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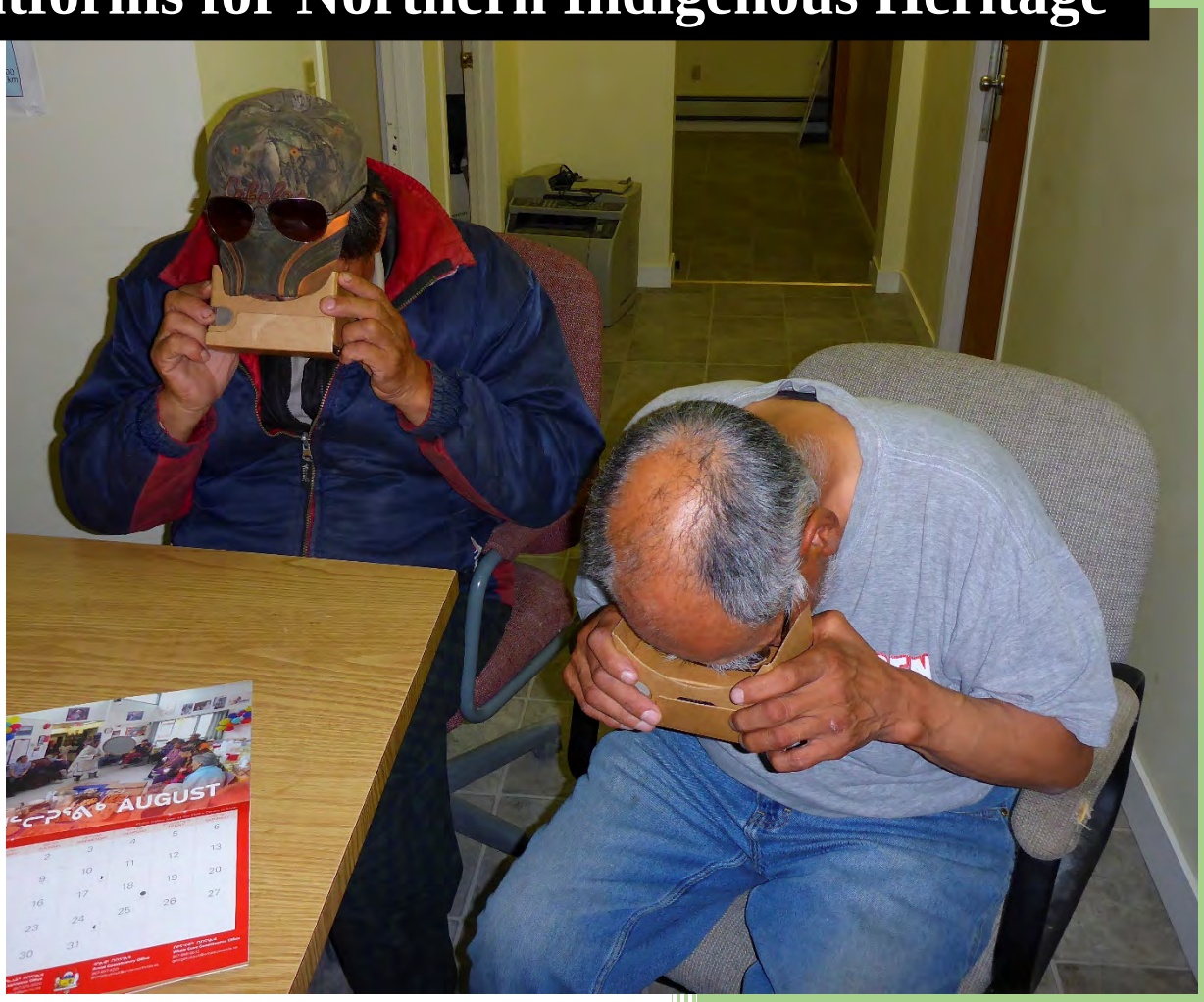
The Design and Development of Digital Return Platforms for Northern Indigenous Heritage



KNOWLEDGE SYNTHESIS FINAL REPORT FOR THE SOCIAL SCIENCES AND HUMANITIES RESEARCH COUNCIL OF CANADA

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Cover Photo Credit: Members of the Arviat Hunters and Trappers Association view panoramic images from Arvia'juaq National Historic Site using Google Cardboard Viewers in 2016. Photo credit: Colleen Hughes.

Contents

Key Messages

- This knowledge synthesis report provides the first bibliometric profile and systematic review of digital heritage projects and the concept of digital return in the North American and European Arctic.
- Canada is a leader among circumpolar nations in initiating and developing digital return projects in Indigenous communities. Within Canada, there is an almost equal representation of projects between Nunavut, Northwest Territories, and the Yukon, with fewer projects occurring in Nunavik and Nunatsiavut. The majority of academically oriented projects are situated in Nunavut.
- Most projects emphasize collecting local knowledge that is environmentally focused, and are primarily concerned with heritage within the last 50 years. Such projects tend to be led by academic and government individuals/groups. Comparatively few projects focus on the digital repatriation of archaeological and ethnographic collections, even though a case study of grass roots heritage organizations identify this as an area of high priority.
- Cyberinfrastructure issues in most arctic communities have created a "digital divide" that severely limits the use of digital technologies for preserving, archiving, and disseminating information about tangible and intangible heritage. This is not being adequately addressed by most projects and funding sources.
- The consequences of placing cultural objects and knowledge online and in open source contexts where Indigenous communities have little or no control over how digital assets are accessed, circulated, and used is not being adequately addressed by the digital return projects examined in this report. As a result, different kinds of "open access" will need to be negotiated.
- Social media platforms and file sharing sites are used by community-led projects to disseminate most heritage content. In contrast, projects led by academic and government groups utilize websites, electronic atlases, and online databases to manage and distribute heritage data.
- Little research has been done on how the process of digitization affects the values and meanings associated with cultural objects in the eyes of source communities. Furthermore, digitization significantly alters the concept of "repatriation" and the practices that surround it. For example, is it actually possible to return something that can be replicated over and over again, or when one cannot be certain what version of the object is being returned?
- There is an urgent need to develop obsolescence management practices to guard against the consequences that rapid technological change may have in rendering digital return platforms inoperable to Indigenous stakeholders.
- Digital return initiatives that are community-led are often youth focused. A side benefit of this is that they can provide important opportunities for training and skills development in digital technology. This will have positive economic impacts in northern communities where youth unemployment is a serious issue.
- Digital return can be viewed as a disruptive technology because it *disrupts* established institutional models/networks for archiving, accessing, and interpreting objects and cultural knowledge.
- At the same time, digital return is a disruptive technology that has the potential to alter Indigenous networks that support how objects and cultural knowledge are accessed and circulated.
- Partnerships between industry and Indigenous communities are rare among the digital return projects reviewed in this study. Recent successful collaborations in Alaska between Cook Inlet Tribal Council and E-Line Media, coupled with the intense interest in digital technology among Inuit youth, suggest that similar collaborations in the Canadian Arctic would be equally successful.

Executive Summary

Digital return technologies[1] offer Indigenous communities a means of repatriating objects and knowledge gathered from their ancestors as part of earlier colonial endeavors. Many third party institutions such as museums, universities, and government heritage agencies, retain possession of these collections because of the perceived impracticality of returning them to source communities. The concept of digital repatriation or "digital return" has emerged as a means of rebuilding relationships between source communities and third party institutions through the transfer of knowledge and objects in digital form. In this way, digital return systems, such as online archives, electronic atlases and digital databases, are excellent examples of *disruptive technologies*. The idea of disruptive technologies was first popularized by Clayton Christensen in his 1997 book "The Innovator's Dilemma". Disruptive technologies are technological innovations that upset networks supporting the existing state of affairs. Digital return acts as a disruptive technology because it *disrupts* established institutional models for archiving, accessing, and interpreting objects and cultural knowledge. Paradoxically, digital return also *disrupts* traditional Indigenous networks that support how objects and cultural knowledge are accessed and circulated by making them freely available on the public Internet. Resolving this paradox requires that we identify and address existing knowledge gaps in both the sociocultural and technological sides of digital return.

A three-part scoping review of Indigenous digital return projects in regions of the North American and European Arctic was undertaken to: a) identify the extent and objectives of academic, government, and community-led digital return projects; b) characterize the digital return methodologies currently used in arctic communities; c) identify the issues and challenges facing digital return projects within the study area; and d) draw attention to heritage initiatives that are grass roots and community led. The methods used in this study include: a) bibliometric analysis of electronic databases; b) online surveys of digital return projects; and c) a case study of community-led heritage organizations and their projects.

Key findings of this scoping review include:

- The majority of digital return projects reviewed were undertaken in the Canadian Arctic. Within Canada, there is more or less equal representation of projects between Nunavut, Yukon, and NWT. Fewer digital return projects were reported in Nunavik and Nunatsiavut. Most academic projects are situated in Nunavut.
- Most projects focus on digitally recording heritage data from the 1950's onwards. Comparatively few projects have specifically targeted the digital repatriation of ethnographic and archaeological collections from the historic and pre-contact era.
- The majority of projects are oriented towards capturing a single category of data. The most frequently collected datatype among projects led by academics was local Indigenous knowledge focusing on climate, flora, fauna, and sea ice. In contrast, the data categories collected by community-led projects focused on oral histories and place names.
- The majority of projects utilized a single method for digitizing heritage data. Geographic information systems (GIS) and digital databases were the preferred methods of academic and government-led projects. Audio and video recording were the preferred methods used by projects that were community-led.
- Websites were the preferred dissemination method used by academic and government-led projects. In contrast, community-led projects made greater use of social media and file sharing sites such as Vimeo,

[1] The term "digital return" is used in this report to refer to digital heritage projects aimed at repatriating knowledge and objects to source communities.

YouTube, blogs, Twitter, Facebook, and IsumaTV - a free web-based Internet portal that streams video created by Indigenous filmmakers.

- Most digital return projects last for only a year, even though many remain on the Internet for much longer. However, the rate at which obsolescence renders digital return systems inoperable to source communities is unreported, suggesting it is not taken into consideration by projects and funding sources.
- Few digital return projects were designed for the specific types of cyberinfrastructure found in most arctic communities, such as satellite and dial-up Internet.
- Rather than tablets and smart phones, most digital return projects are accessed from laptops and desktop computers in source communities. However, few projects mention exactly what types of devices they were designed to accommodate.
- Source communities express an overwhelming level of dissatisfaction vis-à-vis the accessibility of digital content contained within digital return projects. Much of this stems from the digital divide resulting from weaknesses/limitations in cyberinfrastructure.
- Copyright/Intellectual Property issues, implications, and concerns were not mentioned in the vast majority of projects.
- Of the 52 projects identified in the bibliometric analysis, only 29 involve partnerships. Partnership types include government, industry, community, and academic. The majority of partnerships were between academics, with communities serving mainly as participants.
- The majority of grass roots, community-led heritage initiatives are focused on Indigenous youth and the transfer of local knowledge between generations. As a side benefit, these projects can develop digital technology skills among young people which create paths to potential employment and economic development and within the community.

