

DIGITAL KITAMBO: DECOLONISING NARRATIVES AND BRINGING THE PAST INTO THE FUTURE AT THE NATIONAL MUSEUMS OF KENYA

KITAMBO DIGITAL: DESCOLONIZAR NARRATIVAS E TRAZER O PASSADO PARA O FUTURO NOS

MUSEUS NACIONAIS DO QUÊNIA

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ABSTRACT

The Swahili word ‘*kitambo*’, which refers to occurrences in the past that are understood to be at least indirectly connected to the speaker, can be used to describe experimental museology through digital cultural heritage. There is a need to improve access and enhance conservation goals within African cultural heritage institutions, and the National Museums of Kenya (NMK) has been developing innovative technologies and communication tools with the Kenya Heritage Resource Information System (KEHRIS). This paper will discuss *Digital Kitambo*—a pilot project completed at NMK from 2013 – 2019 to create the spatially integrated database KEHRIS, digitise 10,000 artefacts and specimens from the archaeology and palaeontology collections, and develop digital learning programmes to engage a wider audience. Qualitative research methodology included participant observation, qualitative interviews and focus groups with museum staff as well as focus groups with primary and secondary teachers to develop curricula for local schools. This paper traces the evolution of *Digital Kitambo* from its inception and reflects on both the successes and shortcomings of the initiative with particular attention to its goals of decolonising the museum’s collections and contributing to new national narratives by engaging the public through digital initiatives.

Keywords: Heritage studies, Post-colonial museums, Digitisation, Collections management systems, Experimental museology

RESUMO

A palavra swahili “Kitambo” refere-se a ocorrências passadas, ligadas ao orador, nem que seja de forma indireta; neste sentido, pode ser usada para descrever a museologia experimental através do património cultural digital. Verifica-se a necessidade de melhorar a acessibilidade e os objetivos de conservação nas instituições que conservam o património cultural africano. Nesta perspetiva, os Museus Nacionais do Quênia (NMK) têm vindo a desenvolver tecnologias inovadoras e ferramentas de comunicação com o Kenya Heritage Resource Information System (KEHRIS). O presente texto discute o Kitambo Digital - um projeto piloto, desenvolvido pelos NMK, entre 2013 e 2019, e que visava criar a base de dados espacialmente integrada no KEHRIS, tendo-se procedido à digitalização de 10.000 artefactos e espécimes das coleções de arqueologia e paleontologia, a par do desenvolvimento de programas de aprendizagem digital almejando envolver um público tão vasto quanto possível. A metodologia de investigação qualitativa incluiu a observação dos participantes, entrevistas qualitativas e grupos focais com os funcionários do museu, bem como com docentes do ensino básico e secundário, tendo como objetivo desenvolver currículos para as escolas locais. O texto traça a evolução do Kitambo Digital, desde o seu início, refletindo os seus pontos positivos e as suas vulnerabilidades, tendo particular atenção ao objetivo que diz respeito à descolonização das coleções do museu, contribuindo para o surgimento de novas narrativas nacionais e convocando a participação do público através da promoção e divulgação de iniciativas digitais.

Palavras-chave: Estudos do património, Museus pós-coloniais, Digitalização, Sistemas de gestão de atividades, Museologia experimental

1. INTRODUCTION

Cultural heritage management is recognised as an important element of promoting the tourism sector, fostering national unity in multicultural societies and creating a technocratic economic sector (Dahles, 2001; Dupree, 2002; Keesing, 1989). In Europe, North America and northeastern Asia, digitisation of museum collections forms the foundation of the cultural tourism industry and improves access to large collections of artefacts and objects (Chang; Paskaleva & Azorin, 2010; Ricciardi & Lombardi, 2010; Sigala, 2005). In Africa, digitization of collections is taking place in certain institutions but various technical and financial resource constraints continue to pose significant challenges (Abungu, 2010; Kamatula, Mnkeni-Saurombe, & Mosweu, 2013). As costs for basic equipment needed to digitize becomes more affordable and Internet connectivity across the region improves, many African museums and archives are increasingly able to start the digitization of their collections; nonetheless digital museum collections remain the exception rather than the norm in most African institutions (Balogun & Adjei, 2019; Mutula, 2014).

This essay examines digitisation efforts at the National Museums of Kenya (NMK) using the case study of Digital Kitambo —a pilot project from 2013 – 2019 to create a spatially integrated database, digitise 10,000 artefacts and specimens from the archaeology and palaeontology collections, and develop digital learning programmes to engage a wider audience with an emphasis on augmenting curricula at primary and secondary schools in Kenya. This paper will trace the evolution of Digital Kitambo from its inception and reflect on the challenges, successes and shortcomings of the first phases of the initiative within the context of experimental museology and the use of digital technologies and media to interrogate and revise narratives about history and the nation. Research methods included participant observation, qualitative interviews and focus groups with museum staff as well as focus groups with primary and secondary teachers in the Nairobi school district.

