

White Paper

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Project: Mukurtu Mobile: Empowering Knowledge Circulation Across Cultures

Project Director: Dr. Kimberly Christen, Associate Professor, Mukurtu Project Director, Washington State University

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Mukurtu Mobile White Paper
NEH ODH: Digital Implementation Grant
Mukurtu Mobile: Empowering Knowledge Circulation Across Cultures
PI: Dr. Kimberly Christen, Washington State University
Project team: Center for Digital Scholarship and Curation (WSU), Center for Digital Archaeology, Mapp2App

Project Summary

This project both critically evaluates the notion of knowledge sharing in the Humanities and implements a mobile digital platform that extends and contextualizes the practice of knowledge sharing. Mukurtu Mobile builds on work supported by the National Endowment of the Humanities and the Institute for Museum and Library Services to produce [Mukurtu CMS](#) a content management system that meets the needs of indigenous communities globally to manage, share and preserve their digital heritage within their own cultural and ethical systems. Building from this success, our team launched Mukurtu Mobile an innovative iPhone application that empowers indigenous communities to collect, share and preserve their cultural and environmental resources. Mukurtu Mobile provides a platform for individuals to bring their own knowledge base to the common concerns of local, traditional and indigenous communities worldwide. With an interface directly to Mukurtu CMS, Mukurtu Mobile links the power of a robust, culturally responsive CMS to the direct collection of knowledge on-the-ground facilitating curation and collection in real time. From citizen archivists to citizen scientists, activists and scholars, Mukurtu Mobile enables connection of local sets of knowledge and data to fuel research hubs and educational environments that unite local communities around global issues such as natural and cultural resource management, language revitalization, cultural revitalization, educational outreach, and ecological sustainability.

Major Project Activities

In order to meet the main goals of the project—to extend and update Mukurtu Mobile—we undertook five main activities:

1. Creation of **functional and technical specification** documents for Mukurtu Mobile app through all phases of development
2. Create **support hub** for users with multiple access points
3. Iterative **public releases** of the Mukurtu Mobile app
4. Community **outreach and engagement**
5. Collect data **metrics and analytics** for the app and support sites

Functional and Technical Specifications

- Functional specs: This document describes use cases, interface requirements, and expected operations inside the app, as well as behavior in case of conflict and errors. This document was updated through iterations and app releases and is downloadable on the [Mukurtu Mobile GitHub repository](#).
- Technical specs: This document documents the results of the feasibility studies and describes in detail what technology and tools are to be adopted in all phases of development, with special attention to changes in the framework interfacing

with Mukurtu CMS. This document was updated through all phases of work and development and is downloadable on the [Mukurtu Mobile GitHub repository](#).

- Following the development method adopted in Phase 2, technical specifications for release 2.5 were produced as part of the development sprint for updating the mobile app during Phase 3 based on this testing.

Knowledge Hub and Support

The online knowledge hub includes: a dedicated Mukurtu Mobile support page with links to video tutorials and downloadable documents for all aspects of app use, Mukurtu Mobile website with development updates, video tutorials and documentation.

- Mukurtu Mobile [dedicated Support page](#)
 - Basic [Getting Started checklist](#) was created as a starting resource for users
- A dedicated Mukurtu Mobile [YouTube channel](#) with tutorials
- Mukurtu Mobile [website](#) with sections including feature release updates, support links and tutorials, information about getting the app and a demo page with support for testing content without a Mukurtu CMS site and demo content.

Mukurtu Mobile app releases

There were public releases of the app through all phases of development to refine the app to work across a variety of devices.

- **Development phases and releases 1.5-2.5**

Phase I release was a minor updated version of the original beta Mukurtu Mobile app, updates included:

- In app verbiage updated
- Support updates
- Minor interface updates

In Phase II updates included:

- Complete update to interface
- Support for upload of video and audio files
- Internal audio recorder
- YouTube integration for uploading your videos
- Full EXIF support for media
- Preview your content online from the app

In Phase III the app updates focused on key features and integration with the new Mukurtu CMS code release and finalization of display and language features.