Our knowledge synthesis approach revealed some key research gaps and needs including:

- How long do digital return systems remain accessible and operable to source communities, and what are the determining factors? Obsolescence management practices that guard against the consequences of rapid changes in software and hardware need to be developed to ensure that digital return platforms remain accessible to source communities over the long term.
- Why do so many digital return projects focus on Indigenous heritage from the last 50 years? Our synthesis reveals that the digital repatriation of archaeological and ethnographic collections takes a back seat to digitally capturing local knowledge concerning the environment. As Indigenous arctic peoples are on the frontlines of living with climate change, using digital return to reinforce an ancient/traditional cycle of knowledge transfer between generations may be viewed as a more immediate need by source communities. The abundance of these types of projects may also represent an "echo" resulting from the most recent International Polar Year (IPY) in 2007-8. Numerous academic research programs funded through IPY were focused on climate change, and many utilized community-based monitoring programs and local Indigenous knowledge. This stands in contrast to the views expressed by the community-led heritage organizations consulted in this study. The fact that these groups often listed the repatriation of artifacts and human remains as their number one priority suggests that institutional agendas may still be guiding digital return projects, albeit to varying degrees.
- Why is so little mention made of copyright and intellectual property issues, and the potential consequences of placing cultural information into open source contexts? Our review indicates that significant gaps exist in our knowledge of the potentially serious issues associated with placing tangible and intangible heritage online. The UNESCO Convention for the Safeguarding of Intangible Cultural Heritage (2003) advocates the use of digital technologies for preserving cultural heritage, but stops

short of safeguarding groups from having heritage assets accessed and used in ways that are not within the consent of the communities from which they have been derived. This opens up the possibility that cultural content placed online and in open source contexts can be accessed, distributed, reproduced, and repurposed (mashed) in ways that subvert traditional meanings and values. This is an area of concern because of the uncertain judicial status of local knowledge in terms of copyright and ownership. For example, who "owns" a video or audio recording of an Elder discussing traditional land use? The Elder, or the creator of the content (i.e. the person behind the video camera)? Given that so much of the Internet is structured around the concept of "open access", we may need to define different kinds of "openness" in order to accommodate the needs of source communities. Digital copies can also disrupt the sense of trust between researchers and source communities because of the risk of unauthorized distribution over the Internet.

- Why do digital return projects have so few industry partners, given the rich potential for synergies with Indigenous training and northern economic development? The recent success of the video game *Never Alone* demonstrates that mutually beneficial and financially successful partnerships can be developed between industry and Indigenous organizations. Also known as *Kisima Inŋitchuŋa,* this game was developed through a partnership between Cook Inlet Tribal Council and E-Line Media. The game uses traditional stories to explore what it means to be human through an adventure story involving an *Inupiak* girl and her arctic fox. Nunavut-based *Pinnguaq* is a media company exploring similar applications of video games as transmitters of cultural knowledge between generations. The Arviat Film Society's successes in engaging youth with digital media suggest that research into how similar partnerships could be developed in other arctic communities should be pursued.
- Are social media platforms such as Facebook and web blogs a better way of disseminating digital return content to source communities than online databases and websites? Social media platforms are easy to use, easy to access, and circumvent some of the cyberinfrastructure issues currently experienced in arctic communities. The extensive use of IsumaTV by the Arviat Film Society to distribute digital content may provide a good model for designing future digital return platforms for other types of digital return data.
- How does the process of digitization affect the value and meanings attached to traditional artefacts? Do Indigenous perceptions of digital replicas and their relationship to actual objects vary among cultural groups? Or between generations? How does the process of digitization affect the meaning of "repatriation" and the practices that surround it? For example, how is it possible to return something to a source community that can be digitally reproduced over and over again? What version of the digital object is being returned? Finally, is it actually possible to return something to its source when it can exist simultaneously anywhere on the Internet? Is the process of "digital return" more akin to "digital reciprocation"?

A knowledge mobilization plan drawing upon Graham's Knowledge-to-Action (KTA) framework will seek out credible messengers to communicate these key messages to other stakeholders using a KTA strategy that is specific to Northern Canada. To achieve this objective, a website portal will be created to provide access to a database of publications identified and indexed in Part A, along with an interactive electronic map showing the locations of source communities associated with the digital return projects surveyed in Parts A and B. The information contained in the portal will be accessible in Inuktitut, English and French. Users will also be able to express their views on content, as well as reach out to the creators of the projects documented in the study. This may result in new collaborations and partnerships for future digital return projects.

State of Knowledge

Indigenous groups across North America are increasingly seeking to repatriate and reclaim cultural knowledge and material collections that were gathered from their ancestors as part of earlier colonial endeavors [1-4]. These collections are generally held in trust by third party institutions (e.g. government agencies, museums, universities), with their wholesale transfer back to source communities considered impractical or impossible due to logistical complications that jeopardize continued storage and preservation [5-12]. The concept of digital repatriation, or 'digital return,' has emerged as a means of re-building relationships between these institutions and source communities through the transfer of knowledge in the form of digital data [4, 12-23]. While no longer a nascent concept, digital return remains prone to a host of theoretical and practical issues. This is especially the case in Canadian Arctic communities, where Internet access is severely limited due to underdeveloped infrastructure [2, 24]. The design and development of digital return platforms also frequently occurs with very little input from Indigenous users [22-26]. While collaboration remains a strong theme in their development, digital return projects still struggle to re-establish a sense of ownership in source communities [1, 2, 14, 15, 19, 21, 27, 28]. Finally, the power imbalance of non-source institutions possessing the digital know-how, costly hardware and dedicated funds required to both build and access digital return platforms often results in their own priorities for the project being given unequal weight [1].

The purpose of this knowledge synthesis project is to compile information on past and present digital repatriation projects involving Inuit and Eskimo communities as a means of addressing these and other key issues. The North American and European Arctic is the ideal location for such a knowledge synthesis project for two reasons. First, the remoteness and geographical separation of Indigenous communities create many technical and cultural issues for designing digital return platforms, and there is a need to determine whether these challenges are being addressed by existing projects. Second, digital return projects in Inuit communities have tended to operate in silos, with institutional and local grass roots teams seemingly unaware of the existence and objectives of each other's projects. Consequently, there is a need to compile and categorize digital return projects that are currently being initiated in the Canadian Arctic in order to identify their strengths as well as gaps in knowledge.

The advantages of digital technologies in heritage preservation and repatriation are that they provide a rapid way of managing, retrieving, and circulating knowledge relating to cultural heritage [2, 29, 30]. Ethnographic and archaeological objects can be photographed and scanned to create interactive 3D models [24, 25, 31]. Sound recordings and films from earlier eras can be digitized and compressed for easy storage and distribution. Traditional place names, trails, and patterns of land use can be embedded into Google Earth-like maps and used to create electronic atlases [32, 33]. When placed online, these and other types of digital return can be accessed by anyone with a computer/phone/tablet and an Internet connection [24, 32, 34-36]. The past twenty years have seen a steady increase in digital return projects. Many have involved Indigenous communities in the Arctic, and have focused on the repatriation of cultural knowledge and community history. Comprehensive overviews of such projects have rarely been undertaken, creating knowledge gaps in a number of important areas. For example, what kinds of tangible and intangible heritage[2] are being digitized? What technologies/methods are being used? How is the online content being accessed? Are Indigenous conventions surrounding how the content is managed, accessed, and circulated

[2] UNESCO defines tangible heritage as including buildings, historic places, monuments, and artifacts that are considered of cultural value, and therefore worthy of preservation for the future. UNESCO defines intangible heritage as traditions or living expressions that are inherited and passed on, including oral traditions, knowledge and practices concerning nature and the universe, and knowledge and skills to produce traditional crafts.

being incorporated into project design? What kinds of challenges do the limitations of northern cyberinfrastructure present for digital return projects?

Implications: Digital Return as a Disruptive Technology

The idea of Disruptive Technologies was first popularized by Clayton Christensen in his 1997 book "The Innovator's Dilemma" [37]. Disruptive technologies are technological innovations that significantly alter the way businesses operate. One of the ways they do this is by altering the support networks of existing technologies. For example, electric cars are disruptive technologies because they upset the existing networks that support gasoline powered automobiles. In a similar way, digital return can be viewed as a disruptive technology because it *disrupts* established institutional models for archiving, accessing, and interpreting objects and cultural knowledge. For example:

- Digital return *disrupts* the spatial and temporal restrictions that limit access to museum collections. Placing digital replicas of cultural objects online means that users can access them outside of visiting hours, and from locations that are far removed from the source [38].
- Digital return *disrupts* the authority and control that third party institutions often have over granting access to archaeological and ethnographic collections through open access (OA) outputs that are free of all restrictions [15, 39].
- Digital return *disrupts* the authority of third party institutions that have tended to monopolize interpretations of northern Indigenous cultures and their histories [18, 40]. The immutable interpretations attached to objects displayed in museum cases are replaced in digital return platforms by knowledge that is much more distributed, reciprocal, and consensus-based [41].
- Digital return *disrupts* traditional practices surrounding the concept of repatriation. How is it possible to return something to a source community that can be digitally reproduced over and over again? What version of the digital object is being returned? And finally, is it actually possible to return something to its source when it can exist simultaneously anywhere on the Internet? Are we talking about "digital reciprocation" rather than "digital repatriation"? [18].
- Digital return *disrupts* Western science by presenting an alternate body of knowledge and insights into the workings of nature, humans and animals to the world.
- Digital return *disrupts* high risk commercial activities in the Arctic through online representations of sustainable human-environmental interactions, as illustrated in electronic atlases and geographic information systems depicting traditional patterns of land use and occupancy.
- Digital return *disrupts* the negative impacts of colonialism by rebuilding and reinforcing the transmission of cultural knowledge between generations and among Indigenous groups [42].
- Digital return *disrupts* the exclusion of Inuit opinions and world views from global discussions surrounding economic, social, political, and environmental issues.
- Digital return *disrupts* the social and economic challenges facing northern communities by providing opportunities for youth to develop skills in digital technologies, start their own digital media companies, or gain employment through existing businesses that need digital literacy skills.

At the same time, however, digital return is a disruptive technology that has the potential to alter Indigenous networks that support how objects and cultural knowledge are accessed and circulated. Such disruptions may result in negative consequences. For example:

- Digital return *disrupts* the control that Indigenous communities have traditionally had over who accesses, distributes, reproduces, and repurposes (mashes) cultural content through the principle of "open access". [43].
- Digital return *disrupts* traditional assumptions about authorship, ownership, copyright. Who "owns" the digital replica of an artifact? The source community, or the person creating the digital content? The judicial status of cultural knowledge in terms of ownership and copyright is uncertain in the online world [32].
- Digital return *disrupts* the meanings and values associated with real objects by creating virtual replicas. To what extent are the essential qualities of a person or object shifted to the digital replica? As Karen Worcman (2002) explains "*It may be that the most important factor of the digitization project is not the creation of the ''digital collection'' as such, but the group's engagement in the process…….[44]*

There are other issues associated with digital return that have the potential for both positive and negative impacts. On the positive side, the creation of a lasting digital record of cultural materials contained in third party institutions might partially address current concerns about the loss or damage of collections returned to source communities [4, 22, 23]. Alternatively, if Indigenous communities lack the resources for curating archaeological and ethnographic objects, then digital replicas may serve as acceptable surrogates in the interim.

On the negative side, significant gaps exist in our knowledge of the potential consequences associated with placing tangible and intangible heritage online. For example, it is foreseeable that traditional cartographic knowledge might be repurposed for commercial resource exploitation [32]. The online databases used to construct digital return systems are also more management tools than they are access tools, and often don't work well for source communities[45]. This is partially due to the classifying and indexing methods used to structure such databases which are usually designed around Western concepts of science [46]. The use of such standardized categories can create challenges for easily retrieving traditional knowledge because it is more deeply rooted and context-specific [45, 46].

Perhaps the most significant challenge facing digital return initiatives is the limitation presented by cyberinfrastructure in arctic communities. This "digital divide" remains a formidable barrier for using digital technologies to archive, repatriate, and reciprocate cultural heritage online [39, 47]. Few communities have access to high speed fiber optic Internet. Instead, satellite Internet and dial up are often the only options available. This severely limits opportunities to stream video, load images and animations, and download content onto a device. Few web developers outside of the Arctic have the "lived experience" necessary to develop and design digital return systems that will function adequately under such conditions. As the expense and logistical challenges associated with improving cyberinfrastructure are great, new and innovative ways of delivering online content need to be developed. A related issue is the availability of devices such as tablets, laptops, and desktop computers, that can be used to access digital return content. The expense of these items, coupled with the challenges of maintaining them, are often beyond the means of many households and community organizations.

The issue of obsolescence and inoperability caused by the inevitable changes associated with upgrades to software, hardware, and cyberinfrastructure also have dramatic implications for digital return initiatives in the Arctic[48]. In order to ensure the durability of digital return projects, long term commitments will have to be made to ensure that digital assets can be migrated to new formats. This will require that digital return projects have guaranteed access to both funding and technical support over extended periods. Currently, institutions such as the Virtual Museum of Canada require that the

authors/creators of virtual heritage exhibits commit to maintaining their products for a period of five years after their initial launch. However, the VMC does not provide any funding for this. Instead, the institutions behind these exhibits are solely responsible. This is a substantial burden to place on heritage organizations such as small museums that already have significant funding challenges.