NMK exemplifies the situations at cultural heritage institutions across Africa because its collections are both vast and diverse, and the institution is well established in the national consciousness as the premier repository of cultural patrimony. Furthermore, NMK is actively engaged in curatorial strategies to decolonise the ways it collects, interprets and displays Kenya's heritage whilst attempting to engage diverse audiences. Although NMK curators and other museum staff do not specifically identify their practices as experimental museology per se, this paper analyses institutional goals and endeavours within this context particularly in regards to public engagement.

2. BACKGROUND TO THE STUDY

Digital heritage is an expanding global initiative that promotes increased access to archaeological and ethnographic collections by members of the general public (<http://www.digitalheritage2013.org>). The United Nations Educational, Scientific and Cultural Organisation (UNESCO) has promoted digital heritage to one of the pillar cores of its mission and is investing significant resources into opening up museum archives to the general public (<http://whc.unesco.org>). At the heart of this initiative is the realisation that by conveying the complex interweaving tapestry of the human experience, a more peaceful future is possible based on the recognition of our commonalities rather than an emphasis on our differences. As the Human Evolution, Adaptations, Dispersals and Social Developments (HEADS) spearheaded by UNESCO describes:

the record [of human evolution is] increasingly valuable as our inherited storehouse of knowledge about the foundations and diversity of human life, experience, and social behaviour as well as modes of early human adaption in response to environmental and climatic influences. This precious knowledge rests at the core of understanding human lineage and the origins of our cultural diversity, as well as its continuity today (Anatole-Gabriel, n.d.).

In formerly colonised contexts, cultural heritage also holds great potential for reclaiming indigenous identities and centralising local knowledge (Battiste &

Henderson, 2000; Ferris, Harrison, & Wilcox, 2014; Grey & Kuokkanen, 2020). In *Decolonizing Methodologies*, Linda Tuhiwai Smith (2012) criticises how history has not only heretofore been recorded from a colonial perspective while many other narratives have been disregarded, but that postcolonial research structures and methods continue to have Eurocentric biases. As she explains:

The transplanting of research institutions, including universities, from the imperial centres of Europe enabled local scientific interests to be organised and embedded in the colonial system. Many of the earliest local researchers were not formally “trained” and were hobbyist researchers and adventurers (Smith, 2012, p. 8).

This quotation exactly describes the foundation and development of NMK, which continues to contend with the legacy of its colonial past, especially when engaging local audiences to contribute to decolonised narratives about ‘the nation’. When discussing decolonisation and museums, much of the literature focuses on Western museums as repositories of the cultural patrimony looted by the Empire (Hicks, 2020). Although institutions like the British Museum have become a symbol of the vestiges of colonialism, many museums in former colonies have collections that were originally assembled by the colonisers and developed to represent their perspective through the objects. Critical assessments of some of these collections have taken place such as the Natal Nguni catalogue held by Iziko Museums in South Africa (Gibson, 2019) or NMK’s cultural heritage collections (Lagat, 2017). Decolonisation involves a deliberate and purposeful rupture from past institutional structures that has proven to be empowering and enduring in such contexts (Coombes & Phillips, 2015).

A 2009 MBA thesis from the University of Nairobi collected data through interviews with the NMK’s Director-General, Director of Development, Director of Sites and Monuments, all the heads of departments and the principal curators in order to analyse strategic management goals. Ninety per cent of the interviewees cited the need to develop an African identity for the institution, which had

been established by colonists and continued to perpetuate a European point of view in its collection and display of Kenya’s natural and cultural heritage (Borona, 2009). Digital media in a museum context has been shown to offer new means of engaging audiences in ways that centralise their perspectives and even place them in a position of authorship to refashion new narratives from old collections (Parry, 2007). Digitised collections along with digital technologies for community outreach offer great potential for the decolonisation of museums and the incorporation of indigenous viewpoints.

Digital Kitambo sought to embrace the potential of digitised collections in addressing the problems introduced by colonial narratives. Furthermore, it also aimed to step forward into the realm of ‘experimental museology’ which situates museums as ‘networked nodes’ that incorporate co-design and co-creation as essential components of interacting with and contributing to the social, cultural, economic and political milieu in which they are embedded (Haldrup, Achiam, & Drotner, 2021). Museums around the world are responding to new pressures to redefine and demonstrate their ‘art of relevance’ (Simon, 2016). As many institutions rely on social media and other forms of digital engagement to connect with audiences, particularly since the COVID-19 pandemic restricted visitation to physical premises, curatorial and collections management practices have evolved to include various types of experimentation. In this paper, both the accomplishments and shortcomings of Digital Kitambo are examined in order to reflect on the role of digital collections and virtual outreach media in decolonisation and experimental museology. By the end of the twentieth century, with Kenya becoming increasingly democratic, NMK recognised the need for more inclusive representation of the country’s disparate cultures and began to consider how the museum collections and exhibitions could ‘promote unity in diversity and nationalism’ (Lagat, 2017, p. 29). In 1999, NMK leaders invited museum experts to evaluate the institution’s structure and operations in order to suggest improved practices for decolonising the museum and democratising the preservation and dissemination of cultural

heritage in Kenya (Lagat, 2017, pp. 29-30). Following the recommendations of the 1999 study, NMK committed to moving beyond 'static showcases of the past to a more dynamic contemporary present' through the National Museums of Kenya Support Programme (NMKSP) or 'the museum in change' initiative as it was popularly called (National Museums of Kenya, 2006, p. 1). With €8 million in funding from the European Union to implement NMKSP, the museum's Nairobi location closed to the public in 2005 for extensive renovations to the physical building, reorganisation of the institutional infrastructure and development of new exhibitions and public programmes (National Authorising Officer, 2004).

