one visits a real site, is inspired by the suggestion of social agency, the feeling that what one is visiting is an artefact, created and modified by conscious human intention." As a perspective on a past culture, cultural presence is imbued with the trace of lived historical experience. Associated with this is the social embeddedness of the user in a sense of place. At stake for designers wishing to incorporate a greater sense of cultural presence, then, is the extent to which the experience mimics perception of a lived space of human sociality.

5.3 Intangible heritage

The third area of interpretative digital cultural heritage explored in the paper is intangible heritage. While the creation of a high-fidelity digital artefact has been privileged in the archaeological project of conservation and dissemination far less consideration has been given to the more complex non-material aspects of cultural heritage. As post-processual archaeology argues, the past needs to be understood not only in relation to tangible heritage, but also in relation to intangible heritage. Recently recognised by UNESCO as part of cultural heritage, intangible heritage consists of oral traditions, memories, languages, performing arts, ceremony or rituals, games, spiritual beliefs, and craft activities. It also includes meanings associated with places and objects — such as the spiritual or ritual significance ascribed to a site. Thus a monument has both tangible heritage (as architecture and structure) and also intangible heritage (spiritual or ceremonial activities). From this it is impossible to think about intangible heritage without considering people, language, and embodied action.

An interpretative digital heritage calls for models that contextualize and represent a range of cultural knowledges and offer a sophisticated level of cultural presence. Here we cannot assume simple presentation options, but need to consider the user's affective and reflexive engagement with these cultural knowledge systems. Recent work in game studies is useful here for its emphasis on the intention and intervention of the user and the understanding of objects as affordances in an interactive landscape. Champion working with his students at The University of Queensland has paid particular attention to how the process of cultural beliefs and rituals might be offered through the use of game engines [31]. Using game engines such as *Unreal Tournament*; *Elder Scrolls: Morrowind*; *Half-Life* and *Neverwinter Nights* he has explored how the constraints of computer gameplay can be adapted for heritage application. In particular his research has investigated how the intangible heritage of a culture might be accessed through the digital simulation of initiation into local rituals. As his research indicates while computer games hold the potential for engaging users in an exploration of intangible heritage it is a complex task to translate the constraints of one computer world for the cultural beliefs and rituals of another culture.

5.4 Somatics and the phenomenological self

The fourth area under discussion is somatics - the sensing, feeling mobile body in an architectural or artefactual context. An understanding of the past that starts with the somatics of the sensing, feeling mobile body is particularly important for immersive responsive systems and a radical departure from traditional approaches to digital cultural heritage where the corporeal dimension has been absent.

Phenomenological archaeology with a focus on the corporeal experiences of the past is a specific area of post-processual archaeological theory and research practice that holds exciting potential for articulating the affective responsive engagement of users. Phenomenological archaeology enables speaking from and with the body to represent the affective, corporeal and sensuous dimensions of human knowledge. In phenomenological terms – from the standpoint of writers such as Thomas, Tilly and Turnbull who draw on the work of Merleau-Ponty how people experience and understand the world provides the fundamental ground, or starting point for our description of it [1, 16, 32]. As Tilly argues the space of the world rather than being reducible to an objective and geometric grid when considered somatically is the space of sensory experience and bodily movement. Any experience of space is grounded in the body itself, its capabilities and potentials for movement. Through time-space routines of movement and praxis or bodily practice a person knows where she or he is in relation to familiar places and objects and how to 'go on' in the world. Lived body-space incorporates not only habituated movement in general but also modes of walking, turning, reaching, crouching, the performance of particular acts and body movements [1].

In ICT research on somatic engagement has involved the tracking of body parts and the appropriate updating of displays. Analysis carried out by Slater and other researchers includes motion-capture systems and other sensors to provide a vivid 3D representation of the user. Direct manipulation and machine analysis of user intention has been used to evaluate various somatic effects including: having a virtual body, exploration of shadows and the effects of walking in an environment [33-35]. This essentially cybernetic model is concerned with inference about the state of the body but leaves out the content of sensuous engagement or cultural context. A recent paper from Bartley and Hancock extends this discussion to a phenomenological approach as applicable to cultural heritage [8]. As they argue a phenomenological approach leaves in place the ground of human and presupposes an inextricable embeddedness with our material surrounds. Human perception and experiences are mediated through bodily interactions. A phenomenological approach then does not allow for a heritage site to be seen as a passive vessel waiting to be filled with meaning but insists on seeing architecture in the context of transformative action, to be considered as embodied spatiality.

6. Summary

This paper argues that an interpretative and expressive exploration of the past can be constructed through the interplay between interpretative archaeological knowledge and digital cultural heritage practice. As Cameron and Robinson discuss it is the digital recording of significance rather than the textual record that will be an important attribute of future knowledge rendering [36]. As a framework for digital cultural heritage the incorporation of interpretative archaeology has the potential to afford the user a reflective experience of the past that, at its best, is both archaeologically rigorous and contingent. How these concepts might be explored in practice is as yet only partially resolved with a few projects cited above attempting to incorporate a more performative and historically inflected knowledge rendering of the past. The chart below outlines some emerging ideas about the relationship between interpretative archaeology, cultural heritage, and the resulting user experience.

Interpretative archaeology	Cultural heritage	Applied – user experience
Hermeneutics	Social context of artefacts and interpretation	Take account of user individuality. Personalise and communicate individual perceptions of artefacts and spaces.
Cultural presence	The creation of a sense of presence – of “being there” – understood as a cultural activity engaging social agency or user interaction	User interaction in relation to cultural and social functions
Intangible heritage	The translation of non-material aspects including the intangible heritage aspects of community engagement, social presence, and oral history.	Tasks and activities that evoke symbolic and ritual meaning. Experientially derived rather than presented.
Phenomenology	Experience emerges from the body’s response to environment	Somatics of the mobile body affecting the digital environment

Conclusion

It is my central argument that in renegotiating the potential of digital cultural heritage post-processual archaeology has much to offer. Interpretative archaeological research (with its focus on phenomenology and embodiment) can help to reintroduce the affective register of user interaction for cultural heritage. The main conclusions drawn are that foregrounding interpretative processes are important in creating an *authenticity of experience*. Such an authenticity of experience draws on and extends the theme of artefactual authenticity claimed through detailed photorealistic simulation of the original.

It is argued that interpretative archaeological research contributes to emerging debates in digital cultural heritage by including more experiential and performative engagements with the past. From interpretative archaeology the categories 'experience' and 'performance' serve to focus attention on the effects of landscape and architecture on the movements of the human body and the sensory perceptions of persons. In this way, the user-interactive strategies of navigation, wayfinding, and exploration are enmeshed in the formation of cultural heritage experiences. Such research extends our knowledge of the application of high-level interactive technologies for heritage, and has relevance for the ongoing debate on how to create significant digital heritage experiences at the interface between archaeology and new media systems.

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