Approach

In order to better understand the implications of digital return as a disruptive technology, as well as address the project objectives outlined in table 1 (appendix 1), a three-part scoping review was undertaken. Part A consists of a bibliometric profile and literature review obtained from searches of online electronic databases. Part B is an online survey of digital return projects in the Arctic. Part C involves a case study of grass roots heritage initiatives in the Nunavut community of Arviat. A data abstraction form was used to synthesize and analyze information collected in the first two parts (appendix 2). The case study in the third part provides a perspective on the heritage initiatives undertaken by grass roots organizations in northern Indigenous communities. Such initiatives are often overlooked because they exist outside of the realms of academia and government.

Part A: Online Database Search and Analysis

The first part of the review process involved an in-depth search, literature review, and bibliometric analysis of online databases. The focus was on locating peer-review journal articles and grey literature generated by digital return projects that had been undertaken in the North American and European Arctic, Greenland, and parts of Russia. Articles that were more conceptual in nature and not tied to a specific project were not included in the database. The objectives were to: a) identify the extent and objectives of digital return projects in the Arctic; b) characterize their methods; c) identify how digital content was accessed; d) identify the issues and challenges facing digital return projects in the Arctic. Meeting these objectives involved targeted searches of databases using a structured list of search terms (appendix 3, tables 2&3). A relational database was constructed using Microsoft Access to manage and analyze the search returns. A data abstraction form, developed from the objectives of the scoping review, was then used to pull relevant information from abstracts and key words. Initial searches yielded either a few thousand returns or only a handful. This was largely determined by the capacity of the database to use the refined search terms. If the database lacked the capacity to use defined search terms, then only the terms “digital”, “heritage”, and “culture” were used. When a few thousand items were retrieved, only the first 200 were searched. This process provided a representative sample of digital return projects to analyze in accordance with the objectives of the project. This method of searching databases was eventually abandoned, as it was very time-consuming and yielded few results. Consequently, a new approach was developed in which projects identified during the first database searches were themselves searched for publications they had generated. Additional digital return projects were then identified by branching out from the initial projects located during the database searches. This proved a much more efficient and effective approach.

Part B: Online Surveys of Digital Return Projects.

An online survey was designed and administered to identify and examine digital return projects in the Arctic that were not represented in the database survey because they hadn’t produced academic and/or popular articles. The survey was based on the same data abstraction sheet used in the database search, and was created and distributed using Google Forms (appendix 2). A contact sheet was then created in a spreadsheet to track to whom the surveys were sent. The community heritage organizations and individuals contacted to participate in the survey were identified through web searches and community liaisons from earlier research projects. In order to reach even larger audiences, requests were made to organisations such

as the International Arctic Social Sciences Association (IASSA); Yukon Historical and Museums Association; and the Canadian Museums Association.

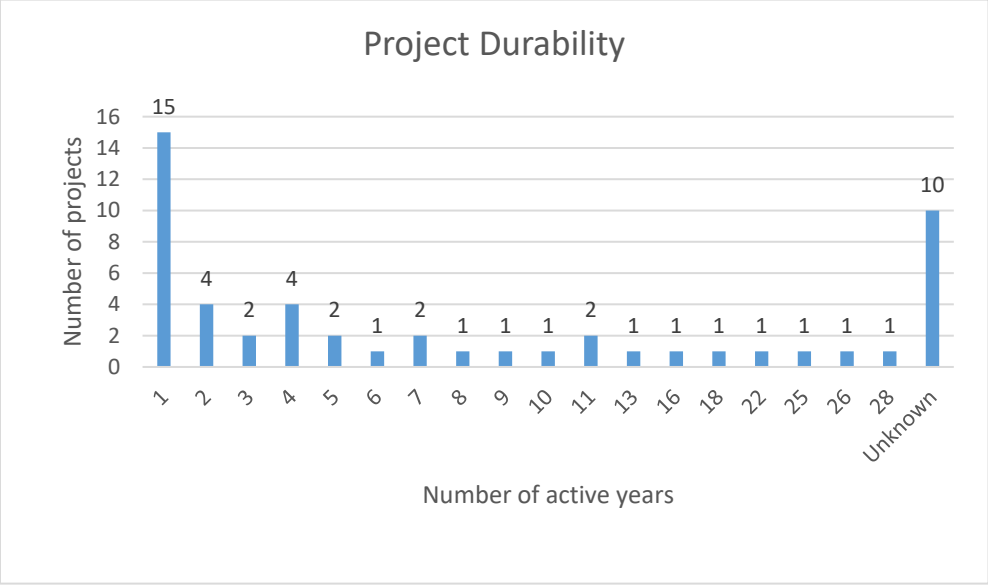
Part C: Case Study of Grass Roots Heritage Initiatives.

Indigenous communities care deeply about preserving their collective heritage. Consequently, a wide range of heritage activities are frequently undertaken by local historical societies and dedicated individuals. As these heritage projects tend to occur "off the grid", many third party institutions remain unaware of their existence. The hamlet of Arviat has several community-run organizations that focus on local and regional heritage. There are also individuals within the community who have dedicated large portions of their lives to collecting oral histories, traditional place names, songs, and stories. Consequently, the intention of Part 3 is to provide a voice for these groups and individuals in areas of heritage preservation, management, and repatriation. A one-week community visit was conducted in August, 2016 to meet with individuals, educators, and community leaders involved in a wide range of heritage projects. This provided an opportunity to examine "on the ground" the types of projects undertaken, the content being captured, the methods used for disseminating heritage information, and the challenges faced.

Part A: Database Search and Bibliometric Analysis.

A total of 52 digital return projects were identified in the database searches, of which 41 were associated with peer reviewed journal articles, 23 with books, and 16 with popular publications such as magazines and newspaper articles. The resulting database was subsequently mined for information using the data abstraction form (appendix 2). The results are summarized and discussed below.

A.1 Project Durability.

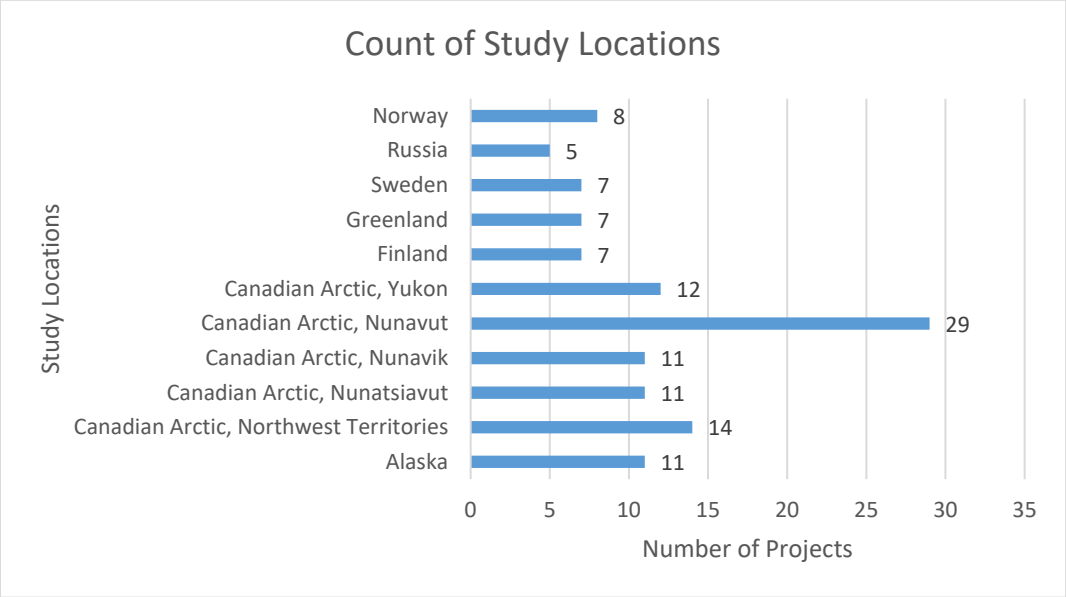


The durability of a digital return project is a measure of the period of time over which it remains active online. Results indicate that the vast majority of projects only lasted for a single year (n=15). However, three projects have run for more than 10 years, and ten projects ran for lengths of time that were undocumented. These results stand in vivid contrast to the length of time that projects were projected to run, as seen in the surveys taken by respondents in Part B of the scoping review (discussed in the next section of the report). These projections were much more optimistic with many respondents forecasting

durations of 5-10 years. Reasons for this discrepancy likely stem from unanticipated issues such as: a) unplanned obsolescence and/or lack of long term funding; b) staff turnover; c) changing priorities of third party institutions.

The earliest digital return project documented was *Project Jukebox*, which began in 1988. *Project Jukebox* is a digital branch of the University of Alaska Fairbanks Oral History Program. The website provides access to audio and video recording, transcripts, maps, historic photographs, and films from across Alaska. Other digital return projects begin to appear in 1998 and steadily increase in number during the 2000's (n=24) as local area networks are established in many arctic communities. However, the current decade has seen a decline in digital return projects by approximately one half. Of the 52 projects examined, over half have been discontinued (n=27). Eight projects no longer have functioning websites while the rest are currently accessible (n=37).

A.2 Locations of Researchers and Study Areas



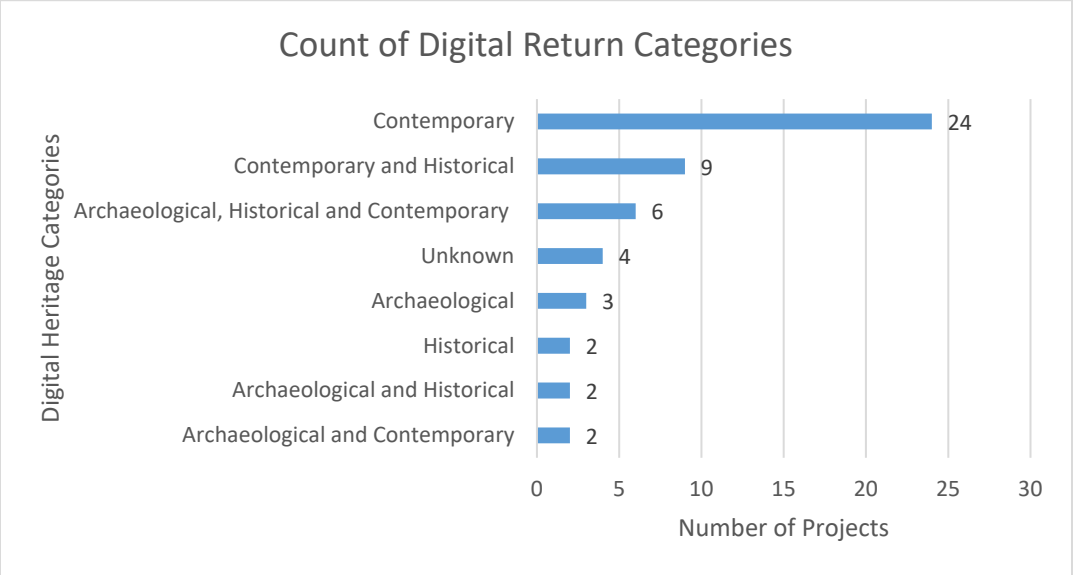
The 52 projects reviewed in this study were conducted in 11 different locations within the North American and European Arctic, Greenland, and Russia. The most frequently encountered study location is Nunavut in the Canadian Arctic, with a total of 29 projects. Only 5 projects were identified in Russia, but this may be due to the fact that information on these projects is likely published in Russian and therefore would be undetected in this review. This may also be true for some European projects in areas like Finland, Norway and Sweden.

The majority of projects confined their activities to a single study location (e.g. country or territory) (n=37). Only four digital return projects covered all 11 study locations. Within these study areas, the vast majority of projects gathered data from a single research site, such as a community (n=32). Others utilized up to 3 different research sites.