The NMKSP assessments and restructuring process identified a need to more actively engage the public in developing exhibition themes and related programming. The NMKSP sought to accomplish this goal through workshops and seminars for various constituency groups, visitor surveys and radio programmes during which the general public could call the station to offer suggestions (Lagat, 2017). Through the public engagement forums and internal strategic development initiatives, the three themes of nature, history and culture emerged as the focus for the new museum's exhibitions (Mirara, 2006). One of the marquee permanent exhibitions that NMK developed during the EU-funded expansion and renovations is *Asili ya Bindamu* (Human Origins), which includes some of the most significant early human fossils in the world.

Kenya currently hosts one of the longest records of human technological evolution spanning some 3.3 million years (Harmand et al., 2015; Sahle, 2020) and biological evolution (Willoughby, 2006). As outlined in Clause 3 of the National Museums and Heritage Act, one of the functions of national museums is to 'serve as places where research and dissemination of knowledge in all fields of scientific, cultural, technological and human interest may be undertaken' ("The National Museums Act," 1983). In fulfilling this function, the NMK Directorate of Research and Collections spearheaded an initiative in 2012 to standardise digitisation practices at the

museums, make its collections more accessible, develop new means of reaching both local and international audiences, and create community-based national narratives through digital engagement (Wabuye, 2013).

The Collections Registrar led a task force comprised of curators from NMK's four primary departments (botany, zoology, cultural heritage and earth sciences) along with ICT staff members to survey collections management practices across the institution, including but not limited to software usage and digitisation of collections. Although all four departments had begun to digitise their collections, the taskforce concluded that insufficient training for staff, inadequate equipment and Internet connectivity, and an incomplete data-sharing policy had impeded digitisation efforts at NMK (Wabuye, 2013, p. 3). The taskforce identified dispersed digital collections throughout NMK using different software systems and advised that the stand-alone datasets generated by each department be integrated into one collections management system (CMS) to be used across the institution, and it recommended KE-EMu as the industry standard that would meet all of NMK's needs (Wabuye, 2013, p. 13). However, the costs of such CMS software exceed NMK's capacity, and the Directorate of Research and Collections began to seek external partnerships to generate the necessary funds, which led to the development of Digital Kitambo as explained in the next sections.

3. PILOT PROJECT WITH ARCHAEOLOGY AND PALEONTOLOGY COLLECTIONS

Since the creation of the Standardised African Sites Enumeration System (SASES) (Nelson, 1973), NMK has maintained its archaeological collections in an analogue, relational database (Figure 1). Archaeology is a spatial discipline, so the museum records site locations based on SASES, which situates locations within a grid of the African continent. A SASES accession begins with the grid coordinate represented by four letters followed by an ordinal number according to the site's order of record at NMK. Archaeological materials brought to NMK are housed in wooden storage boxes that are organised according to shelf numbers. Artefacts associated with each archaeological

site are given a Kenya National Museum (KNM) accession number, which relates to project notes and excavation records that are stored in a filing cabinet or on a shelf in a two-ring binder. The notes and KNM card have an associated shelf number corresponding to a physical location in the Archaeology Section where artefacts are curated. All records are maintained on paper sheets, stored on shelves and in cabinets in the Archaeology Section of the Nairobi National Museum.

The archaeology collection's accession system lends itself to digitisation as all of the data are organised relationally in the analogue system. The challenges to digitising this collection, however, are primarily three-fold: (1) converting paper records into a digital format is extremely time consuming, (2) infrastructure upgrades in data storage are needed, and (3) developing a flexible, yet descriptive ontology acceptable to a wide range of users

necessitates the input of stakeholders at all levels of the curation process.

In 2013, the authors initiated a pilot project of digitisation sponsored by the National Research Foundation of Korea with a view to scaling up for an eventual complete digitisation effort at NMK. The pilot focused on a selection of archaeological sites in the Lake Turkana region of Kenya that were excavated in the late 1970s and early 1980s that have not been thoroughly analysed or published. Although archaeological investigations in this area have been continuous since the 1970s and produced significant findings in regards to the technological and biological origins of the human species (Harris, Leakey, & Brown, 2006; Robbins, 2006), there has been no attempt to archive the archaeological collections in an easily accessible format so that comparative research can be done.

