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Original article

## Three-dimensional, community-based heritage management of indigenous museum collections: Archaeological ethnography, revitalization and repatriation at the Sámi Museum Siida

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### ABSTRACT

Ethnographic museum collections have traditionally been acquired, maintained, and utilized by anthropological and other museum-based researchers. Increasingly, indigenous communities consult museum holdings in order to inform social movements reclaiming cultural heritage, though collections and their records are often not conserved or made accessible with these goals in mind. We report a project conducted with Arctic Sámi communities in collaboration with the Sámi Museum Siida. Coupling the results of detailed ethnographic interviews with accessible three-dimensional modeling techniques – in particular photogrammetry – we propose a community-based methodology in archaeological ethnography aimed at increasing accessibility for descendant community members that may potentially expand collections' use for researchers. Concurrently, we stress that such an integrative approach must be particularly cautious in the sharing of models of indigenous cultural heritage, which encounter frequent threats of misuse and appropriation in an era of easy 3D modeling and printing. This abstract appears below in North Sámi (Davvisámegiella). Davvisámegiella (North Sámi): Etnográfalaš museaid čaokkáldagaid leat dábálaččat čoggán, bajásdoallán ja geavahan antropologijjadahje museasuorggi dutkit. Eamiálbmotservošat gallegit museaid čaokkáldagaidain eanet ja eanet vai besset ealáskahttit iežaset kulturárbbi. Čaokkáldagaid ja daidda gullevaš dieđuid eai goittotge dábálaččat leat seailluhan ja dahkanrabasin dan dárkkhusa várás. Dárkilis etnográfalaš jearahallamiid bohtosiidovttastahttin álkit logahahtti 3D hábmenteknihkkii, erenomážit fotogrammetriai- mii evttohit servoša geahččanguovllus vuolgi metodologijja, man ulbmilin leabuoridit čaokkáldagaid rabasvuodta servoša lahtuide ja jos vejolaš, maiddáidutkiide. Seammás mii deattuhtit, ahte dakkár lahkonanvugiin 3D-mállidjuohkimis galgá leat várrugas. Erenomážit dakkár eamiálbmogiid bokte, geaidkulturárbbi geavahit boastut dálá áiggis, goas 3D-hábmen ja prenten lea álki.

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### 1. Introduction

Early anthropology was a field of salvage. Artifacts and stories were carried away from indigenous peoples<sup>1</sup> by the thousands to fill books and museums, intended not for the communities who produced them, but for others interested in their preservation. Handling objects in culturally appropriate ways was far from the minds of these early collectors. In recent decades, curatorial

practices and community engagement have begun to drastically transform [1–4]. Museum professionals and anthropologists – in a growing number of cases members of indigenous communities – are becoming critically aware of the objects held on the shelves and drawers of institutions. An environment of collaboration and respect is developing; there is growing consideration about the subjects that are displayed, how they are presented and maintained, and who is permitted to access them. In cases from Polynesia to the Americas, indigenous-run museums develop and maintain ethnographic and archaeological collections. Through self-determination, descendant communities are beginning to establish their own terms for the storage, maintenance, continued collection, and presentation of their histories [1,2,5–9].

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<sup>1</sup> We use the term “indigenous” inclusively, as defined by the ILO, C169 – Indigenous and Tribal Peoples Convention, 1989 (No. 169).

Shifting practices in heritage have emerged in parallel with novel forms of public engagement. Museum collections and archives provide valuable sources of information to fuel vibrant indigenous cultural revival programs around the world [10]. For some peoples, museum objects bear witness to ways of life and thinking that disappeared or changed through histories of colonization. Artisans look to museum collections to ascertain materials, patterns, and deduce how things were made, sometimes by their own family members generations ago. Traditional boats, dress, and many other items have formed the focus of revival initiatives, often undertaken to remember both ancestral production techniques, forms of objects, and ways of engaging with raw materials and surrounding environments.

Despite these positive changes, indigenous communities face difficulties in accessing their own cultural heritage held in museum collections. Additionally, and increasingly, populations live far away from their traditional homelands and cultural centers. In many other cases, objects are kept in foreign institutions or by private collectors. Even when community members reside closer to relevant museums, contact is typically limited by conservation and time constraints, not to mention the opacities of language and practice that exist for those outside the museum world.

## 2. Research aim

To address these issues, we develop and present a methodology in archaeological ethnography, incorporating participant observation and semi-structured interviews with current three-dimensional modeling techniques developed in archaeology. We address the following questions: how can three-dimensional models be quickly and cautiously mobilized to improve community access to museum collections? How do new, rapid modeling technologies like photogrammetry change the cultural heritage landscape for indigenous peoples and their collaborators? Exploring potential applications of a three-dimensional tool kit, we stress that novel technologies provide positive opportunities for indigenous communities and their collaborators, yet raise new ethical considerations.