Most of the researchers involved in the digital return projects surveyed were based in Canada (n=33). Within Canada, the majority of project members were conducting their activities in the territory of Nunavut. In the United States, the activities of most digital return researchers were situated in Alaska, while in the European Arctic, most were in Finland, followed by Greenland. Thus, Canada appears to be a world leader in initiating digital return projects in northern communities. Furthermore, the data indicates that the

vast majority of projects involve researchers that are embedded within arctic communities, rather than being exclusively from areas further to the south.

A.3 Types of Digital Return Projects.



When database returns are categorized by subject matter, results indicate that the majority of digital return projects focus on heritage data from the 1950s onwards. Projects concentrating solely on archaeology and the repatriation of artifact collections were far less frequent. Furthermore, when archaeology was included as a category of interest, it was usually combined with heritage data from historical and contemporary time periods, such as traditional land use and occupancy, Indigenous place names, personal biographies, oral histories, the results of community observing networks, and health and wellness. Given that one of the assumptions of this study was that repatriation of cultural objects is an area of great interest to Indigenous communities, it's underrepresentation in the database search is surprising. The reasons for this may lie in the disconnect that exists between community-led grass roots heritage initiatives versus the larger and more academically-driven digital return projects represented in electronic databases. For example, in the years following the most recent International Polar Year (2007-8), there has been a steady increase in digital atlases and online databases containing local knowledge that is pertinent to climate change [26, 27]. Many of these projects stem from the establishment of community-based observing networks and the recording of local environmental knowledge [26]. They have also been driven to a large extent by broader academic agendas concerned with climate change research. All of this may have occurred at the expense of digitally preserving and repatriating tangible heritage.

A.4 Most Popular Data Types Digitized

Most projects identified in the database searches tended to focus on digitizing a single category of data (n=19), such as historic photographs, oral histories, songs, etc. However, one of the projects identified digitally recorded 15 different types of data. The most popular data type collected is oral history with over half the projects containing an oral history element (n=23). Interestingly, the least collected data type was traditional knowledge relating to celestial or astronomical data which was reported in just two projects.

In the analysis, local Indigenous knowledge relating to animals and the physical environment (TEK) was broken down into four separate categories: landscape, fauna, climate/meteorology, and flora. If all of these categories are combined, then TEK projects considerably outnumber all other data types (n=71). This may again reflect the emphasis placed on academically driven projects dealing with climate change.

A.5 Dissemination Methods

Dissemination methods refers to the platforms used to distribute digital return content to source communities (social media, websites, CD-ROMs, etc.). Most projects identified in the database searches employed either one (n=19) or two (n-=20) methods of dissemination. However, a single project (*Pinnguaq*) employed seven different dissemination methods. *Pinnguaq* which means "play" in *Inuktitut*, is an association based in the Canadian Arctic that utilizes social media, games, blogs and a variety of other digital technologies to capture and communicate Indigenous northern heritage. Websites were by far the most popular methods used by digital return projects to circulate the data they recorded (n=41). It is important to note that none of the projects utilized file sharing/social media sites like podcasts, Vimeo, or YouTube. As will be discussed later in the report, these dissemination methods feature much more prominently in community-based grass roots projects.

A.6 Digitization Process

Digitization processes refer to the techniques used to digitally capture an object, voice, image, song, photograph, map, etc. Modern scanners used to digitally capture documents and photographs typically use a charge-coupled device (CCD) or a contact image sensor (CIS) to digitize content. Other processing methods include video (including digitizing film), digital audio recordings, and digital photography. More technologically advanced approaches include Geographic Information Systems (GIS), reality capture, and digital databases.

Over half of the projects relied on a single method of digitization (n=28). Seven projects employed 3 different digitization processes. GIS (n=16), digital databases (n=17), and audio and visual recording (n=18) were the preferred types of digitization process, and were more or less equally distributed in number. Of these, only audio and video recording were used extensively in grass roots heritage projects. The limited use or complete absence of GIS and digital databases by community-led projects probably reflects lack of access to technical expertise, computer hardware, servers, and adequate bandwidth.

A.7 Accessibility

Cyberinfrastructure refers to the research environments that support advanced data acquisition, data storage, management, integration, mining, data visualization and other computing and information processing services distributed over the Internet. It is unknown what specific types of cyberinfrastructure the projects reviewed were designed for, as it is rarely mentioned on either the project website, or in the literature generated by the project. Only one project identified the data storage and dissemination methods they used. This was the *Cultural Sites, Traditional Knowledge and Participatory Mapping. Long-Term Land Use in a Sámi Community in Coastal Norway Project* which employed a personal hard drive or flash drive to give the information back to the community. The absence of information relating to cyberinfrastructure is significant, given that issues of Internet accessibility plague many remote arctic communities. Furthermore, the use of flash drives and hard drives reported by the Sami project is likely a work around for some of these issues. This is picked up again in a later section of the report.

A.8 Intended Purpose of Project.

The intended purpose of nearly 70% (n=36) of the digital return projects identified in the database searches was knowledge repatriation, but education, archival and pure research are not far behind. The most common combination of purposes is archival and knowledge repatriation (n=22). Unfortunately, none of the projects reviewed specify the extent to which source communities are able to easily and reliably access the information contained in their digital return platform, or how useful it is to community members.

A.9 Project Challenges.

Among the challenges that digital return projects in the Arctic have to deal with are limitations in bandwidth and cyberinfrastructure, the high costs charged by Internet providers, and limited access to devices such as tablets and computers. An emerging area of concern surrounds issues of copyright/intellectual property, and the potential consequences of placing cultural knowledge and objects in open source contexts. Surprisingly, these issues/implications/concerns were not mentioned in the vast majority of projects (n=47) with only five projects addressing any of these subjects directly. None of the projects mention if they were successful in terms of addressing the expectations and needs of source communities. There is also no mention of whether community feedback was sought. This would seem to indicate that significant knowledge gaps exist in these important areas.

A.10 Research Leaders and Partnerships

While many digital return projects have a single principal investigator or lead (n=22), projects were identified with two, three and four project leads. Little information exists as to whether multiple leads are all academic, all Indigenous, or some combination of the two. However, if a project has a single leader, is it is usually an academic (n=33). This finding is somewhat biased by the fact that government funding agencies such as SSHRC and NSERC have rules and regulations about who qualifies for support. Regardless, the end result is that academics and third party institutions are likely driving the agendas of most digital return projects identified in the database searches.

Of the 52 projects identified, only 29 involve partnerships. The vast majority (n=17) had between 3 and 5 partners. The types of partners include industry, government, community, and academic. When projects involved two different partnership types (e.g. government, academic, community), academics were most commonly included as partners (n=24). Partnerships in which source communities assumed meaningful roles as research leads along side of academic and government partners were rarely encountered. Instead, source communities seemed to function mainly as participants.

A.11 Funding Sources.

Of the 52 projects identified, only 19 acknowledged their sources of funding. Of these 19 projects, 7 had multiple funding sources. Analysis of the data indicates that the majority of these projects were funded through provincial, territorial, and federal government agencies.

Summary of Findings in Part A.

- The vast majority of digital return projects last for only a year, yet most retain an active web presence for much longer. This is especially the case when projects are contained within larger institutions such as the Virtual Museum of Canada. However, the durability of digital return platforms in light of obsolescence resulting from technological change is rarely mentioned or planned for.
- More digital return projects are undertaken in the Canadian Arctic than any other geographic region in the study[3]. Within the Canada Arctic, most projects have been undertaken in Nunavut.
- Outside of the Canadian Arctic, the United States (Alaska) and Norway are leaders in initiating digital return projects.

[3] The database returns may be somewhat biased by language, as projects publishing in languages other than French and English may have been missed.

- The vast majority of projects focus on a single research location (e.g. country or region), and collect data from a single study site (e.g. community).
- Most projects focus on digitally recording heritage data from the 1950s onwards. Comparatively few projects targeted archaeological and ethnographic collections from the pre-contact and historic era.
- The majority of projects were oriented towards capturing a single category of data, with the two most popular categories being traditional environmental knowledge and oral histories.
- A single method of digitizing heritage data was used by the majority of projects. Of these, geographic information systems (GIS), digital databases, and audio-visual recording were the preferred methods.
- Projects usually employ only one or two methods of dissemination. Websites were the most popular dissemination method. Most projects made little or no use of social media and file sharing sites such as Vimeo, YouTube, blogs, Twitter or Facebook.
- Few projects mention whether feedback was sought from source communities about preferred ways/methods of accessing digital heritage content, or if the digital return platform met their needs.
- Few projects mention whether the digital return platforms they created were specifically designed to address the limitations of northern cyberinfrastructure.
- Most digital return projects represent applied research, with education, archiving, and repatriating knowledge cited as their intended uses.
- Limited cyberinfrastructure, copyright and intellectual property issues, and their implications for source communities were not mentioned in the vast majority of projects.
- Most projects had a single research lead who was frequently an academic. No community leads or Indigenous leaders were identified.
- Of the 52 projects identified, only 29 involve partnerships. Potential partners included government, industry, community, and academics. The majority of partnerships were formed among academics, with communities serving mainly as participants.
- Most projects were funded through a combination of sources (academic, government, industry). When projects received funding through a single source, it was usually government.

Part B: Survey Results of Heritage Organizations Involved in Digital Return.

A total of 152 surveys were emailed to a variety of local, government, and academic organizations. Of these, 26 responses were received, yielding a 17% success rate which is within the expectations of a large external survey. The survey was conducted between June and September, 2016.

B.1 Location of Source Communities.

As with the database survey, respondents indicated that the majority of source communities used in digital return projects are located in the Canadian Arctic (58%). However, the sample size may be biased towards organizations in which English is spoken. Within the Canadian Arctic, there was more or less equal representation of projects between Nunavut (34%), the Yukon (25%), and the Northwest Territories (29%). Projects in Nunavik were underrepresented in the survey (12%), as were those from Nunatsiavut (0%). This result differs from that of the database survey, which showed that the majority of digital return projects

were situated in Nunavut. These differences suggest that while digital return projects associated with a wide range of interests are more or less equally distributed throughout the Arctic, those that are academically oriented are more frequently staged in Nunavut. It is not known why Nunavut would be of greater interest to academic researchers.

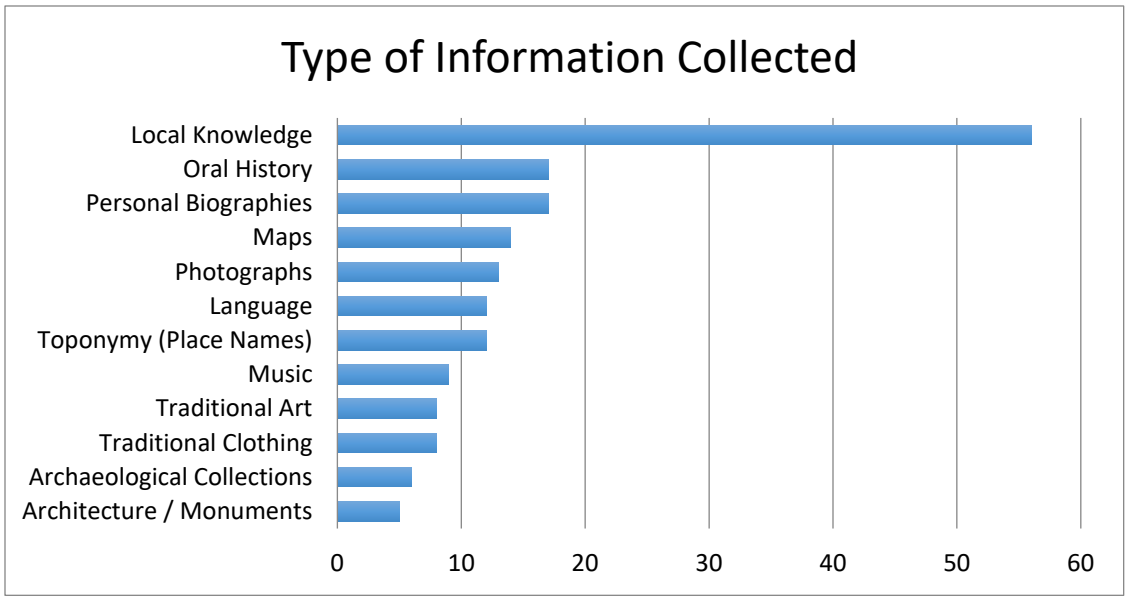
B.2 Time Periods Covered

The digital return projects that respondents were involved in were overwhelmingly focused on historical and contemporary time periods (47%). This is likely due to the emphasis placed on local environmental knowledge and oral histories. Information collected about tangible culture, such as archaeological and ethnographic objects are again underrepresented as compared with other categories of heritage data. These results align with similar findings acquired through the database searches and bibliometric analysis reported in Part A.

