**WATRALL — mbira**

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**mbira: A Platform to Build, Serve, and Sustain Mobile Heritage Experiences**

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The spaces and places we inhabit and interact with on a daily basis are composed of layers of cultural activity that are, quite literally, built up over time. While museum exhibits, historical and archaeological narratives, and public archaeology programs can communicate this heritage, they do not generally allow for rich, place-based, and individually driven exploration by the public. In addition, public heritage programs rarely explore the binary nature of material culture, the preserved record of human activity, and heritage: the presented information about the heritage in question and the process by which scholarly research has reached those conclusions. In short, the scholarly narrative of material culture, heritage, and archaeology is often hidden from public understanding. Further, traditional public heritage programs often ﬁnd it difﬁcult to support rich and vibrant multivocality.

In recent years, mobile devices as well as the development and maturation of augmented reality (broadly construed) have offered both platforms and models for mobile heritage applications to at least partially address these issues (Casella and Coelho, 2013; Haugstvedt and Krogstie, 2012; Davies et al., 2013). Mobile applications such as the Museum of London’s Streetmuseum Londinium (http://www.museumoﬂondon.org.uk/Resources/app/Streetmuseum­Londinium/home.html), Florida Public Archaeology Network’s Destination: Civil War (http://www.ﬂpublicarchaeology.org/civilwar/), Histories of the National Mall (http://mallhistory.org/), and the CHESS Acropolis Museum mobile application (http://www.chessexperience.eu) successfully facilitate public interaction with heritage and archaeology in a place-based context. Unfortunately, most mobile heritage applications do not support multivocality, nor do they expose and explore the scholarly narrative of the process by which cultural, heritage, and archaeological information was uncovered and information was generated.

It is within this context that this paper will introduce and explore mbira (http://mbira.matrix.msu.edu). Developed at Michigan State University’s MATRIX: The Center for Digital Humanities & Social Sciences (http://matrix.msu.edu) in collaboration with the Cultural Heritage Informatics Initiative (http://chi.anthropology.msu.edu), mbira is an open-source platform that is purpose built to address critical shortcomings in many mobile heritage applications.

**‘Space and Landscape as Museum’**

Based on the metaphor of ‘space and landscape as museum’, mbira lets users create mobile experiences in which locations and areas are organized into curated exhibits displayed within a rich, interactive map interface. Each exhibit location contains information and rich media (video, audio, and imagery) about that location as well as the narrative about the associated scholarly work (excavation, survey, historical and heritage research, etc.).

**Cloud-Based Content Management**

mbira projects are created and managed using a cloud-based digital repository platform (discussed below). All content (exhibits, locations, and location content) are added, edited, and updated from within an open-source digital repository platform. When app creators or editors add new project content or edit existing project content, changes dynamically appear in the project’s public native mobile app or mobile website.

**A Constellation of Open-Source Tools**

mbira leverages a series of open-source software and tools, both existing and purpose built, with which individuals, projects, organizations, and institutions can use to author, deploy, and sustain mobile heritage experiences:

**KORA.** Developed by MATRIX: The Center for Digital Humanities and Social Sciences, KORA (http://kora.matrix.msu.edu) is a self-installed, open-source digital repository platform. KORA serves as the backbone for the mbira platform—managing all underlying content and data management and delivery. KORA, originally developed with funding from the National Science Foundation Digital Library Initiative, IMLS, and NEH, has several strengths in relation to other digital repository platforms. Designed for small and medium-sized cultural heritage institutions with limited technological resources, KORA facilitates data ingestion, data export, data preservation, and data management. KORA also facilitates easy delivery of complex digital objects (i.e., groups of objects of different media displayed together for a speciﬁc use) through a robust RESTful API.

**mbira plugin.** The mbira plugin (which is installed on top of the KORA digital repository platform) is the core authoring environment in the platform’s constellation of open-source tools. The mbira plugin facilitates the creation of mobile projects and their associated exhibits, as well as all locations and areas (and their associated content). The mbira plugin allows creators and editors to manage all social aspects of their mobile applications. In addition, the plugin lets users manage all of the device-speciﬁc deployments of their mobile heritage experience (iOS, Android, mobile web).

**Mobile templates.** mbira includes elegantly designed (and well-documented) native mobile (iOS and Android) and mobile-web stock templates that individuals, projects, or institutions can use as is or modify as they see ﬁt. While the templates are designed primarily for those with minimal programming experience, they can also serve as a project jump-start for more seasoned developers. The templates are built speciﬁcally to dynamically display content (exhibits, places, spaces, explorations) authored in the mbira plugin. As with all of the other components of the mbira platform, the mobile templates are available to users for free under an open-source license.

**Data Portability**

Project administrators can easily export data from their mbira installation (KORA + mbira plugin) as structured data (XML and JSON) for the purposes of backup, preservation, and migration. Data can also be imported from other CMSs and digital repository platforms into an mbira installation.

**Strongly Social and Multivocal**

The mbira platform allows heritage professionals, projects, and institutions to create mobile experiences in which users can interact with one another and domain experts around heritage places and spaces. The mbira platform also includes tools to recognize the expertise and experience of community members, thereby adding a critical dimension of multivocality to mobile heritage experiences.

**Building Sustainable Mobile Heritage Experiences**

Beyond addressing the aforementioned issues with current models of mobile heritage experience design, one of the core goals of the mbira platform is to empower individuals, projects, organizations, and institutions to build more sustainable mobile projects. All of the tools in the platform (as well as associated technical documentation) are speciﬁcally designed to lower the oftentimes signiﬁcant technical barrier associated with building mobile experiences. The result is that individuals, projects, organizations, and institutions without existing technical expertise are not forced to contract with potentially costly third-party vendors to develop their mobile projects. The fact that all of the tools in the mbira platform are free and designed to run on the open web further reduces the cost associated with deploying and maintaining mobile projects. Because all of the tools in the mbira platform are available under an open-source license, those with existing technical experience are able to copy, modify, adapt, and redistribute the source code without any ﬁnancial or signiﬁcant copyright barriers. Finally, mbira’s cloud-based content management model means that individuals, projects, organizations, and institutions can easily add new content, thereby extending the effective life of their mobile heritage projects.

**References**

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