Figure 1 - Paper record storage system at the Nairobi National Museum, 2014. Accession numbers are written in notebooks, which direct the user to a specific box on a shelf. There is no direct catalogue for artefacts in the present museum accession system unless individual archaeologists generated them. Image courtesy of David K. Wright



PHASE I—THE LAKE TURKANA PILOT PROJECT

Funding for the pilot project provided the necessary equipment for digitising records and training staff, and NMK staff members were consulted in how to construct a database that would incorporate elements of the existing KNM system into a new digital platform. To develop digitisation protocols and test conversion of the archaeology collection's analogue database, a selection of records was converted into a digital database using

Microsoft Access. By entering KNM data cards into Access, general information about site documentation history and location became searchable using a computer. However, detailed site data are not part of the KNM records. For these data, approximately 40 archaeological sites in the Lake Turkana region were catalogued using digital photography and partial reanalysis of legacy collections. A total of 603 photographs were taken from the archaeological sites, most of which have not been published in previous reports.

Archaeological sites were plotted into a Geographical Information Systems (GIS) database using QGIS 2.0, an open access software program (www.qgis.org). Dozens of sites were spatially plotted based on field notes of archaeologists who have retired from active fieldwork. Conversion of legacy coordinates from the East African Grid into Universal Transverse Mercator (UTM) coordinates was done by means of an algorithm programmed into Microsoft Excel. The elevations of sites were estimated from the Digital Elevation Model (DEM) of the region (<http://earthexplorer.usgs.gov>), and the longitudinal information was combined with archaeological datasets in order to constrain the locations of human occupations. Aggregation of the data was made in Microsoft Access and stored in the central data server of the NMK for the purpose of easy conversion to a custom database at a future date.

An immediate positive outcome of the pilot project was the relocation of unpublished archaeological datasets for which there had been no plans to disseminate findings. Portions of these previously unanalysed collections have now being published (Bloszies, Forman, & Wright, 2015; Forman, Wright, & Bloszies, 2014; Wright, 2019; Wright, Forman, Kiura, Bloszies, & Beyin, 2015; Wright, Grillo, & Soper, 2016). However, the overall outcomes of the pilot project demonstrated the enormity of the task of a full-scale digitisation effort. Translating handwritten field notes from individual archaeologists into a standardised ontology proved exceptionally challenging. Beside issues transcribing near-illegible handwriting into the database, there are no standardised definitions for classes of archaeological artefacts. This led our team to develop impromptu translational ontologies that conformed to other classificatory schemes used by NMK staff to accession artefacts from recent projects, but the reclassifications were, at times, subjective judgement calls and may not have been consistent with the original excavators' determinations.

Furthermore, longitudinal data prior to the use of GPS technology were often insufficient to relocate archaeological sites on a map. We classified archaeological site locations into

three categories depending on the relative degree of confidence in the site location. Precision values ranged from ± 100 to 5000 m. For mapping purposes on a large, countrywide scale, this is sufficient resolution. However, imprecise mapping coordinates complicate future statistical-based analyses in a GIS. Despite these imprecisions, aggregation of sites into a GIS provided a tool for creation of data management and treatment plan associated with the proposed Lamu Port Southern Sudan-Ethiopia Transport (LAPSSET) corridor. NMK Archaeology Section staff members were able to delineate 'highly sensitive' cultural resource zones and recommend locations for archaeological survey and monitoring of construction activities. With the implementation of a new national constitution in 2010, Kenya federalised its constituencies and decentralised the responsibility for heritage management across the country. By providing site-specific information from its significant database and resource-rich collections, NMK has become the facilitator of information and knowledge to local communities rather than the aggregator. LAPSSET provided an immediate opportunity for NMK to exercise its new role and coordinate heritage interventions against potential threats to specific local cultural resources. This immediate impact of the pilot digitisation program was unanticipated, but proved the value of the effort for the purpose of conserving cultural heritage sites against the potential impacts of new infrastructure development.

PHASE II—CREATING A CMS FOR NMK

Despite the challenges inherent to digitising NMK's collections, the pilot project in archaeology yielded sufficient success that the museum's senior leadership as well as curatorial and collections staff members were convinced of the need to scale up these efforts across the institution. However, identifying appropriate and cost-effective CMS software remained a limiting factor. Many different options were considered,

including a partnership with Aluka (www.aluka.org), which is arguably the most

coherent digitisation effort in Africa so far. Aluka partners with JSTOR to accession natural and cultural resources behind a paywall (Limb, 2005; Masinde & Rajan, 2010). However, Aluka has been subject to heavy criticism for promoting a neo-colonial agenda, siphoning information resources from the Global South to the Global North whilst the majority of African educational institutions lack access to the database (Breckenridge, 2014; Garaba & Ngulube, 2010; Lor & Britz, 2012; Pickover, 2014). Thus, there has been a pullback of engagement with Aluka among African heritage repositories that seek to digitize their collections, but insist on maintaining control over how the collections are used.