B.3 Funding Sources

As with the database survey, government funding supports the highest percentage of heritage projects (38%). Academic and government funding is second highest (24%). Of the respondents surveyed, 19% indicate that a combination of funding sources was used to support their digital preservation projects. Industry, especially resource extraction industries, or industries developing digitization technologies, are largely underrepresented in the survey, and account for only 5% of the funding sources cited.

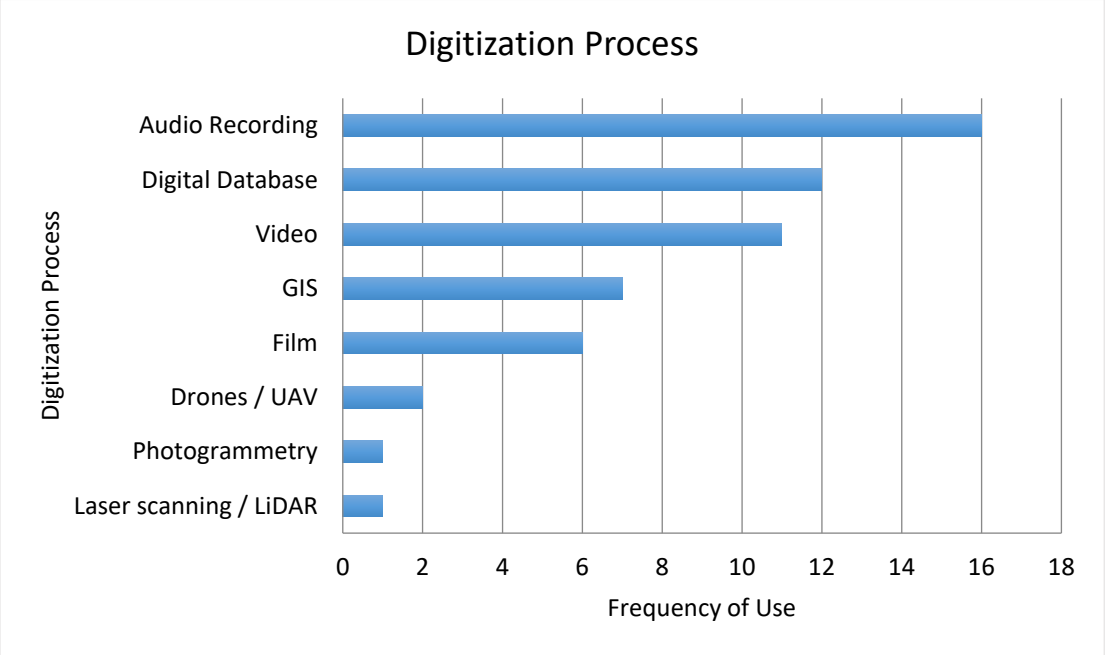
B.4 Most Popular Data Types Digitized



Local knowledge, which is defined as the knowledge that people in each community have developed over time, and continue to develop, and which includes flora, fauna, landscape, and climate/meteorological observations, is by far the most common type of heritage data collected by survey respondents. This type of information appears to have been given a high priority in many digital return projects, perhaps for reasons that are similar to those cited in the database survey. In the wake of the most recent International Polar Year (2007-08) the results of community-based monitoring programs, coupled with the recording of local knowledge along side Western scientific research on arctic climate, appear to have created a significant number of digital return projects containing these forms of data. Such projects include digital atlases of traditional place names, sea ice, and Indigenous land use and occupancy.

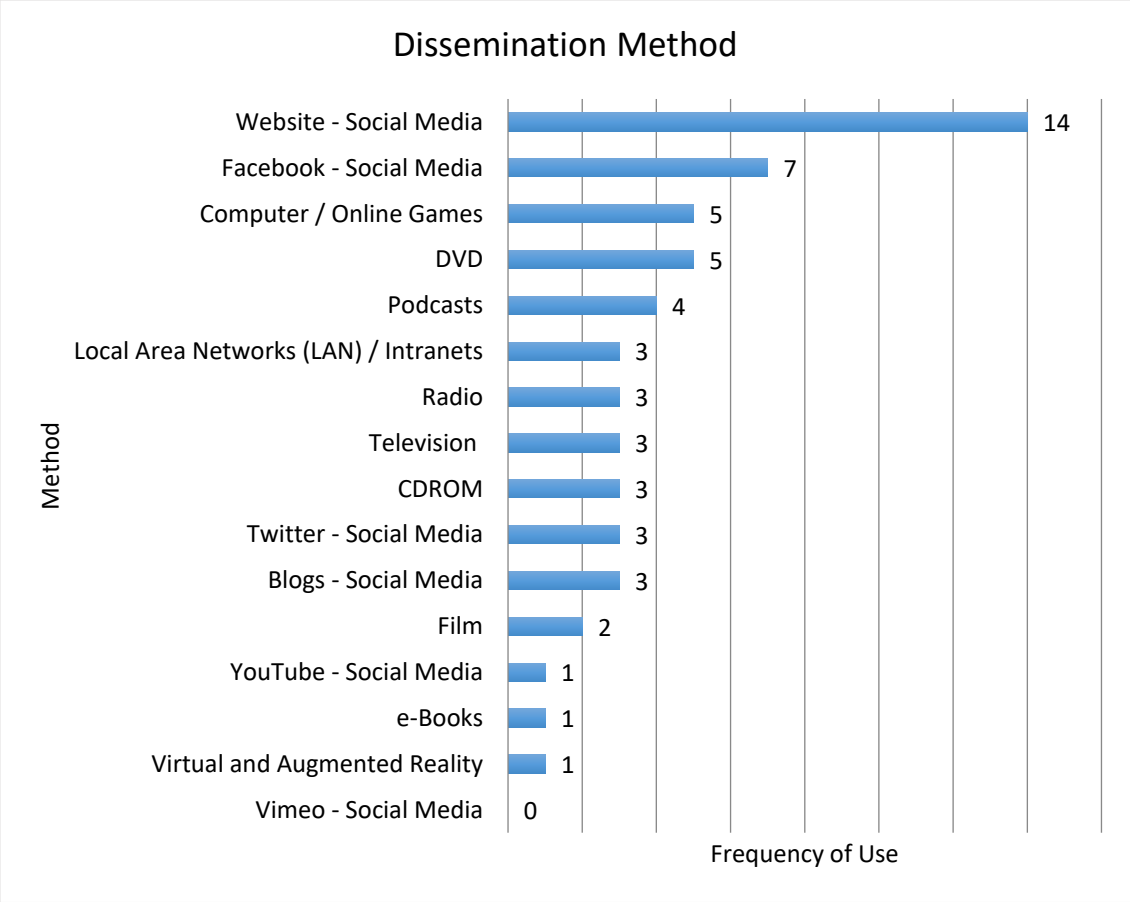
These projects serve a number of important purposes. First, the circulation of Indigenous knowledge concerning climate and related issues has the potential to aid decision-making at both local and regional levels. Second, it ensures that Indigenous knowledge systems remain intact so that it can be used by future generations. Oral histories focusing on personal biographies, community histories, stories, myths, and place names were the second most frequently collected data type recorded. Interest in these types of data likely reflects the urgent need to record the personal histories and knowledge of Elders before they pass away. The category of "Other" that was used in the survey identified additional categories of heritage data, including a) arctic military presence and interactions with Western Arctic Inuvialuit; culture change due to contact with outsiders; education; ceremonial and spiritual life; settlement, subsistence and economic patterns; public health and wellness, childcare; research permitting processes; cumulative impacts of pollutants; industrial development; and climate change.

B.5 Digitization Process



Survey respondents identify audio recording as the most frequently used method for digitizing heritage data. This technology is among the easiest to use, is widely available, has the longest history as a method for recording heritage data, and matches well with the heritage data types identified in the previous section (local knowledge, oral histories, etc.). Digital databases also remain an important data management tool in digital return projects. However, no projects mentioned whether culturally specific methods were used for indexing and classifying cultural content within these databases. Video is also frequently used, which is perhaps due to the proliferation of small handheld devices with cameras (i.e. smartphones). More advanced or technologically sophisticated digital recording methods, such as laser scanning, photogrammetry, and 3D modeling are underrepresented in the study. This likely reflects the expense and technical expertise required to operationalize these forms of digital technologies. In terms of data visualization, GIS and cybercartography are preferred techniques. The "Other" category revealed that some respondents are using some new and innovative techniques for documenting heritage. These include video game creation; the scanning of field notes and photographs using CCD optical scanners; panoramic photography and virtual reality.

B.6 Dissemination Methods.



Survey respondents indicate that websites were the most frequently used method for disseminating digital return information. Interestingly, multiple dissemination methods were used more commonly than among projects reviewed in Part A. Respondents also identified utilizing a wider range of social media sites than projects reported on in Part A. Social media accounted for 48% as compared with other dissemination methods. In terms of devices, 31% of projects surveyed designed their digital return platforms to be accessed using laptop computers, with desktop computers coming in a close second (30%). Interestingly, tablets and smartphones rank a distance third and fourth at 14% and 13%, respectively. This runs counter to urban areas in the south where increasing numbers of people are accessing online content almost exclusively through such devices. Such differences likely reflect a lack of access to smartphones and tablets within source communities.

B.7 Intended Purpose of Project.

Knowledge repatriation, the archiving of local knowledge and oral histories, and youth education were cited as the intended purposes of the majority of digital return projects reported in the survey. Digital return projects dealt with a range of subjects within these areas, including the impacts of the DEW Line; archaeology and community engagement; and increasing accessibility to oral history records. Many projects also served more than one purpose. For example, they could function both as archives and educational tools. Although archaeology and community engagement were listed by respondents as among the purposes

served by digital return projects, object repatriation itself accounted for only 6% of the digital return projects reported in the survey. Community-based monitoring accounts for 10% of the digital return projects.

B.8 Accessibility.

Among the survey respondents, 69% expressed dissatisfaction with how accessible their projects were to source communities. This relates directly to the issue of the digital divide caused by the shortcomings of bandwidth generated by local and regional Internet providers. It also likely stems from a lack of access to up-to-date hardware, such as smartphones, tablets, laptops, and desktop computers. Despite these shortcomings, over 65% of the projects surveyed report receiving positive feedback from community members, indicating that there is strong support for, and interest in, digital return projects. Accessibility is also measured by other factors. In some cases, respondents report using a password to restrict accessibility to sensitive data types. In other instances, an application must be made to a heritage agency in order to receive permission to access the online data. In cases where the final product is still in development, social media sites such as Facebook are used as surrogates for disseminating information to the source community and beyond.

B.9 Project Durability.

Of the projects surveyed, 68% remain accessible to source communities and the public for some period of time after the project had formally ended. However, the extent to which these online platforms remain operable, or whether or not information is still being added, is unreported. Many of the projected lifespans of digital return projects seem overly ambitious given that none of the respondents mention potential issues arising from technological and software obsolescence. Of the respondents surveyed, for example, 33% saw their projects as lasting between 5-10 years, with another 33% stating that they would last even longer – 20 or more years. The absence of any obsolescence management strategy among respondents suggests that such forecasts are overly optimistic.

B.10 Cyberinfrastructure.

