**CHAMPION — Infrastructure**

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**Infrastructure Requirements for a World Heritage Archival Infrastructure**

Champion, E. M.

Ideally, Virtual Heritage Environments (VHEs) help the public to

1. Create, share, and discuss hypothetical or counterfactual places.

2. Meet virtually in these places with colleagues to discuss them.

3. Contextually understand limitations forced on their predecessors.

4. Develop experiential ways to entice a new audience to both admire the content and the methods of their area of research.

A group of academics and partners are proposing to UNESCO to run a project to survey, collate, and develop tools for heritage sites and related built environments, focusing initially on Australia. We intend to consolidate and disseminate 3D models and virtual environments of world heritage sites, and host virtual heritage examples, tutorials, tools, and technologies so that heritage groups and classrooms can learn how to develop and maintain 3D models and virtual environments.

The primary aim is to help educate the public in the area of world heritage sites via interactive digital media, with an emphasis on providing training resources for free and open-source software. We will also integrate and extend existing and new infrastructure to support this learning material and the integration of scholarly publications, publicly available media, and online directories and repositories of digital 3D models of world heritage sites and related artefacts.

Our objectives are to

• Collate and archive a range of online virtual heritage resources (currently scattered).

• Develop training material that can be developed and expanded by others.

• Recommend ways 3D models can be better linked to scholarly articles and archives.

• Create lists and host 3D heritage models for the Australia-Pacific region.

• Provide introductory material for classrooms / community groups.

# Creating Public Accessible Virtual Heritage Models

Why is this necessary? Hal Thwaites (2013) wrote in ‘Digital Heritage: What Happens When We Digitize Everything’:

In the very near future some critical issues will need to be addressed; increased accessibility to (and sharing of) heritage data, consistent interface design for widespread public use and re-presentations of work, the formalization of a digital heritage database, establishment of a global infrastructure, institutionalized, archival standards for digital heritage and most importantly the on-going curation, of work forward in time as the technology evolves so that our current digital, heritage projects will not be lost to future generations. We cannot afford to have our digital heritage disappearing faster than the real heritage or the sites it seeks to ‘preserve’ otherwise all of our technological advances, creative interpretations, visualizations and efforts will have been in vain.

So there is an international need to collate and store digital heritage models of heritage sites (Reinhard, 2013). We also lack a way to provide access to the models, sites, and paradata, which the London Charter (Denard, 2009) defines as ‘information about human processes of understanding and interpretation of data objects’). Although there are charters such as the London Charter and the Seville Charter, as there are few publicly accessible models (Barsanti et al., 2014), there is also no shared standardised evaluation data, and many scholars have complained about user experience issues and a scarcity of suitable pedagogical material (Economou and Pujol, 2008).

# Technical Obstacles

A serious technical obstacle is the absence of a shared, secure, feature-rich format for 3D models (Koller et al., 2009). International efforts to remedy the above issues include work by 3D Icons (3D HOP) in CIDOC CRM, Europeana, Smithsonian Institute X3D BETA, Fraunhoefer (X3DOM ON GITHUB), Ariadne, CARARE, EU EPOCH, and V-MUST.

Long-term, we wish to investigate how 3D models can be better linked to library and archival systems of literature and multimedia that communicate important historical and cultural aspects of the simulated heritage site. Current journals that feature papers and 3D models typically lack integration with text resources, and they also have limited interactivity and immersion (Elsevier). A second long-term aim is to develop evaluation mechanisms to understand how the viewed and downloaded heritage models and simulations are used. Choosing a format that is robust, durable, well-supported, free, highly interactive, cross-platform, and easy to create or export to or export from is a serious challenge.

# In Australia

This is also an Australian problem. CSIRO (CSIRO, 2014) have released a report, stating, ‘Australia’s cultural institutions risk losing their relevance if they don’t increase their use of digital technologies and services’. Michael Brünig (Mansfield et al., 2014) has stated that the Australian GLAM industry is worth 2.5 billion Australian a year, roughly only a quarter is digitalized, and there are 629km worth of archival material. Brünig notes there is a shift to open-access models and greater collaboration with the public, but that we need to explore new approaches to copyright management that stimulate creativity and support creators. We also need to build on aggregation initiatives such as the Atlas of Living Australia, standardise preservation of born-digital material to avoid losing access to digital heritage, and exploit the potential of Australia’s Academic and Research Network (AARNet) and the National Broadband Network (NBN) for collection and collaboration.

There is another problem. Australian heritage includes large rock art sites, and the Gigapixel photographs, panoramas, and 3D data require a large amount of storage and new ways of navigating via online databases. There are 19 UNESCO World Heritage listed sites in Australia, including some of the oldest rainforests and one-third of the world’s protected marine areas. So we have vast and remote natural landscapes where pre-tour visits are expensive, 3D models and landscapes are not part of ICOMOS reports, and the Australian Burra Charter only recently reflects 3D. Of course there are also copyright, contestation, and forbidden knowledge issues that require legal experts and indigenous consultants.

# Current Status

For the presentation of this short paper I will discuss the above issues, our data management plan, and our communication with UNESCO to tackle these problems. Our research development unit will support the venture with funding for postdoctoral scholars and postgraduate students. I have proposed to UNESCO that our group will collate and archive the related heritage data, provide training material that can be developed and expanded by others, and recommend ways in which 3D models can be better linked to scholarly articles and related digital material and can be included in classroom teaching. We have linkages and ongoing relationships with other relevant universities in Australia and the wider Asian area, and organisations in Europe like DARIAH, NeDiMAH, and Europeana Cloud, and have an understanding from iVEC Curtin for storage of the initial models and related assets, but we are interested in talking to organisations about longer-term storage. The first task is to survey and develop a library of heritage models using a robust data management plan. However, a secondary task is to develop strategies to encourage scholars to submit to an agreed format, and then develop a workflow to provide models suitable for dissemination and general learning.

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