In 2015, the non-profit organisation, OpenHeritage, joined the project to overcome the obstacle of using proprietary software and external hosting

of heritage data (<https://www.openheritage.org.za/about>). In compliance with the National Heritage Resources Act (NHRA), Act 25 of 1999, the South African Heritage Resources Agency (SAHRA) developed a digitization protocol on open-source, Drupal- and Geoserver-based software platforms in which 21,000 archaeological sites and 4300 objects were curated from across the country (Wiltshire, 2013). The system that developed from this effort is known as the South African Heritage Resource Information System (SAHRIS) and is still in use across the country today. Their heritage inventory has since grown to over 60,000 sites and 62,000 objects. After the system was developed, the lead architects of SAHRIS registered OpenHeritage as a non-profit organisation to design and implement similar systems elsewhere. OpenHeritage's mission remains to customise heritage management systems similar to SAHRIS that are affordable and accessible to Global South heritage institutions.

Following initial discussions of how to execute a common vision, Digital Divide Data (DDD) were formally approached by the project team and NMK to provide scanning resources and pursue funding opportunities. DDD is a hybrid for-/non-profit entity, the latter of which trains

students and professionals in information technologies in Kenya, Cambodia and Laos, the former of which employs successful graduates of the programmes to work in for-profit digitisation ventures (<https://www.digitaldividedata.com/>). The project team and NMK provided DDD with an initial proposal, access to collections and expertise, which enabled DDD to secure funds from a large, private corporation to implement a comprehensive CMS, first using the collections in Archaeology and Palaeontology with a view to ramp up to a comprehensive digitisation of NMK more generally.

In July 2017, work began in earnest on the project with an initial scale of digitising 10,000 archaeological artefacts and palaeontological specimens and building a website with teaching resources suitable for the Kenyan public school system. The first step was to conduct a focus group with senior museum management, the department head of earth sciences, and curators and collections management staff in the archaeology and palaeontology sections. Additional focus groups were also organised with the department heads, curators and collections management staff in botany and zoology to ensure that the CMS would meet their data management needs as well as those of the archaeology and palaeontology collections. The focus groups gathered information about the collections in each of these departments to develop appropriate ontology for the CMS, but also queried the curatorial and research needs that digitisation could help fulfil. Because the sections of contemporary art and cultural heritage are much smaller than archaeology, palaeontology, botany and zoology, we used semi-structured interviews with the curators in contemporary art and cultural heritage to ascertain the ontology that would suit their CMS needs and discuss how digitisation could further research and use of their collections.

In addition to these focus groups and curator interviews, we also had semi-structured interviews with NMK's Registrar, Alfreda Ibui, and Public Programmes Coordinator, George Juma Odeng, the latter of which is discussed in the next section because it pertains more directly to digital engagement of various

audiences. In her interview, NMK's Registrar highlighted the pressing need for a centralised CMS to maintain collection records, support curation of the collections, improve on the museum's holdings, and disseminate data about the collections. She provided quarterly reports that NMK collections managers had submitted to her with data about holdings as well as the status of what had already been digitised and which platforms had been used to assemble the data. According to her records in 2017, NMK held one of the largest and well-curated collections in sub-Saharan Africa with—at that time—9,683,935 items that were documented and a similar number that were yet to be documented (Alfreda Ibui, interview, 13 July 2017).

The focus groups with senior museum management and staff members in archaeology, palaeontology, botany and zoology further underscored the need for digitising collections to facilitate research and curation and increase the museum's capacity to engage in international collaborations. These conversations were largely focused on the development of appropriate ontologies for the CMS, integrating previously compiled databases on different platforms, and sharing digitised data both within NMK's institutional structure that includes regional museums and with external collaborators such as the many researchers whose work contributes to the acquisition of new objects, specimens and data for the collections. Because this initial phase of Digital Kitambo was directed towards digitising portions of the archaeology and palaeontology collections with the creation of a website as a final goal, these focus groups considered digital engagement with the public more than the groups in botany and zoology. However, even in botany and zoology where the discussion was primarily focused on aspects of the CMS, NMK staff members indicated a need for public outreach and ways of using digitised collections to more fully engage both local and international audiences. Within these conversations centred on research and the ontology of terms to encapsulate the scope of the research collections, such recognition of outreach as central to the museum's core mission demonstrates its function as a 'networked node' where community

engagement is intrinsically linked to researching, collecting and interpreting data and artefacts (Haldrup, Achiam, & Drotner, 2021).

Senior NMK managers and archaeology and palaeontology staff members discussed how the public website could appeal to different audiences with varying levels of knowledge. One target audience that was considered especially important were the school groups that routinely visit the museum to fulfil a compulsory component of the national curriculum. Although NMK has an education department to coordinate these visits, their capacity is limited in terms of the materials and support they are able to provide teachers in optimising their students' learning experiences at the museum, and the public website could address this important need.