Feature updates in 2.5 include:

- Integration with Mukurtu CMS 1.5 and 2.0
- Offline content collection and creation
- Geopositioning
- Syncs with the Communities and Cultural Protocols on Mukurtu sites
- Mukurtu CMS standard metadata
- Internal documentation and online support page
- In-app image, audio and video collection capabilities

- Full EXIF support for your photos
- Preview your content online

Updates and changes in 2.5:

- In April 2015 due to a new release of Mukurtu CMS with, the Mukurtu Mobile app client had to undergo a new phase of code update to ensure interoperability between the two systems. Specifically the updated had to enable the client to fetch content from - and post content to - the server environment, as well as to leverage new capabilities offered by the CMS most specifically in media management.
- Extensive research and testing during the development of the Exhibit feature integration with the platform map2app.com resulted in a test HTML5 web application with the demo content. The result of this testing phase and the concurrent code updates to Mukurtu CMS to version 2.0, resulted in the decision that Mukurtu Mobile will not rely on an external platform for the creation of Mukurtu Exhibits.
- Exhibit and display integration with Mukurtu CMS. A new workflow allows users to create online “exhibits” using the Drupal content type Collections within Mukurtu CMS sites via the Mukurtu Mobile app. Within Mukurtu Mobile, content is created, uploaded, and categorized/tagged accordingly through the mobile client, while Collections can be set up in the CMS, including configuration and look-and-feel of a dedicated exhibit page for each collection. The adoption of the Twitter Bootstrap design framework in the last update of Mukurtu CMS allowed a greater freedom in content presentation.
- This final update and release at 2.5 ensures compatibility both Mukurtu 1.5 and 2.0. The app fully leverages the new media management capabilities in Mukurtu with integration to the Drupal module SCALD, and full support for YouTube videos. Substantial security fixes were included with the latest release of the Mobile app, which now allow the app to safely work with any Mukurtu site without need for further configuration. A [Release Backlog document](#) was created by the project’s subcontractor, the Center for Digital Archaeology, for tracking the work on the app providing a transparent set of build and release documents for further development in other stages.

Community Outreach and engagement

Community testing, local hands-on workshops and user engagement surveys have been underway since September 2014. We held workshops at the Association of Tribal Archives Libraries and Museums annual conferences, the Convening Culture Keepers gathering, the Northwest Archivists Native American Roundtable, the Alaska Native Language Archives and held hand-on community testing with the Zuni Public Library, the California Indian Museum and Cultural Center, the Pokagon Band of Potawatomi’s summer Dreamcatchers kids’ camp and in three community workshops in Australia in collaboration with the Traveling Places local workshops in remote communities in New South Wales. At each session we used pre-and post evaluations to assess individual and organization needs as well as if basic tasks using the app were readily understandable. A

sample summary of three sets of workshop evaluation responses shows interest in the app for community engagement, its ease of use, and possibilities for future use (see samples below in Evaluations section).



(Left) Fourth and Fifth graders at Paschal Sherman Indian School on the Colville reservation use Mukurtu Mobile to record narratives about water health and stream resources in their community. (Right) Pokagon children use Mukurtu Mobile to document traditional practices related to their environment during the annual summer Dreamcatchers camp.

Dreamcatchers Camp Summary:

Jason Wesaw (Pokagon), Lotus Norton-Wisla (WSU team), and Michael Wynne (WSU team) co-lead a set of workshops with approximately 60 8-12 year olds during a day of the Pokagon Band of Potawatomi 2016 Dreamcatchers Camp. During each 1.5 hour workshop session throughout the day, the three taught kids how to use the Mukurtu Mobile app on iPads to collect pictures, audio, and video to create stories and memories in Mukurtu Mobile and upload to the Pokagon Mukurtu site. Kids created Mukurtu Mobile items based on interviews with each other, teachings from camp instructors and kids, nature, documenting camp, cultural arts, and other topics. The content that the kids created was then uploaded to the Wiwkwe'bjgen Mukurtu CMS site under a Dreamcatchers Camp 2016 Community Only Cultural Protocol. A total of 53 items were created on the Wiwkwe'bjgen website. Most items included more than one media asset, and many included more than 3 media assets. Most multi-asset items were a mix of images, audio, and/or video, chosen by the kids to best tell their stories.