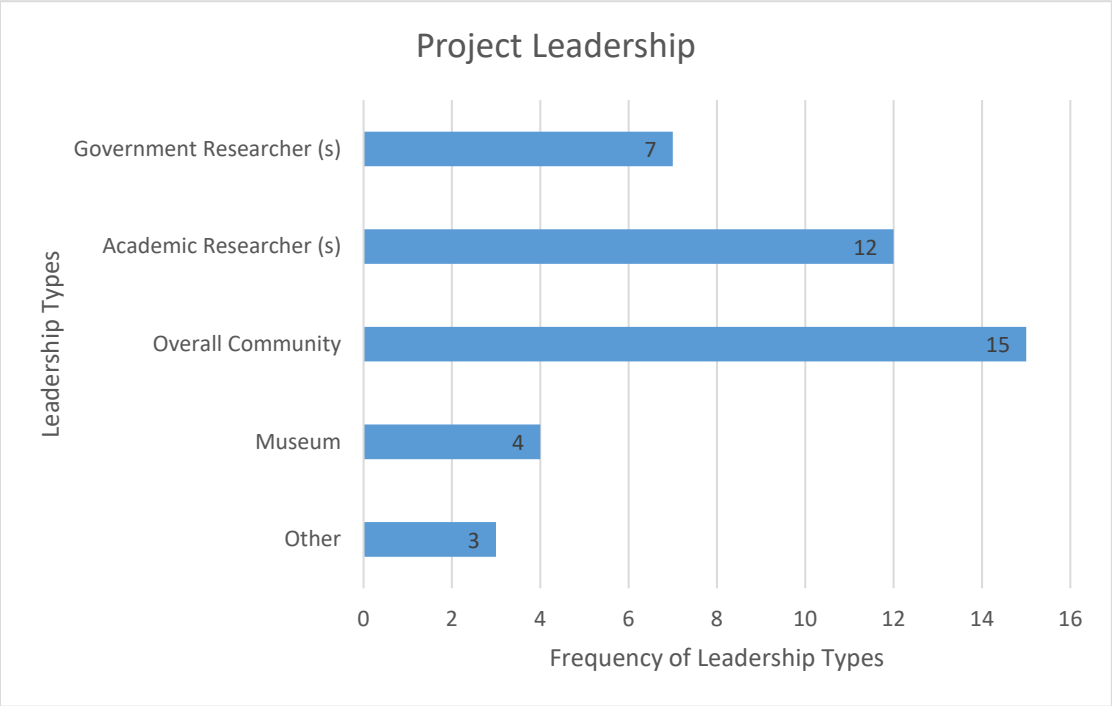
Cyberinfrastructure supports advanced data acquisition, data storage, data management, data integration, data mining, data visualization and other computing and information processing services that are distributed over the Internet. The projects surveyed indicate that the Internet remains the most used form of cyberinfrastructure (49%). This is in spite of significant issues relating to the reliability and cost of satellite Internet, and the restricted bandwidth associated with dialup. Other forms of cyberinfrastructure include the use of community-based servers (21%); computer hard drives (18%); cloud storage (7%); and portable drives (flash drives) (12%). Surprisingly, 18% of survey respondents identified that they were able to access a fiber-optic connection. However, this likely accounts for projects centered in large centers such as Whitehorse and Yellowknife.

The Nunavut Fibre Optic Feasibility Study commissioned by the Nunavut Broadband Development Corporation (NBDC) concludes that the installation and operation of a fiber optic network in Nunavut is possible[49]. The capital cost to build a Nunavut fibre ring, providing fibre service to 24 communities in Nunavut, is estimated at $1.05 billion[49]. A fibre network serving only the regional capitals (Iqaluit, Cambridge Bay, Rankin Inlet) and extended to Resolute Bay, is estimated to cost $342 million. However, the report also makes the point that a concurrent investment in high throughput satellite is critical to ensure that non-fibre linked communities are served, and to act as back-up in the event of a fibre break[49]. Therefore, it would appear that satellite Internet services will continue to be the norm in most arctic communities for some time to come. This is an unfortunate reality, as these satellite base systems are severely affected by weather and frequently have far more subscribers than they are able to adequately service. They are also notoriously unreliable and extremely expensive.

B.11 Copyright and Intellectual Property Concerns.

Of the respondents surveyed, 50% expressed concerns about copyright and intellectual property issues surrounding online digital heritage. This is one of the areas where differences exist between the survey data and the database search. As mentioned previously, very few academic and government publications associated with digital return projects mention anything at all about copyright/intellectual property. The only places these concerns were expressed was in papers dedicated specifically to examining these issues in digital return research. If we assume that the authors of the publications reported on in Part A are primarily academic or government researchers, then there seems to be a divide. In other words, community-focused projects may be expressing more concern here because they are affected more directly by these issues.

B.12 Project Leadership



The majority of digital return projects reported in the study are community-led, and involve local historical societies, clubs, and dedicated individuals (n=15). Academically-led projects are only slightly less numerous (n=12). This stands in contrast to the data reported in Part A, where far fewer source communities assumed project leadership roles. Survey responses indicated that most digital return projects are led by a single individual or community organization (n=18) collaborating with between 2 and 10 partners. Only slightly less numerous are partnerships led by academic institutions and government agencies.

B.13 Partnership Types.

While project *leadership* defines the governance structure of a project, *partnership* defines the number of participating entities. Not surprisingly, 33% of the digital return projects surveyed indicated that their partnerships included members of source communities such as historical societies, Elders groups and youth clubs. Partnerships that involved academics and their institutions were the next most numerous (31%), Partnerships that involved government agencies rounded out the top three at 26%. Industry

accounted for only 6% of the partnership types reported in the survey. This is somewhat surprising, given that there have been several recent examples of highly successful examples, including the game "*Never Alone*", a puzzle-platformer video game in which a player completes puzzles in a story based on Alaskan Indigenous stories. The game was the result of a partnership between the Cook Inlet Tribal Council and E-Line Media. It is one of a growing number of video games produced by Indigenous people. The rarity of these types of partnerships among the digital return projects surveyed suggests that this is a missed opportunity for industry. Games such as "*Never Alone*" have proven to be both highly profitable, as well as successful in mobilizing cultural knowledge across generations.

Summary of Findings for Part B

- The majority of digital return projects were undertaken in Northern Canada. Within Canada, there was more or less equal representation of projects between Nunavut, Yukon, and NWT. Fewer projects were reported in Nunavik and Nunatsiavut.
- There was an overwhelming focus on heritage within the last 50 years. Projects focusing on the digital return of archaeological and ethnographic collections were underrepresented in the study.
- The majority of digital return projects were funded by government agencies and secondarily by academic funding agencies. To date, industry has played a very small role in funding digital return projects.
- Local knowledge comprising information about flora, fauna, land and sea is the most frequently collected data type. Documenting knowledge relating to sea ice is particularly prevalent. This was followed closely by oral histories involving map biographies, community histories, myths, stories and place names.
- Audio recordings were the most common digitization process utilised. Digital databases and video capture is also frequently used as a documentation method. More technologically sophisticated digitization methods such as GIS, 3D laser scanning, photogrammetry, and 3D modeling, are underrepresented in the survey.
- Social media sites, including interactive web pages, were cited as the most popular methods of disseminating information to source communities. Facebook ranked extremely highly.
- Most projects are being accessed by source communities from laptops and desktop computers rather than tablets and smartphones.
- Applied research focusing on knowledge repatriation is the intended purpose of the majority of digital return projects.
- There is an overwhelming level of dissatisfaction surrounding the accessibility of digital content contained within the projects reported. Most of this stems from weaknesses in cyberinfrastructure and related issues associated with the "digital divide".
- Copyright and intellectual property issues were identified as major concerns by survey respondents.
- Most digital return projects are led by a single individual or community organization collaborating with between 2 and 10 partners. Only slightly less numerous are partnerships led by academic institutions and government agencies.

Part C: Case Study of Heritage Initiatives within Arviat

C.1 Background.

The community of Arviat (ᐊᕐᕕᐊᑦ) is located on the western coast of Hudson Bay in the *Kivalliq* District of Nunavut. The community has a population of approximately 2,800 of which 92% are Inuit, and who collectively identify as *Arviarmiut.* The community, which was once known as Eskimo Point, is among the most traditional communities in the Canadian Arctic[29]. Arviat was selected for the case study because of its proactive stance on preserving local history and culture.

Historically, the coast of Hudson Bay near present day Arviat was a traditional summer gathering location for the *Pâdlimiut*, one of several Inuit societies referred to collectively as the Caribou Inuit[50-52]. During the warm season, *Pâdlimiut* families would begin arriving on the islands that lie close to shore where they would camp, hunt, play games, sing songs, and renew bonds with friends and family [50, 51, 53-55]. During the historic period, the Hudson Bay Company (HBC) would send ships north from Churchill to trade with the Inuit who were gathered together at these coastal locations[56]. The HBC eventually established a trading post in 1921 at Eskimo Point (Arviat)[50, 56]. During the first three decades of the 20th century, Inuit travelled to HBC trading posts throughout the *Kivalliq* to trade fox pelts for European goods. Traders encouraged many Inuit to abandon subsistence hunting in favor of trapping foxes as there was great deal of profit in the trade of fox pelts[50, 56]. When the price of fox furs plummeted during the depression era, the traders largely abandoned the *Kivalliq* area, and many Inuit families were left destitute[50, 56].

In the decades that followed, Catholic and Anglican missionaries arrived in the Arviat region, and the Royal Canadian Mounted Police established a permanent detachment in the community[50, 56]. A federal day school was also built, as was a medical clinic. These developments brought permanent settlement to the area. By the 1970s, the majority of Inuit in Canada had moved into communities such as Arviat where they had access to western housing, education, and healthcare, in keeping with modernist policies of the day[50]. Thankfully, many of these policies have since been discarded. In their wake, *Arviarmiut* now strive to preserve their language, local knowledge, and oral histories for their youth. Statistics Canada cites that between 1996 and 2006 the Aboriginal population of Canada grew at a rate of 45% while the non-Aboriginal population increased by only 8%. As a whole, Aboriginal peoples of Canada, including the Inuit, are Canada's fastest and youngest growing demographic. This makes the intergenerational transmission of traditional cultural information all the more critical in communities such as Arviat.

C.2 Grass Roots Heritage Organizations in Arviat.

The Arviat Heritage Society and the Arviat Film Society are two community-led organizations within Arviat that are directly involved in the preservation and dissemination of Indigenous heritage and local history. The Department of Education, Government of Nunavut, which is based in Arviat, has also produced digital return content through partnerships with the Arviat *Sivulinut* Elders Society, as well as the heritage and film societies.

C.2.1 The Arviat Heritage Society.

The Arviat Heritage Society began as the Arviat Historical Society in 1992. Prior to this, a heritage group called *Hivullinuut* Elders Committee was active in the community during the 1970s and 80s. Among its members was the late Inuit Elder Donald Suluk, who was passionate about preserving traditional Inuit culture. The society currently has eight active members. The mandate of the society is defined as "The passing of knowledge and how it can be facilitated before it is gone". The society received funding in 1995

from the Department of Indian and Northern Affairs (now Indigenous Affairs and Northern Development). The money was used to fund two full time positions – a project manager whose job it was to oversee and plan heritage projects; and a financial manager to do project accounting.

One of the most significant projects undertaken by the Arviat Heritage Society was the successful application to have *Arvia'juaq* and *Qikiqtarjuk*, two archaeological sites of great local significance, designated as National Historic Sites. These sites are currently co-managed by the society and Parks Canada. Other projects undertaken by the society have focused on transferring traditional skills to interested members of the community, especially young people. The society has also worked with academic researchers on several heritage projects, including several with the author of this report - an electronic place name atlas and database of Elders quotes called Arctic IQ, which is currently accessible at (www.arcticiq.com).

The society was not involved in any projects at the time of our community visit in 2016. Among the reasons cited were a lack of funding to initiate new projects. Regardless, the society does have plans for future projects. Many of these proposals are aimed directly at involving Inuit youth in cultural activities and include: a) building an igloo with school children; b) traditional kayak building workshop; c) visiting historic and archaeological sites with youth; d) making a traditional caribou skin tent and documenting the process. One of the current members of the society expressed her interest in recording place names along the coast of Hudson Bay up to Whale Cove while she is still able to recall them. Furthermore, society members expressed a desire to make contact with people in the south who could assist them in realizing some of these heritage projects and their objectives.