The emphasis of the technical effort to create a CMS was three-fold: (1) purchase and install equipment; (2) select and digitise marquee objects to explain Kenyan prehistory to a general audience; and (3) train staff in using the CMS, including open-source GIS applications such as QGIS. To that end, computers were purchased for the NMK and installed in a classroom that was connected to broadband Internet. NMK staff and DDD recruits were trained in heritage CMS development as the architecture of a database management system was created by OpenHeritage in Drupal, similar to what was executed for SAHRIS, in consultation with NMK staff. Outreach to research affiliates of the NMK was also made to assemble personal databases into the new system, dubbed the Kenyan Heritage Resource Information System (KEHRIS).

A training manual was written and used as a teaching resource for a period of two weeks based on the outcomes of the pilot project and objectives of the next phase of digitisation (Wright, 2017). A total of 15 staff members from archaeology and palaeontology were trained on basic tenets of GIS, map creation and digitisation, and vector and raster data integration into spatial environments. Once those skills were obtained, the participants were trained to incorporate spatial and object data into KEHRIS. Ontologies were developed

with NMK staff pertaining to the classification of objects, mostly following protocols used in the creation of paper records according to the decades old KNM/SASES systems, but also based on the results of the Phase I pilot project. The new system was designed to allow other departments at NMK to tailor their disciplines' ontologies into the CMS, which would ultimately be linked together into a centralised system managed by the registrar's office.

4. DIGITAL ENGAGEMENT WITH DIVERSE AUDIENCES

After the construction of KEHRIS and staff training was completed, the next phase of Digital Kitambo was to create the public website and develop innovative means of engaging with different audiences through the digitised collection. According to NMK's Public Programmes Coordinator, NMK considers issues of representation in a decolonising way and tries to involve source communities to include their perspective whenever curating or interpreting objects of significance to these communities (George Juma Odeng, interview, 13 February 2018). A digitised collection available online would provide a powerful tool for reaching communities in different parts of Kenya as well as Kenyans in the diaspora. Furthermore, because all permanent exhibitions at NMK are required to have a link to the Kenyan national curriculum and part of the exhibition development process is to consult with teachers to ensure this is happening, digital tools would greatly facilitate that endeavour countrywide (Galgalo Rashid Abdi, NMK Head Curator, interview, 21 February 2018).

Input derived from all the focus groups and semi-structured interviews with NMK staff indicated a general consensus that a website featuring digitised collections should present the information in ways that are accessible for varied audiences ranging from primary school students who have no prior background knowledge to university students conducting research. Digital engagement opportunities to facilitate the outreach efforts of the Public Programmes and Education units at NMK were deemed to be especially important. For example, instead of bringing replicas to classrooms as education officers have been

doing on an ad hoc basis upon request by teachers, virtual exhibitions could accomplish the same goals without the costs of time and transport for physically visiting the schools. Offering digital programmes such as this would enable outreach to schools in even the most remote parts of Kenya as the education department is currently limited to providing support for schools within the greater Nairobi area.

From the outset, one of the main goals of Digital Kitambo was to develop materials for teachers in the Kenyan public school system to support them in providing such scaffolding for their students to visit the museum as a compulsory component of the national curriculum. Primary and secondary students comprise over half of NMK's visitors, and school groups were unanimously identified in all the focus groups and interviews as one of the museum's key audiences to target. Working with NMK education staff, focus groups were conducted in February 2018 with primary and secondary school teachers to obtain input from them on the goals of a digitized national heritage collection and how the museum could develop thematic virtual programmes based on the school curriculum. Research has shown that informal learning in a museum context is facilitated and enhanced when visitors engage in an activity prior to their visit to prepare for what they will experience at the museum and afterwards to reinforce the learning (Eshach, 2007; Griffin, 2004; Lin, Fernandez, & Gregor, 2012).

The focus groups with teachers at NMK were organised on two consecutive days with the first group comprised of ten primary teachers and the second group of seven secondary teachers. Every teacher who participated had brought a group of their students to the museum for at least one visit, but the secondary teachers indicated they have done so more frequently with some saying that they bring their students every year. Ecology and evolution were identified as the two main themes of the national curriculum at both the primary and secondary levels that the teachers focus on when their students visit NMK. Most teachers in both focus groups complained about out-dated textbooks as their primary

resource, the ensuing discussions resulted in numerous ideas for online resources to augment or even replace these textbooks.

One aspect of these discussions that stood out was the need to situate and better contextualise both the specimens and artefacts that demonstrate human evolution as well as the geographic locations where these were discovered. One teacher commented, 'So, when I go to Kariandusi, all I see is rocks. Even as a teacher, I don't know how that shows anything about early man'. Kariandusi is one of the nine satellite NMK facilities, and it has a rich history and prehistory. Originally excavated by Louis Leakey from 1929-1931, it is a nearly 1 million-year-old Early Stone Age site consisting of hundreds of handaxes made from volcanic glass (obsidian), trachyte and basalt (Durkee & Brown, 2014; Shipton, 2011). It is one site in a trifecta from this period (including Isinya and Olorgesailie) that demonstrate complex cooperative hunting behaviours and group mobility in the circumstance of extreme degrees of climate change (Gowlett & Crompton, 1994; Potts, 2013). These behaviours and handaxe technology, more specifically, were exported from eastern Africa in waves of migration leading to the colonisation of the far reaches of Eurasia at this time (Shipton & Petraglia, 2011). However, the context and significance of the Kariandusi site is not obvious to laypeople, and it was generally agreed in the focus groups that the story of the rocks needed to be more clearly articulated in the digital resources on NMK's website.

