The Potential of Open Models for Public Archaeology

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ABSTRACT
This paper presents a public archaeology project that aims to train community groups to use computational photography techniques for the recording and dissemination of church gravestones and memorials. The project implements open approaches into its use of technology and also methodological design. The manner by which open principles were engaged by the project is described. The paper ends with an outline of plans for future work, to include crowdsourcing and open access publication in pursuit of these objectives.

Keywords
Public Archaeology, Community Archaeology, open data, open source software, Reflectance Transformation Imaging, Polynomial Texture Mapping, Digital Imaging

1. INTRODUCTION TO THE PROJECT
This paper will describe the design and development of an open public archaeology project; Re-Reading the British Memorial. The project was initiated in order to assist local groups in the documentation of memorials or inscriptions primarily associated with churches and other religious sites. The primary goal of the project was to provide local organisations with training in the use of freely or cheaply available digital technologies which might assist them in their work. One of the guiding principles of the project was sustainability; the idea that the project should expand organically, should not be reliant upon single members for its continuation and that the methodological practice of the project should be reflexive and versatile, adapting to the needs of participants. It became clear at a very early stage that open development offered a model of collaborative de-centralised working which was harmonious with these goals and which might be adapted for use within an archaeological setting.

The impact of Free Open Source Software (FOSS) has been well explored by the social sciences, science, technology, engineering and mathematics disciplines (von Krogh & von Hippel 2006). Equally, the ways in which open access publication of research and sharing of data contribute to the sciences are being explored and promoted by advocates of such movements (David 2005). In the Humanities these arguments remain in their infancy with archaeology being no exception (Hajjem, Harnad & Gingras 2005). The Digital Humanities movement has given rise to increased participation in discussions around open access and also the use of FOSS and non-proprietary digital formats. One topic that has, as of yet, had little consideration paid to it is the extent to which the use of open approaches could improve the impact that public archaeology projects have on the communities within which they work.

2. OPEN ORGANISATION, OPEN ARCHAEOLOGY
This paper argues that the principles of openness offer the basis for a sustainable model for the development, implementation and dynamic expansion of public archaeology projects.

In the instance of the Re-Reading the British Memorial Project, openness was seen as the key to developing a project which was both sustainable and responsive to the needs of all stakeholders. This paper describes the manner by which open practice and open innovation has been incorporated, not just in the selection and development of software but also in the development of methodologies and in the organisational and social structure of the project itself.

3. A DEFINITION OF PUBLIC ARCHAEOLOGY
Public archaeology, also referred to as community archaeology, is a model for the implementation of archaeological investigation which has the communities within which a project is based at its heart. Many public archaeology projects have at their core an attempt to facilitate archaeological practice and interpretation that is more meaningful in human terms, and to extend projects beyond the community within which they are being carried out (Marshall, 1999: 214-5). In 2002, Moser et al. put forward a methodology for the seven components of public archaeology, and these are used today as a guideline for design and implementation of projects that wish to fulfil the public archaeology requirement (Moser et al. 2002:).

However, the piecemeal adoption of some of those components does not result in a truly public archaeology project. It seems that in practice the reality within which most archaeologists in the UK are working prevents the full implementation of public archaeology. Faulkner addresses this issue of UK archaeologists being forced to carry out “archaeology from above”, driven by commercial and governmental pressures, and not “archaeology from below, rooted in the community, open to volunteer contributions, organised in a non-exclusive, non-hierarchical way, and dedicated to a research agenda in which material, methods and interpretation are allowed to interact” (Faulkner 2000: 21).

The public archaeology project that this paper describes has openness at its heart, and provides a unique example of how the methodological approaches pioneered by public archaeology can be implemented in a fuller and more dynamic sense through the introduction of approaches to organisation and working practice championed by open movements such as FOSS, open data publication and open business models.

4. PROJECT IMPLEMENTATION

The impetus behind the Re-Reading the British Memorial Project was the availability of open source and free software and the proliferation of relatively cheap photographic equipment. Developments in open source computational photography techniques have ensured rapid expansion in the capabilities of photographic documentation. The initial inspiration behind the project was the realisation that there were now very few barriers to the widespread public adoption of these techniques as research tools. Within the UK, the barriers which remain primarily relate to issues of awareness and training rather than issues of access to technology. The development of Reflectance Transformation Imaging (RTI) in particular has placed a powerful tool for the visualisation and simulated re-lighting of 3D surfaces into the hands of the public (Mudge, Malzbender, et al., 2006).

Using photographs of an object with directionally variable lighting RTI enables the user to produce a simulation of the surface within which the light source can interactively controlled. The direction and power of the virtual light can be adjusted, as can the reflective characteristics of the surface. RTI is a powerful tool for documenting, interpreting and disseminating cultural heritage objects and is particularly useful for the documentation of inscriptions. Both the compiler and the viewer for RTI are openly available under Gnu General Public License version 3.

The project has aimed to train a number of local groups in the use of RTI as a means of recording and interpreting difficult to read memorial inscriptions, a task which has been difficult to solve in the past. RTI is easy to use and is reliant upon only very basic and widely available technology, in its most basic incarnation you need only a mobile phone camera, a torch, a snooker ball and a computer. In this way, easy to use, freely available software have been placed into the hands of a pre-existing highly motivated research community.