Both past and current society members articulated a strong interest in repatriating archaeological and ethnographic objects and human remains to the community. This is significant, as the repatriation of objects was underrepresented in the analyses presented in Part A and B of the scoping review. The society understood that plans were underway to build a large facility for housing artifacts in the Nunavut capital of Iqaluit. However, the society felt that more locally situated heritage centers that contained artifacts from their own community would be preferable. For example, it was suggested that the *Margaret Aniksak Visitors Center* in Arviat should function more as a heritage center for community members, and not just as a visitor's center for tourists.

A past member of the society explained that much of the early research into Indigenous knowledge and oral history in Arviat is filled with inaccuracies that need to be corrected through partnerships with Inuit scholars. The society also stressed the need to be sensitive and respectful of Elders who choose to share their knowledge with southern researchers. For example, families need to be asked if old recordings, photographs and maps can be used. This reflects a concern with issues surrounding copyright, intellectual property, and control over heritage content that is not significantly represented in either Part A or Part B of this scoping review.

The Arviat Heritage Society and Hunters and Trappers Association both expressed interest in using heritage as a means of economic development in the community. The members of each group felt that this could be achieved by partnering with tour companies and operating guiding services in which local guides were trained in Inuit history and archaeology. Virtual tours of archaeological sites and historic places were seen as leveraging polar tourism by increasing awareness of Inuit heritage online.

Interestingly, several recent heritage events within the community had been co-organised by the Arviat Heritage Society, the Arviat *Sivulinut* Elders Society, and the Arviat Wellness Center. This suggests that there is a perception that heritage is significantly linked to health and wellness within the community.

C2.2 The Arviat Film Society.

The Arviat Film Society is a student-driven non-profit corporation comprising students and youth. This group of eclectic young media creators is guided by teachers and mentors in Arviat. The Society was founded in 2010 to support Inuit youth and students in exploring education and careers in film and new media, communications, research, the skilled trades, and digital technology. Since its beginnings, many of the projects undertaken by the society have had a strong emphasis on incorporating youth participation into community-based research using film, video and new media. Building on the success of projects like the *Nanisiniq Arviat History Project*[4], youth in the community have been volunteering their time and energy to build a communications environment that supports opportunities for youth engagement, digital literacy, entrepreneurship and leadership.

In 2013 the Society started to explore professional development opportunities with educators, parents and graduates who are interested in learning more about new media and technology. In November 2013 the Arviat Film Society also launched Arviat TV on cable channel 19 in partnership with Isuma TV, the Canada Media Fund, and Arctic Co-Operatives. This volunteer-driven society has grown over the last three years from 5 to almost 30 Inuit youth, Elders, educators and mentors, ranging in age from 13 to 66 years old. The subject matter of the Arviat Film Society is wide-ranging, focusing on locating and archiving film and video relating to the community of Arviat, as well as creating new content. Much of this content is then uploaded to a community channel on Isuma TV where it can be accessed throughout the world. Isuma is used because it is a simple Linux-based platform that makes downloading easier for northern residents who often have access to limited bandwidth.

The society is interested in introducing young people to new digital technologies. To this end, they have staged a number of highly successful digital development workshops. For example, Dr. Timothy Pasch from the University of North Dakota's Communications Program has worked in collaboration with Arviat's film and media groups to explore how digital development can contribute to various initiatives in the community, including heritage.

The projects that the Arviat Film Society engages in are youth focused, in that young people use digital technologies to create and distribute content. Much of this content explored the many connections that exist between traditional knowledge and the land and sea, and is therefore directly linked to the digital preservation of Arviarmiut Heritage.

C.3 Dissemination Methods and Connectivity Issues.

The Arviat Film Society uses Isuma TV, an Internet video portal for Indigenous filmmakers, to distribute their video content. In contrast, the Arviat Heritage Society utilizes digital technologies to a far lesser extent. They are in the process of transition with a new membership, and are not actively engaged in any digital return projects at the moment. Satellite Internet and cable are the main types of cyber-infrastructure available in Arviat. Currently, there are only two Internet Service Providers (ISP) serving Arviat: Northwest Tel and *Qiniq*. However, a third Internet service provider, Xplornet, is attempting to enter the marked.

[4] The Nanisiniq project was initiated by Frank Tester, a professor of social work at the University of British Columbia. Tester partnered with Arviat's Sivulinuut Elders Society who worked collaboratively with young people to document the history of the community and the Kivalliq region.

Company	Advertised Highest Speed (Mbps)	Monthly Usage Cap	Cost for Nunavut Residents / Month
Qiniq Internet (4G - new)	5	50 GB	399.00
Northwestel ("cable")	2.5	30 GB	129.95

Speed tests that were run during the community visit in 2016 illustrate that actual download and upload speeds are much less. For example, download speed were measured at only 0.16mbs, while upload speeds clocked in at a mere 0.10 mbps. This stands in vivid contrast to speeds that were advertised at 3mbps by Internet providers (IPs). The slow download speeds we experienced in Arviat make streaming video impossible. Furthermore, we found that several digital return projects were extremely frustrating to use because digital content takes such a long time to load. Northern-based web and game developers such as *Pinnguaq*[5] are better situated to design digital return platforms than southern developers because they are aware of these severe limitations in cyberinfrastructure. One community leader recommended that researchers, communities, and government organizations partner with such northern-based web design companies so as to ensure that the digital content they create is accessible. As technology is a moving target, it seems likely that Internet speeds in Arviat will eventually improve. However, the expense and logistical complexity of installing fiber optic cable networks in arctic regions suggests this will be a slow process.

The distribution of digital media via flash drives and the use of local servers is another way that community members have worked around the issue of limited bandwidth. The Department of Education currently distributes content using flash drives. For a recent community demonstration of our digital return project, *Virtual Tour of Arvia'juaq*, we utilized an inexpensive way of powering the website that circumvented the limited bandwidth available to us in Arviat. Server software such as *PAW Server for Android* can be used to convert a tablet into a local server, which other nearby devices can access. In a classroom setting, a teacher could pre-load web-based content onto her/his tablet. Using the PAW server, created on an Android tablet in Arviat, we were able to allow other people in the room to access the website on their own devices by simply typing in the server's URL into their browser.

One of the biggest issues in Arviat is lack of access to digital devices. Costs associated with purchasing and shipping hardware to remote northern communities create obvious challenges. Desktop computers were located in each of the three schools in Arviat, and the Donald Suluk library has three computers for public use. One local teacher, who was recently the recipient of a National Teaching Award, facilitated the creation of a "Mac lab" with 11 iMacs and video-editing software despite geographical challenges such as low bandwidth and high shipping and freight charges. At the other end of the spectrum, an increasing amount of Internet content is being designed for use by small tablets with touch screens. For example, sales of tablet computers surpassed those of laptops for the first time in 2015. However, only small numbers of smart phones and tablets are present in Arviat. This is likely due to their cost, as well as the fact that access to the cellular networks that many are designed to use are also expensive.

Summary of Findings for Part C.

- The majority of heritage initiatives within the community of Arviat are youth focused.

[5] Pinnguaq Association is a not for profit Pangnirtung-based technology startup that explores how computer gaming technology can be used to create tools for the preservation of language and culture in Indigenous communities.

- Heritage priorities emphasise the repatriation of archaeological and ethnographic collections, knowledge transfer, and revising oral history and local knowledge research done by earlier researchers.
- Along with history and archaeology, the lived experiences of youth within the community are being documented. Issues include suicide, bullying, and loneliness, and suggest that wellness and heritage are intrinsically linked.
- There is a great deal of interest in using emerging digital technologies to document life and history in the community. These include reality capture technologies such as laser scanning and virtual reality, as well as cybercartography.
- Community-led digital return projects are severely limited by cyberinfrastructure and access to funding.
- There is a desire to partner with individuals and organizations in the south who can show *Arviarmiut* how to use existing and emerging digital technologies to achieve their own heritage objectives. Within these partnerships, *Arviarmiut* would assume leadership roles.
- The majority of digital content created in Arviat is disseminated through IsumaTV - a free video Internet portal dedicated to Indigenous filmmakers.

Additional Resources.

As part of the knowledge mobilization activities planned for this scoping review, a searchable GIS database of the digital return projects identified, along with their associated publications, will be made accessible online. A separate fully searchable database of just publications will also be constructed through collaboration with the Arctic Sciences and Technology Information System (ASTIS) at the Arctic Institute of North America.

Further Research.

The scoping review completed in Parts A, B, and C of the study identify a number of significant gaps in knowledge surrounding key issues affecting digital return projects. A summary of these issues is presented below:

- Once a digital return project is completed, how long does the digital return system (i.e. website, database, etc.) remain accessible and operable to source communities?
- What are the potential short term and long term impacts of obsolescence (technology, software) and inadequate cyberinfrastructure on the viability of digital return platforms?
- Why is the digital repatriation of archaeological and ethnographic objects underrepresented when compared to more intangible forms of heritage?
- Why do so many digital return projects focus on Indigenous heritage from the last 50 years?
- Why is so little mention made of copyright and intellectual property issues, and the potential consequences of placing cultural information into open source contexts?
- Given that most digital return projects have an academic lead, to what extent are agendas that lie outside of source communities driving digital return projects?

- Why do digital return projects have so few industry partners, given the rich potential for synergies with Indigenous training and northern economic development?
- Why are cutting edge digital technologies such as reality capture (3D laser scanning, 3D printing, etc.) not being used more regularly in digital return projects? Do these technologies offer any potential advantages or disadvantages to source communities?
- Why do community-led projects rely on social media platforms such as Facebook and video/photo file sharing sites to disseminate digital return materials? Does this represent attempts by source communities to address cyberinfrastructure issues? Or are social media platforms attractive to grass roots heritage initiatives because they require few specialized skills to create and circulate digital content? Are social media platforms a better way of disseminating heritage data to source communities than online databases and websites?
- Can digital return projects stimulate economic development by providing youth training opportunities, employment, and potential start-up opportunities for creating small businesses? To what extent do they differ?
- How does the process of digitization affect the value and meanings attached to actual objects? Do Indigenous perceptions of digital replicas vary among groups? Or between generations? Are terms like "repatriation" relevant if digital objects can be endlessly replicated?
- When online databases are used as digital return platforms, can methods for classifying and indexing be developed that are better suited to the structure and context of Indigenous knowledge systems?
- To what extent do digital return systems function as disruptive technologies in the collection, management, and dissemination of Indigenous heritage? What problems and prospects do they have for source communities and third party institutions over the short and long term?

These are all areas that stand to benefit from future research as we seek to understand the benefits and drawbacks associated with digital return, and its role as a disruptive technology in Indigenous communities and third party institutions.

Knowledge Mobilization Plan

Drawing on Graham's Knowledge-to-Action (KTA) framework [57, 58], an active KTA plan for this project will be developed by taking the key messages arising from this research project and: 1) determining the principal target audiences for each of these messages; 2) seeking out the most credible messenger for these messages and engaging their interest in becoming involved in their communication to other stakeholders; and 3) launching a KTA strategy grounded in the best available research evidence. The KTA strategy for this project will involve the creation of an online publications database and interactive map of digital return project locations to be constructed in collaboration with The Arctic Sciences and Technology Information System (ASTIS), which is part of the Arctic Institute of North America, an international institute located at the University of Calgary.

Identifying Key Messages.

The ASTIS[6] database is widely used by industry, academics, and community stakeholders, and currently contains 81,000 records describing publications and research projects about northern Canada. It

[6] ASTIS stands for Arctic Science and Technology Information System.

is therefore perfectly suited for disseminating the knowledge gained through this project. The articles, manuscripts and other documents collected during Part A (the study selection and data abstraction phases of the project) will be indexed and entered into a customized database within ASTIS to be named "Digital Heritage in Northern Regions". The database will be fully searchable using conditions such as Title, Abstract, Author, Subject and Geographic Code and Year. The ASTIS database will provide an essential means for mobilizing the knowledge gained through this synthesis grant to a wide variety of end users. The database will be accessed through a portal located on a website which will be constructed for the project. The website will outline the background and objectives of the project in three languages: English, French and Inuktitut. The geographic locations of the digital return projects identified in the study will also be displayed on an interactive map sheet. Clicking on a project will connect the user to all of the publications generated by that project. There will be opportunities for users to leave feedback about their experiences using the website and portal, via a comments box. These comments will be emailed to the principal investigator.

