

3D Digital Technology Connecting the Remote Community, the Native Village of Igiugig, Alaska, with Material Culture in Museum Collections



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Introduction

Museum collections of Indigenous ethnographic materials are often inaccessible to source communities whose heritage is stored in faraway museums. Historically, collections access has been limited to in-person visits by elders or community representatives having to travel far from home or remote viewing of often inadequate 2D images. Recent efforts to digitize museum collections, utilizing 3D technology, are increasing access to museum collections and connecting entire communities through online digital viewers and physical replicas (Csoba DeHass and Hollinger 2018; Hollinger 2022).

Improving access both virtually and physically for remote communities, such as the Village of Igiugig in southwestern Alaska, with their material culture is possible through development of 3D digital and physical models.

Material Culture and Collection Context

Six items from their area were selected by the Village of Igiugig for digitization and replication.



They include a wooden dish in the form of a bird (E56005) that was collected by C. L. McKay in 1881 or 1882. A wooden double visored eye shade or goggles (E127781), or *ihng-äch-shū-dūk*, was worn strapped over the eyes. This visor was collected in 1885 or 1886 by William J. Fisher found in the portage from Ugashik to Igiugig. A wooden board for throwing harpoons while hunting seals and otters (E11347) was collected in 1872 at Bristol Bay, Alaska, by Vincent Colyer.

Three other objects were collected at the Kaskinak settlement near the mouth of the Kwichaak River at Lake Iliamna and were collected by William J. Fisher in 1887. Two are a bone spoon (E127813) and a comb made from caribou antler (E127796).

One item, a **wooden dance mask** (E127808), listed in the museum ledger with the name *Kchi-na-gok*, and the place of origin as Kaskinak. Accession records list it as "used at dances and masquerades".



Printing the 3D physical replica of mask.

Future Research

This research is ongoing. The next steps are to continue the cyclical process of 3D digitization for the remaining objects. As of July 2023, the objective is to print and mill 3D physical replicas for the remaining five 3D digital models.

Discussion

This project shows that 3D digital technology can change the way ethnographic material culture within museum collections can be viewed, studied, accessed and reconnected. Procedures for the process should make future requests for 3D digitization and replication more efficient, and simpler for both communities and museums.

References

Hollinger, R. Eric 2022 "3D Digital Replication: Emerging Cultural Domain for Native American Communities." In *Handbook of North American Indians, Introduction*, Krupnik, Igor I., editor. 182-195. Washington, DC: Smithsonian Institution Scholarly Press.
Csoba DeHass, Medeia and R. Eric Hollinger 2018 "3D Heritage Preservation & Indigenous Communities in the Circumpolar North." In *Arctic Yearbook*, 1-15.

3D Digitization Process

Consultation

In 2017, AlexAnna Salmon and Elder, Annie Wilson, visited the National Museum of Natural History Anthropology collection for a repatriation consultation.



Lily McEwen positions mask to be photographed.

Photogrammetry

Photogrammetry is the process of capturing hundreds of photographs to record object data (shape, texture, color, dimensions, etc.). The photographs are captured at various angles and heights.

Data Processing

The object data captured from the photographs are uploaded into a 3D modeling software. The images are then aligned to create a point cloud and mesh model.



Point cloud model of the mask.

3D Digital Model

Texture and color files are applied over the mesh to complete the 3D model.

3D Digital Viewer

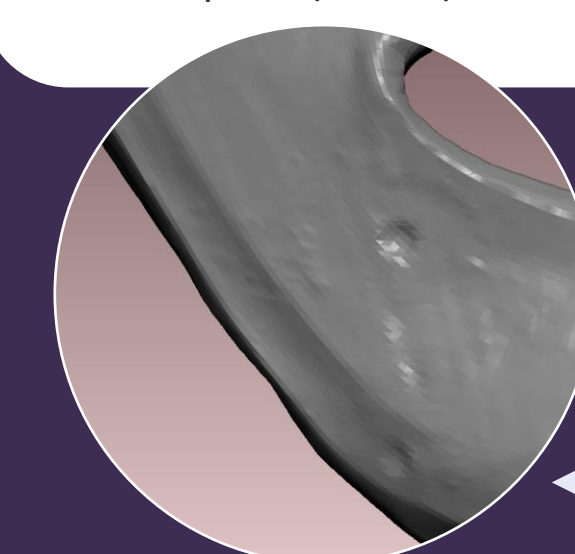
A completed digital model is uploaded to an online viewer to be accessed for study and research by viewers thousands of miles away.

3D Digital Sculpting

Digital sculpting occurs when alterations are needed to edit the 3D digital model before the 3D physical printing or milling process can begin. There are several reasons for editing, such as digitally restoring or erasing object features, such as the labret on the right cheek of the mask.



Photograph of the labret (above). Digital sculpting to remove labret for 3D physical print (below).



3D Physical Model

A physical model can be produced from either 3D printing or milling machines. The mask replica was created using 3D print technology and is made from a UV cured resin. Figure 8 is the mask being printed, but before post print clean up.

Community Engagement

Once the 3D physical replicas return home, they will be incorporated back into the community where they will be used as part of an educational workshop to learn about traditional arts and technology.

"...to see, hold, use, and experience a connection with these ancestral objects, even if its through replicas will be important for the community. Whether in the school or the new cultural center, these will be wonderful educational objects that the village's youth can learn from for generations to come " (Monty Rogers, personal com July 25, 2023).

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