Perhaps even more than technology, it was community sat at the heart of the project design. Open principles have typically provided a framework for software development and also for research and data publication. Increasingly however open principles are expanding into other areas of creative endeavour, providing a model for collaborative and inclusive working practice. Many archaeological and historical initiatives have incorporated openness into their working practice and have often played pivotal roles in the development and distribution of open source applications (Kansa, Whitcher Kansa & Watrall 2011; Tringham, Ashley, Mills 2011). We believe that archaeology, with its unique relationship both to the humanities and the sciences, is uniquely placed to explore the implications which open approaches may have, not only upon the development of the tools we use to conduct research, but also upon the design of research practice itself (Zubrow 2010:2). The Re-Reading the British Memorial Project explores the potential for expanding an open approach to archaeology to incorporate the development and use of open software, open access publication and an open practice model.

It became clear from a very early stage that if the project was to have any impact, and to be sustainable into the future, then it would ultimately rely upon mass participation. Consequently the organisational structure could not be reliant upon the efforts of a few core individuals. Instead it was decided that the project should focus upon the training of groups and individuals in the use of FOSS more generally, with RTI as a focus for learning. These efforts have been accompanied by an emphasis upon skills sharing whereby groups who have learnt new skills are encouraged to arrange their own training sessions for others. This distributed structure has helped to ensure that the project is sustainable and to a certain extent self-organising.

As a result of this structure the heart of the project has not been a rigid and pre-determined methodology but a process of dialogue and communication. The specific research aims have not been centrally controlled but have been guided by the requirements of individual communities of researchers. Consequently, formalised methodologies have been kept to a minimum and where they exist (for example, in the more or less standardised provision of training) they have been flexible and responsive to the needs of specific research communities. In order for this strategy to have succeeded it has been essential that the structure of the organisation has been open and understood by all involved.

5. TOWARDS AN OPEN FUTURE FOR PUBLIC ARCHAEOLOGY?

We end this paper with a description of the future plans for the Re-Reading the British Memorial Project. These plans include considerations of sustainability, transparency and de-centralisation, potential for crowdsourcing, and publication models for data and research outputs.

Traditionally public archaeology projects have relied upon on-going support from academic or commercial project instigators, who contribute expertise and resources (Faulkner 2000). The Re-Reading the British Memorial Project recognised from the outset that this issue of being confined by more traditional organisational structure would not be sustainable should the project wish to develop beyond the initial few case study community groups. Instead, an alternative model for development has been followed.

The project aims to test the extent to which support networks can be de-centralised to ensure the development of open archaeology projects. Transparency is at the heart of the recent moves by the UK Government to increase accountability and adopt Berners-Lee's five star model for open data sharing (Kalampokis et al., 2011). The recent Civil Service Reform Plan outlines the components necessary for open policy design as: Shared power; Cross-boundary teams; Joint accountability; Transparency; Direct Access to Ministers; Real world testing; Iteration (HM Government, 2012: 12). Approaches used as part of the open Government movement, outlined in publications such as the Civil Service Reform Plan, provides the foundations for understanding how community engagement can be supported using Internet-based solutions as well as cooperative working practices with open data at their heart.

In the future stages of the project, we will challenge traditional forms of planning and implementation, with inspiration from Third Sector social enterprise approaches, and will put forwards open methods for mitigating against barriers to longevity. Open science provides guidance for the adoption of open access publication of research data and results (Murray-Rust, 2008; Waldrop, 2008), which in the instance of this project are both theoretical and technical. By this we mean that the project methodology, as well as any research data and results are all considered to be part of the project outputs. Research into open data use in science advises that the primary obstacle takes the form of infrastructure challenges to the embedding of openness in practice (Fry et al., 2009). This project contributes to this challenge by taking an open approach to methodological design from its inception.

We aim to publish all outputs (as defined earlier in this paper) from the project, in a continuing iterative process. One need only visit the data.gov.uk website and search through the growing list of case studies to identify companies that are adopting open data as the central component to their business. Not only are many companies adopting open data use, there is also a move to take on open business design principles in some organisations. There are now some examples of businesses being open from inception, basing their work on open standards of transparency, having open invitations for people to join in, and adopting open knowledge approaches. These range from the use of open access models to publish research and development activities, creating and sharing as well as using open data, and having open software behind their activities.

Sharing outputs as well as approaches will ensure that the project has the broadest impact. The project will explore the possibilities for raw data publication as well as research results using appropriate licensing, alongside the provision of the open methodology. We plan to publish all outputs under Open Database License (ODbL), giving third-parties permission to re-use the dataset and ensuring that derivative works are published under the same license.

Finally, there has been an increasing interest in the potential for crowdsourcing for history and archaeology research. The Re-reading the British Memorial Project will build on those attempts, by investigating to what extent the use of crowdsourcing can contribute to locally-originating projects. The project plans to implement several crowdsourcing-based components in order to identify viable methods for contributing to knowledge. These include firstly a project wiki for methodology design, using lessons learned from the Smithsonian Institution's Web and new Media Strategy process wiki (http://smithsonian-webstrategy.wikispaces.com/). Secondly, through an analysis of various crowdsourcing projects for researching into textual data, such as the Transcribing Bentham Project (http://www.ucl.ac.uk/transcribe-bentham/) the Old Weather Project (http://www.oldweather.org/), and the Ancient Lives Project (http://ancientlives.org/), The project plans to investigate into the potential for the implementation of a user interface for general public analysis and data entry from RTIs of individual gravestones and memorials.

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