- 53 items total
- 47 items with image assets

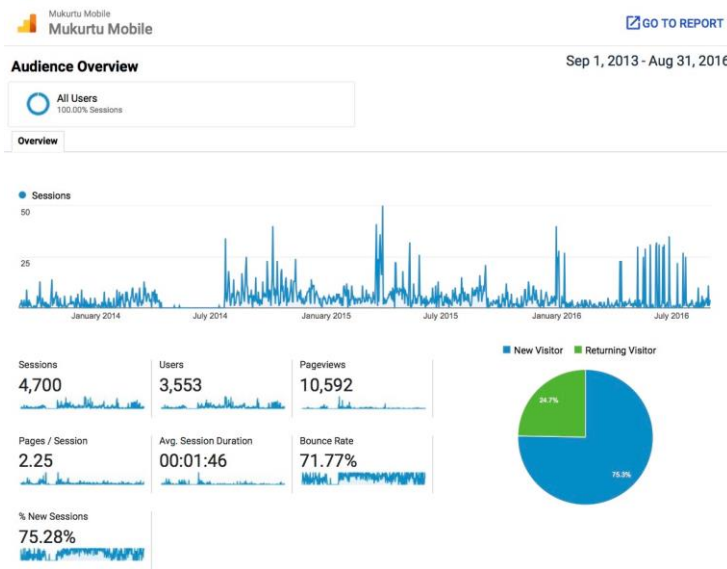
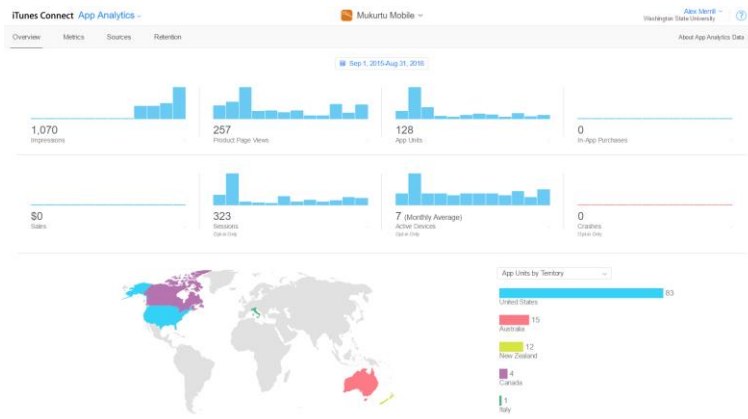
- 24 items with video assets
- 10 items with audio assets

Metrics

We captured three sets of metrics:

- Mukurtu Mobile app downloads and use through the iTunes store
- Mukurtu Mobile website traffic
- Mukurtu support page traffic

For the (extended) three year grant period during which approximately two years we had an active app for updates and downloads, we show 302 unique downloads across the active release period for the iOS app in the iTunes store. This number is consistent with the uptake of Mukurtu CMS and especially shows the higher number of downloads close to the release dates and in the months after the Mukurtu CMS 2.0 release. Website traffic was 3,550 unique users over the 2.5 years which matches with the numbers of Mukurtu CMS sites and users showing a positive and growing user base as well as high traffic from those interested in using the app. Support traffic was steady over the granting period and shows spikes around the time of launch releases and coinciding with Mukurtu Mobile workshops and hands-on sessions with the Mukurtu team.



Accomplishments and Changes

Original Objectives

- Update the original beta version of Mukurtu Mobile to a stable release
- Allow for audio and video capture and upload in app.
- App availability on a wide range of platforms (iOS and Android)
- Responsive online support, educational tutorials
- Seamless integration with the latest release of Mukurtu CMS

Accomplishments

- Mukurtu Mobile is now at a 2.5 release and includes in app audio and video capture. Video still requires a YouTube account but the experience for users is seamless within the provided workflow.
- Online support is fully updated and current with documentation including text, screencasts and video tutorials.

Changes in development

- Our original objective was to have Mukurtu Mobile compatible with iOS and Android platforms. The complete code update of Mukurtu CMS created unforeseen interoperability issues past the Mukurtu Mobile 1.5 release. Mukurtu CMS is now at a 2.0.6 release. The updated CMS provides a secure, simple, and streamlined interface with Mukurtu Mobile. The remaining challenge will be the next integration of Mukurtu Mobile 2.5 with Android. Our user analysis showed less than 14% of Mukurtu Mobile users on Android, given the cost and timeframe we elected to wait for a Mobile update at this time. Android is still compatible with Mukurtu CMS 1.5 however we will be adding Android support to our next development cycle post-grant.

Audiences

The primary audience for Mukurtu Mobile is Mukurtu CMS users. Mukurtu Mobile was developed as part of Mukurtu CMS's community software development model where features and functions are determined by the communities we serve. Each new feature or function within (or attached to) Mukurtu CMS is born from the direct needs and suggestions of the community of people using Mukurtu CMS: Indigenous communities, archives, libraries and museums and non-Indigenous collecting institutions with Indigenous collections and/or who collaborate with Indigenous communities. Our team first encountered the need for a mobile collecting tool during our Mukurtu 1.5 workshops in Australia and New Zealand in 2012. It was crucial here that the focus for the app was not a recreation of Mukurtu CMS or a display tool, rather it was clear from this early feedback that the need was to empower community members, particularly kids, to collect—to document, narrate and add content to their community Mukurtu CMS sites. Indigenous communities around the world—while diverse in languages, cultural practices and social structures—share histories of colonialism that have left many disenfranchised and with shocking rates of adolescent suicide and drop out from school. Part of the empowerment needed that we first heard in our workshops was from young adults working in their communities to stave off these issues and using technology as one part of that set of solutions. As we took this first feedback to communities in the United States

and Canada we heard an overwhelming need to “get the kids involved” and to build a collection tool that would provide that engagement. Indeed, many of our workshops have included Native youth school groups and summer camps.