Similarly, the geographic spatialisation of human evolution is an important but elusive concept that most teachers in the focus groups struggle to explain to their students. As one primary teacher explained, 'For example, when we teach about Hyrax Hill [another of NMK's satellite sites], the children don't know where that is, so we just say near Nakuru'. Many teachers wondered why there are so many prehistoric sites in the Rift Valley. Beginning after 4000 years ago, people herding domesticated animals and their technologies trickled south of the Lake Turkana Basin, mostly within the Rift Valley corridor as a phenomenon known as the 'Pastoral Neolithic'

(Prendergast et al., 2019; Robertshaw, 2021). Excavated by Mary Leakey in the early 1940s (M. D. Leakey, 1945), Hyrax Hill has long been recognised as one of the best-preserved archaeological sites recording this process (Bower, Nelson, Waibel, & Wandibba, 1977). Its status as an NMK satellite museum situates Hyrax Hill as protected from threats of development, although the significance of the site remains opaque to most Kenyans. As a system, KEHRIS was designed to incorporate legacy collections such as Hyrax Hill, as well as ongoing excavations and reanalysis of such sites (Shoemaker & Davies, 2019), which are continuous in Kenya. The strategy with developing a public outreach component from the collections was to connect the scientific understanding of the collections to information that was usable and relevant for a general audience—demystifying the objects of the past by making them more accessible.

The focus groups identified several issues and questions that they would like support from NMK's digital offerings to address. Strategies to navigate the conflicts between religion and evolution, in particular, generated a great deal of discussion in both focus groups. Teaching human evolution in Kenya is controversial due to the strong influence of fundamentalist Christian and Muslim groups who oppose the curriculum in school settings (Njenga & Manthi, 2007). Questions about whether or not humans continue to evolve were also raised. One secondary teacher commented 'I remember learning in primary school that humans evolved from monkeys and I wondered if I would evolve into something else. I'm still not sure how to explain this to my students now'. Related to this issue, several teachers explained that it is not always clear in the primary school curriculum that other animals besides humans have also evolved or why some species have become extinct. NMK staff members in archaeology and palaeontology agreed to collaborate with their colleagues in education and public programmes to develop digital resources to support teachers at both the primary and secondary levels in teaching evolution and augment the standard textbooks issued within the national curriculum. The teachers in both focus groups seemed especially interested in practical activities that

their students could do to help them better understand the abstract concepts of evolution. Suggestions for these included didactic materials like worksheets, but more importantly ways for students to interact with objects and information such as games (both analogue and digital).

In a brainstorming session about participatory activities that teachers could do in the classroom, the suggestions that generated the most excitement were creating replicas of objects with clay or stones and constructing a model of an archaeological site on the school grounds. Despite the fact that the teachers were asked to brainstorm in the context of developing a website with digital forms of engagement, many of their ideas for interaction focused on the materiality of information about evolution. Before each focus group began in a conference room at the museum, curators from palaeontology and archaeology led the teachers on a 'behind-the-scenes' tour of the laboratory and storage facilities where artefacts and specimens are kept, conserved and interpreted. It was clear both during these tours and in the subsequent focus group discussions that experiencing the lab and storage facilities made a vivid impression on the teachers and that no form of digital engagement would ever replace the 'brick and mortar' experience of a visit to NMK's galleries. As one teacher remarked, 'When students see something like a handaxe in the textbook, it is theoretical and even boring. But when you actually come to the museum and see that handaxe in person, you realize this is what early humans were using and it is really exciting'. Recent developments in human-centred design can help bridge such gaps between the primacy of materiality and various forms of digital engagement by shifting the focus in the design process from technological innovations to how a visitor's experience of a museum's collection can be enhanced through digital means (Mason & Vavoula, 2021). The focus groups with teachers at NMK were an attempt to involve non-designers/users in the design process in order to create new approaches for engaging with cultural heritage, but as will be discussed shortly, the results fell short of the ideals.

Internet connectivity did not seem to be a problem in classrooms and many teachers conveyed that extensive mobile network coverage around the country has made online engagement possible for most schools in Kenya even those located in remote, rural areas. Both the teachers and NMK education and public programmes staff members indicated that opportunities to continue engaging with teachers would be helpful because the syllabus is always changing, and new challenges will occur. The enthusiasm and excitement were palpable amongst the teachers in both focus groups as well as with NMK staff members in archaeology, palaeontology, education and public programmes, and all the focus groups seemed to generate good momentum for implementing the final phase of the Digital Kitambo experiment to bring the digitised collections to a broader public with new forms of engagement.