### 2.1. Changing museum technologies

Alongside emerging collaborative relationships, anthropologists and museum researchers have developed technologies that enable data sharing and analysis in new formats—from the early creation of online databases incorporating basic data and photographs [11], to the more recent production and storage of dense, three-dimensional models of collections for study or reference [12,13]. Three-dimensional modeling facilitates particularly rich access to cultural heritage remotely. Models can be uploaded online and analyzed from behind almost any screen, or milled and printed in a variety of media. Although 3D models can be made with technologies from the most inexpensive digital cameras to six-figure CT scanners, affordable techniques are becoming the norm in anthropology. Of these, photogrammetry is the most accessible, and has been used to model variably-sized subjects from entire landscapes or larger archaeological sites [14,15], to smaller features, excavation surfaces [16–19] and artifacts [20–26].

### 2.2. Indigeneity in a digital age

Novel technological applications articulate with collaborative foundations laid by indigenous communities, museum specialists and anthropologists, further contributing to emerging discourses on cultural property [27] and digital heritage more broadly [28,29]. Dialogues between these groups have fostered an environment of reciprocity, promoting the importance of knowledge exchange

rather than extraction. For example, Ann Fienup-Riordan and Yup'ik elders traveled to Germany together to access collections acquired from the Yup'ik community over a century ago, while improving anthropological understanding of the objects [30]. Other “visual repatriation” projects have been carried out, whereby communities and anthropologists address multiple scales of their respective and entangled histories through museum collections [31]. For instance, in Papua New Guinea, Bell returned copies of images stored in collections, exploring their potential for both source communities and anthropologists [32].

Further advances have been realized by integrating technology with collaborative projects. Online exhibits, such as those created by the Doig River First Nation and a number of researchers, chronicle oral histories and songs [33]. Through a workshop at the Denver Museum of Nature and Science, an internship program for indigenous youth emphasized the power of incorporating Native voices and the learning of technical skills—including quick read (QR) codes and web page production—alongside traditional museum dioramas [34]. Online databases, containing diverse media including photographs, archival data, or three-dimensional models, have the potential to be shared over vast distances and curated remotely (see for example [35]). Large working groups, including the Intellectual Property Issues in Cultural Heritage project (IPinCH) have brought attention and funding to address broader issues facing indigenous communities through a number of case studies (<https://www.sfu.ca/ipinch/>). For instance, IPinCH facilitated a collaborative effort between the Inuvialuit and Smithsonian, encouraging community reconnection through physical engagement with collections, and through cultivation of an online, multimedia platform [36]. The Reciprocal Research Network (RRN) created a platform to serve the needs of numerous indigenous and museum communities by facilitating discussion, file sharing and project building [37]. Additional examples include the Mukurtu Wumpurrarni-kari Archive. This archive has been developed as open source. Access to online records may be limited according to local cultural prescription; for example, restrictions may be placed on age or gender [38].

Most recently, three-dimensional technologies have been explored as a tool for collaboration. Working with the Nalik community of New Ireland, Papua New Guinea, Were demonstrates the potential of digital repatriation—in particular models of wood carvings—to acquire social stability and governmental support [39]. Amongst the Maori, Brown explores the potential of augmented reality for viewing cultural objects, which she maintains may carry meaning similar to the original physical objects [40]. Finally, a collaboration between the Smithsonian and groups including Tlingit First Nations, the Stockbridge-Munsee Tribe, the Delaware Nation, and Delaware Tribe of Oklahoma, has incorporated 3D modeling. In partnership with the latter three groups, the Smithsonian 3D printed a pipe recovered from a burial context, presenting the model to the nations. For the Tlingit, laser-scanned and milled replicas of crest items have been produced and used, in part to safeguard the objects against destruction, in part for ceremony. Despite being acknowledged as replicas, the objects served to elicit powerful ancestral connection. Furthermore, the 3D models were intended to teach not only about culture, but also about ongoing repatriation processes [41].

Indigenous communities and their collaborators have been increasingly presented with opportunities based on technological innovation. Yet, in uninformed hands, these advances threaten to distribute indigenous heritage in culturally-inappropriate and uncritical ways, under the banner of open access (for an extended discussion on indigenous heritage and the issues posed by open access see [42]). With the growing ease of digital documentation and dissemination, questions of accessibility and ownership have become particularly pressing [33]. One need not look very far to

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