Given our community software development model for Mukurtu CMS, the audience for Mukurtu Mobile is current Mukurtu CMS users. The primary audience is Indigenous communities using Mukurtu CMS, at present for those downloads we can track and those from self-reported use numbers just over 300+ installs worldwide mainly in the United States, Canada, Australia and New Zealand. With the new one-click install hosted package on Reclaim Hosting we have also seen over 50+ new sites since the release in mid 2016. Secondary audiences are the non-Indigenous groups who use Mukurtu CMS as a way either to engage with Indigenous communities through the return and sharing of digital content and or organizations or scholars who wish to implement Mukurtu CMS for their own projects that rely on specific protocols for access, use and sharing of digital content. For example, we have worked with the National Museum of the American Indian’s conservation program to test an instance of Mukurtu CMS for the purposes of providing communities a forum for sharing information about the correct and culturally appropriate forms of care for the materials held by NMAI.

Evaluations

1. Development Evaluations and Assessment

Simultaneous to development and integration we conducted user testing and user experience sessions allowing communities and our staff to work together to upgrade and define the use of Mukurtu Mobile for their needs. Usability and quality assurance tests were conducted at each testing phase of the project. Evaluation took place largely in-person although we had a few online sessions, with less usable data. We found that the online evaluations and testing were hard to control and we had limited success getting usable feedback. In person evaluations included a combination of user surveys, cognitive walkthroughs, and contextual inquiry to assess accessibility, usability, and design interface. In person evaluations will include combination of user surveys, cognitive walkthroughs, and contextual inquiry to assess accessibility, usability, and design interface. The cognitive walkthrough method relies on a variable set of tests and multiple user groups to gain the most insight into the usability of the system. During the walkthrough, the user is asked to “think aloud” as they perform certain tasks and maneuver through the site. The value of the cognitive walkthrough is that one gets significant qualitative data about the human-computer interaction. Following this phase of testing, contextual inquiry interviews are used to gather specific data about the interface, design, and experience of the user. Contextual inquiry provides the following information about the product: 1) constraints on use/environment, 2) the process that the user goes through in their navigation, 3) specific steps to gain positive results, and 4) where users have difficulty. The in-person sessions, however, yielded usable results and helped at every stage for us to refine development, training and support.

2. Training Evaluations and Assessments

[Sample evaluation responses compiled from workshops in Alaska, Washington and California]

What features of the Mukurtu Mobile demo and using Mukurtu Mobile yourself did you find most relevant to your needs?

Summary: easy, fun, less intimidating, easily used by community

- It is less intimidating than Mukurtu like the mobility and it gives you instead a feeling of success. I think this will be good with the kids in my outdoor classroom.
- Immediacy. Haven't really spent much time with it.
- User friendly, versatile, quick upload.
- Easy, fresh & fun, envision it being used easily when attending community gatherings.
- Small, portable, assume nice quality images possible, like the speed; steps are pretty intuitive.
- Adding existing photos from my phone/cloud.

What additional features or capabilities would you like to see in Mukurtu Mobile?

Summary: Interactive games, language app

- I am kind of set with this for now I might have other ideas later.
- Interactive games for end users. Not really sure yet.
- Language app :)
- Not sure?
- Want to use it to create an environmental awareness, TEK game; really though it could be great to engage the kids in so many projects that involve culture.

How do you envision using Mukurtu Mobile at your own institution?

Summary: Kids, educational, elders, collaboration

- The kids in the outdoor classroom. To view tribal future, interact with elders, etc.
- Perhaps museum's exhibits info for visitors. Student educational---not sure.
- Quick upload of images/stories by kids, elders, etc. Collaborations on so many levels.
- See above
- I like the idea of bringing elders and children together to work on collecting photos, videos of traditional/historical & genealogical knowledge.
- Recording language and culture class.

What other departments in your tribe or organization could use Mukurtu Mobile? What types of projects might they want to do?

Summary: All respondents had ideas, language, food security, education, age, domestic violence prevention

- Language enrollment for update as tribal people. Library, age, cultural graphics, tribal general council, historic info museum, harvesting. I could go on forever. Wow!
- Food security
- All of them: education, weavers, language, tribal members.
- DNR, language and culture, education, media services.
- Natural resources; I have to think education would love it. Human resources, perhaps. Domestic violence prevention.