5. IMPLEMENTATION AND EVOLUTION OF OUTREACH PROGRAMMING

In December 2018, DDD hired an external web developer to create a website based on the collections and input from the focus groups with teachers, and interviews and focus groups with museum staff. Content was developed in an interactive website entitled 'The Evolution of Technology from Stone Tools to Smart Phones' in which users were provided information pertaining to past periods of Kenyan history, coeval environments and the evidence of hominin technologies and fossil records from the NMK collections. The text was tailored to conform to the Kenyan public schools' learning objectives and designed to facilitate user engagement with the collections at the museum, although specific thematic materials were never created for teachers to use in their classrooms before and after their museum visits. After a public launch and publicity push (Oluoch, 2020), the website was attached to the NMK's public site at www.nmkearthsciences.org. The website has subsequently been taken down, but archived versions of the site can be accessed via the Wayback Machine at <https://web.archive.org/web/20201128072832/https://nmkearthsciences.org/>.

In May 2020, Google Arts and Culture spearheaded a new initiative—completely separate from the *Digital Kitambo* project—to digitise parts of the NMK collection and host portions of the collections online (<https://artsandculture.google.com/partner/national-museums-of-kenya>). In May 2021, 'The Evolution of Technology from Stone Tools to Smart Phones' website was removed from the NMK server, including the digitised collections and online exhibition. To our knowledge, none of the external stakeholders of the digitisation effort were informed or consulted about the decision. The new online gallery created by Google is not contextualised thematically, although it is searchable by keywords if one knows what terms to enter. Metadata are available for the objects when the user clicks on them, though the location is non-specific (all artefacts are attributed to 'Kenya'), and there is little by way of context provided about any given object's manufacturers, use or provenance in relation to the museum collections. Exhibits created on the Google Arts and Culture site are authored by 'National Museums of Kenya' and are designed to showcase aspects of the collections and communities of Kenya appealing to tourists and local audiences interested in Kenyan culture. Whether the KEHRIS CMS remains operational as an internal resource at the NMK is not known to the authors of this article, but if it remains operational, it has no functional relationship to the public website managed by Google Arts and Culture.

6. CONCLUDING REFLECTIONS

On the one hand, the Digital Kitambo project was successful in securing funding, training staff and digitising portions of NMK's archaeology and palaeontology collections. These accomplishments further the NMKSP's efforts to decolonise the museum and represent 'a more dynamic contemporary present' through its collections (National Museums of Kenya, 2006). On the other hand, overcoming the limitations of old collection techniques and reporting standards, continuing the process beyond the funding life cycle and improving public access to the collections was equivocal. The scope of digitisation to this point and planned transition of analogue cataloguing to digital formats in the Digital Kitambo initiative

is a template for a process that could be undertaken by other national museums across Africa and beyond. The NMK exemplifies the challenges and opportunities many national institutions face in terms of economic circumstances, condition of collections and scientific value of the collections (see also Baro, Oyeniran, & Ateboh, 2013; Eke, 2011; Mutula, 2014). Making obvious upgrades to Internet infrastructure, stable power sources and enhancing the technical capacity of staff will not be enough to complete digitisation of natural and cultural heritage collections. Instead, a common purpose for digitisation is needed, which satisfies disparate political and social perspectives on the past and ascribes value to collections by disseminating information that meets present and anticipated future national priorities.

Digitisation of archives alone is a valuable tool for preservation of national collections for future generations, but dissemination of data is a critical element of heritage preservation because it allows the public to understand the value of the objects and feel invested in maintaining them for future generations (Kamatula et al., 2013). Digitisation of museum collections is also important for preventing species loss through conservation efforts and maintaining accurate diachronic records of spatial distributions of biological taxa (Berents, Hamer, & Chavan, 2010; Coetzer, 2012; Meier & Dikow, 2004; Otieno, Njoroge, Agwanda, Gikungu, & Mauremooto, 2014). More tangibly, archaeological and petroglyph sites are continuously threatened by development projects like LAPSET and other forms of human encroachment. Communities unaware of natural and cultural resources at their doorsteps are unlikely to ascribe economic or social value to them.

Furthermore, ready access to a national museum's collections with opportunities to create one's own stories from the digitised objects can provide a sense of ownership and belonging that is empowering in formerly colonised places. Edward Said (1995), for example, shows the dominant historiography that negated and repressed histories of the colonised can be reclaimed through alternative narratives told by those who were formerly

oppressed. On any given day, the parking lot outside NMK's flagship location in Nairobi is full of buses as thousands of schools around the country visit the museum every year. The importance of telling stories about Kenya's history, present and future from a decolonised perspective cannot be underestimated for this target audience. For children to learn about the history of their country from a decolonised perspective empowers them to shape both its future and their own. As the central repository of the country's natural, cultural and artistic heritage, NMK is telling its own stories about conquest, colonialism and the enduring legacies of these histories on contemporary Kenyan society. The museum's full institutional movement into the digital age remains an ongoing and negotiated process.

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