- Language documentation and teaching, collection

What was the most valuable part of the workshop?

Summary: All respondents found the hands on the most helpful and the ability to work with their fellow participants at collecting and uploading content.

- All of it!
- What it is, and how we use it. All well explained.
- The hands-on aspect was the most helpful to me.
- How user friendly Mukurtu Mobile is
- Face to face support and hands on experience creating DH items for CIMCC, and the ability to share Mukurtu with interested folks
- I took a fair amount of notes, all valuable! The most valuable part was getting to work with a Mukurtu site. I've read so much and really wanted to see how it works. Also I gained clarity on hosting in general, and also gained additional clarity on what I am trying to do in my role at Graton, in addition to the need for a community archive.
- The overview and group walk-throughs
- I enjoyed the hands on mobile demonstration. It is valuable to planning our activities. The background info is relevant too.

Continuation of the Project

Mukurtu Mobile ongoing development and institutional support

The project will continue as an integral part of Mukurtu CMS and its ongoing development. In 2014 Washington State University created its Center for Digital Scholarship and Curation (CDSC), with PI, Dr. Kimberly Christen as one of the co-Director's of the Center. The mission of the CDSC is to facilitate and sustain digital scholarship and teaching in support of the University's strategic plan to foster exceptional research, innovation, and creativity. The CDSC is committed to upholding WSU's land-grant heritage and tradition of service to society by collaborating with and providing support to a wide range of constituents with a focus on ethical curation and the production of digital tools that support social justice, diversity and sustainability. The Center provides not only a physical space, but dedicated faculty, resources, and programming that build from current projects to provide a base for research, scholarship, and tool-building with a focus on ethical, cultural, sustainable projects, practices and a continued emphasis on reaching out to underserved populations. With dedicated development staff, the CDSC now fully manages Mukurtu CMS and Mukurtu Mobile and will continue their development, regardless of grant funds. This level of institutional support fosters trust and provides the stability for the community of users we serve now and opens our digital tools to uses by other communities engaged in collaborative models of curation.

Key areas of growth for Mukurtu Mobile will be extended during our next phase of development with a recent IMLS National Leadership Grant and through programming from a Mellon-funded planning grant (2015-16). Specifically we will be building out the dictionary and language collections functions within Mukurtu CMS and the connection to

those features will be expanded in Mukurtu Mobile and we have built into our roadmap for future development updates to the Android app that will be compatible with Mukurtu CMS 2.0 and future releases.

Collaborative partnerships

Building from another NEH funded project—the Plateau Peoples’ Web Portal—we are applying for NSF funds to build out the mobile application to include educational modules for STEM that facilitate the creation of land-based, culturally responsive curriculum that bring together Western science and traditional knowledge. This new project brings together eight tribal nations in the region, the College of Education at WSU and the Center for Digital Scholarship and Curation to produce an update and secondary app that allows teachers to design specific culturally responsive curricula and integrate primary sources from the Portal along with collections of content gathered by students, teachers, community members and other scholars.

Long Term Impact

The impact of the Mukurtu Mobile app has been increased community engagement within Indigenous communities and non-Indigenous collecting institutions using Mukurtu CMS. Mukurtu Mobile provides an avenue for individual and group collaborations that respect difference and provide culturally responsive and ethical protocols to guide content collection, creation and curation. The long-term impact for our institution will be on-going and increased collaboration with Indigenous communities globally, increased use of both Mukurtu CMS and Mukurtu Mobile that contribute to the diversity of voices and collections at all institutions, and through increased grant funding. To date we have a new IMLS grant, a pending NSF grant and we will be submitting a Mellon Foundation implementation grant following our planning grant phase in 2016. The institutional impact long term will be to not just increase grant funds, but to ensure that our mission to develop digital tools, projects and partnerships around broad-based ethical concerns and with a social justice foundation. At institutions such as WSU it is increasingly clear that we must lead by example to promote inclusion, diversity and ensure a wide range of stakeholder needs are not just represented, but become part of the fabric of the university and the Center for Digital Scholarship and Curation as we seek to build, design and produce more digital tools and platforms.

Grant Products

The main product of the grant was the open source Mukurtu Mobile app with the corresponding source code, documentation and support sites.

- Mukurtu Mobile App releases on Google Play and iTunes
- GitHub source code
- Mukurtu Mobile website
- Mukurtu Mobile Support site and YouTube channel support videos