Determining the Principal Audiences for Key Messages

One of the primary barriers limiting the uptake of knowledge is a general lack of awareness about what organizations and individuals are currently engaging in digital heritage research in Canadian arctic communities. It is therefore essential that the principal audiences for whom this knowledge is intended are identified and made known to one another. For example, digital repatriation projects are currently being undertaken by large academic and government institutions such as the Prince of Wales Northern Heritage Center (Yellowknife), Parks Canada's Nunavut Field Unit, and Carleton University's Geomatics and Cartographic Research Center. At the local level, Inuit-run organizations such as the Inuit Heritage Trust are also engaged in a variety of heritage projects that involve digital technologies. At the grass roots level, community organizations such as the Arviat Heritage Society and Arviat Film Society are successfully initiating digital preservation projects such as online photo and film archives. Academic publications are often not generated at these more local levels, and therefore information about these projects is difficult to access. As a result, community-level digital return projects with objectives that compliment those of larger institutions are often overlooked, and can even go unnoticed. As this scoping review compiles both academic and grey literature with a community case study, it will raise awareness of exactly who the current practitioners of digital return/heritage projects are in the Canadian Arctic. This will help to more accurately identify who the principal audiences for the knowledge synthesis are, as well as encourage future collaborations between institutional and locally focused teams at regional levels.

Seeking Out Messengers.

Organizations like the Virtual Museum of Canada constitute ideal messengers for taking the key messages that have emerged from this study, and implementing them in ways that will result in more engaging and robust digital return platforms and virtual heritage exhibits that will benefit all Canadians. The Virtual Museum of Canada (VMC) provides an online environment for Canadian communities to tell their stories and preserve their histories. The VMC Investment Program currently offers funding to large sized institutions to create virtual exhibits. Likewise, the Community Memories Program, which is designed for smaller community-based museums, allows them to create online exhibits to tell their histories. Neither program is currently flexible enough to be "customized" to suit the needs of remote communities such as those found in the Canadian Arctic. Consequently, programs run by the VMC and other heritage organizations can benefit from the key messages emerging from this knowledge synthesis. For example, the knowledge synthesis project will increase awareness of the unique technical challenges that face digital return projects in remote communities. It will also raise awareness about the kinds of heritage data that Inuit are interested in preserving and accessing.

Launching a KTA Strategy that is Specific to Northern Canada.

Bridging the knowledge to action cycle requires that a series of steps are undertaken so as to ensure that the knowledge contained in this synthesis project remains accessible and useful to a diverse range of stakeholders. Northern communities are varied in their opinions about how cultural heritage should be preserved, managed, and accessed. Consequently, it is essential that the value, usefulness, and appropriateness of the knowledge contained within this scoping review is customized to meet the needs of northern stakeholders. One of the ways this will be addressed is by ensuring that the website containing the ASTIS database and map portal contains information in Inuktitut, English and French. Users will also be able to submit comments through the website, where they will be encouraged to express their views on content.

Conclusion.

At the beginning of this report, digital return was defined as an example of a disruptive technology. The results generated in Parts A, B, and C in this scoping review effectively demonstrate that digital return technologies *disrupt* established institutional models and networks for archiving, accessing, and interpreting objects and cultural knowledge. The paradox is that they can also *disrupt* Indigenous networks that support how objects and cultural knowledge are accessed and circulated. Resolving this paradox will require the following solutions:

- Obsolescence management practices will need to be developed to ensure that source communities are able to access digital return content over the short and long term.
- When using electronic databases to manage heritage data, new methods of classifying and indexing Indigenous knowledge will need to be developed so that source communities can easily retrieve the information they seek.
- Different types of “open access” will need to be negotiated to ensure that Indigenous communities retain some control over access, circulation, and use of heritage data that is placed online and in open source contexts.
- Intellectual property and rights of ownership involved in creating, accessing, distributing, and using digital return data will need to be negotiated between source communities, the third party institutions they partner with, and the public at large.
- The impact that digital replication has on the concept of repatriation will need to be re-examined because different versions of digital objects can be created and endlessly reproduced. In light of this, the term “reciprocation” may be preferable to “repatriation” in the context of digital return.
- The “digital divide” issue that severely restricts the use of digital return platforms in arctic communities will have to be addressed, either through substantial investment in new cyberinfrastructure, the development of innovative “work arounds”, or some combination of these two.
- New ways to train Indigenous youth in digital technologies need to be developed because they have the potential to enable BOTH economic development and the preservation of cultural knowledge within source communities.

Solutions to these problems are possible, but they can only be achieved through meaningful collaborations between third party institutions and Indigenous communities. The purpose of this report is to (hopefully) serve as a catalyst for such collaborations.

Appendix 1: Tables.

Table 1. Analysis Plan and Expected Outcomes for each of the Four Synthesis Objectives.

Synthesis Objective	Method	Question to guide analysis	Anticipated outputs
To identify the extent and objectives of community-led digital return projects in Canadian Arctic communities.	We will conduct a survey of local historical societies in the communities of Arviat, Nunavut	1. What kind of information is being collected? How is it being digitized and disseminated? (i.e. social media, you tube).	Gaining an understanding of how grass roots heritage projects differ from those of larger institutions.
To characterize the digital return methodologies currently used in the Canadian Arctic.	We will chart the digitization and delivery methodologies reported in each of the included studies (database searches, surveys of heritage organizations, case study of community-led heritage initiatives.	1. Are digital return platforms designed and delivered in ways that relate to local (community) ideas of relevance, tradition, and usefulness?	Identification of the extent to which the priorities of non-source institutions have taken precedence over those of the community.
To identify how digital return content is currently accessed in Canadian Arctic communities.	We will conduct a technology survey using the Inuit community of Arviat, Nunavut, as a case study.	1. What devices are most commonly used to access digital return projects? Smartphones, tablets, laptops, desktops?	Categorization of the devices most likely to be used to access digital return content in Arctic communities.
To identify the issues and challenges facing digital return projects in the Canadian Arctic.	We will categorize key articles that explicitly examine global issues of Internet accessibility with special reference to Indigenous communities in remote regions of North America.	1. What kinds of technical requirements are being met to ensure that digital return platforms operate effectively in northern communities?	Development of a clear set of technical “best practices” to ensure that digital return platforms operate effectively and reliably in Inuit communities.
As above.	As above.	2. How are digital technologies being used to accommodate Inuit conventions	Identification of the facilitators and barriers that might impede the creation of truly

		surrounding how cultural knowledge is managed, accessed, and circulated?	collaborative digital return platforms in Canadian Arctic communities.
As above.	As above.	3. Is there consensus among community members surrounding issues relating to ownership, copyright, and intellectual property rights when cultural property is placed online?	As above.
As above.	As above.	4. Do digitization practices shift the balance between institutional expertise and Indigenous participation in the ways that Inuit heritage is represented?	As above.

Table 2. Databases searched.

DATABASE	NO. OF RETURNS	NO. OF RELEVANT RETURNS
GOOGLE SCHOLAR	74600	1000/14
JSTOR	4252	100/13
WEB OF SCIENCE	6	0
SCOPUS	7	2
IEEE XPLORE	58	0
ASTIS	1	0
EBSCO - ARCTIC AND ANTARCTIC REGIONS	3	0
EBSCO - BIBLIOGRAPHY OF NATIVE AMERICA	16	0
CENTRE FOR RESEARCH LIBRARIES - GLOBAL RESOURCE NETWORK	16750	100/0
CANADIAN PERIODICALS INDEX QUARTERLY	877	15
NUNAVUT DATABASE	602	18
NSF ARCTIC DATA CENTRE	2	1
ATLAS OF COMMUNITY-BASED MONITORING & INDIGENOUS KNOWLEDGE IN A CHANGING ARCTIC	64	4
EBSCO - HISTORICAL ABSTRACTS	6	1

Table 3. Breakdown of publications types produced by digital return projects.

PUBLICATION TYPE PROJECT NAME	# OF PEER REVIEWED ARTICLES ASSOCIATED WITH PROJECT	# OF BOOKS ASSOCIATED WITH PROJECT	# OF POPULAR PUBLICATIONS ASSOCIATED WITH PROJECT
ABORIGINAL PEOPLES AND MEDIA MEDIACAN	0	1	0
ADVANCING LANDSCAPE CHANGE RESEARCH THROUGH THE INCORPORATION OF INUPIAQ KNOWLEDGE	1	0	0
ALASKA NATIVE KNOWLEDGE NETWORK	1	2	0
ALASKA NATIVE SCIENCE COMMISSION	2	0	0
ALASKOOL	1	0	0
ARCHAEOLOGY AND ORAL HISTORY OF INUIT LAND USE ON THE KAZAN RIVER, NUNAVUT: A FEATURE-BASED APPROACH	1	0	0

ARCTIC CIRCLE	2	0	0
ARCTIC CULTURAL CARTOGRAPHY	2	0	0
ARNAIT VIDEO PRODUCTIONS	3	3	0
CLYDE RIVER KNOWLEDGE ATLAS	0	0	1
COMMUNITY ATLAS OF ARCTIC BAY	1	0	0
CULTURAL SITES, TRADITIONAL KNOWLEDGE AND PARTICIPATORY MAPPING. LONG-TERM LAND USE IN A SÁMI COMMUNITY IN COASTAL NORWAY	3	0	0
CULTURE GREENLAND	0	1	0
CYARK - FORT CONGER	2	0	1
FORT CONGER QUTTINIRPAAQ NATIONAL PARK, NUNAVUT	2	0	1
GLENBOW MUSEUM: THULE WHALEBONE HOUSE	2	0	0
IDENTIFICATION OF A PRE-CONTACT POLAR BEAR VICTIM AT NATIVE POINT, SOUTHAMPTON ISLAND, NUNAVUT, USING 3D TECHNOLOGY AND A VIRTUAL ZOOARCHAEOLOGY COLLECTION	1	0	0
IGOOLIK ISUMA PRODUCTIONS	17	11	9
INUIT KNOWLEDGE AND GEOSPATIAL ONTOLOGIES IN NUNATSIAVUT	1	0	0
INUIT KNOWLEDGE ONLINE DATABASE PROJECT	0	0	2
INUIT QAUJISARVINGAT: THE INUIT KNOWLEDGE CENTRE	1	0	0
INUIT SIKU (SEA ICE) ATLAS	5	3	1
INUVIALUIT PITQUSIIT INUUNIARUTAIT: INUVIALUIT LIVING HISTORY	3	2	3
INUVIALUIT SETTLEMENT DATABASE	0	0	4
INUVIALUIT SOD HOUSE	3	0	0
IQALUKTUUQ PROJECT	2	1	0
KAWERAK'S ICE SEAL AND WALRUS PROJECT	3	1	1

KITIKMEOT PLACE NAME ATLAS	2	1	0
LOOKING ACROSS THREE GENERATIONS OF ALASKA NATIVES TO EXPLORE HOW CULTURE FOSTERS INDIGENOUS RESILIENCE	1	0	0
MY WORD: STORYTELLING AND DIGITAL MEDIA LAB	1	0	0
NATIONAL PICTURE DATABASE OF GREENLAND	0	1	1
NEW WAYS OF MAPPING: USING GPS MAPPING SOFTWARE TO PLOT PLACE NAMES AND TRAILS IN IGLOOLIK (NUNAVUT)	1	0	0
NORTHERN PEOPLE AND NORTHERN KNOWLEDGE: A VIRTUAL MUSEUM ON THE CANADIAN ARCTIC EXPEDITION OF 1913-1918	1	0	0
NUNALIIT	4	4	0
NUNAVUT DATABASE (WAS KNOWN AS THE NUNAVUT ENVIRONMENTAL DATABASE (NED)	2	1	0
PAN INUIT TRAILS ATLAS	0	0	6
PINNGUAQ	0	0	7
PROJECT JUKEBOX: DIGITAL BRANCH OF THE UNIVERSITY OF ALASKA FAIRBANKS ORAL HISTORY PROGRAM	5	2	0
"RECALLING ANCESTRAL VOICES" REPATRIATION OF SAMI CULTURAL HERITAGE	0	3	0
ROOTS2SHARE	2	1	0
SAMENET	1	1	1
SILA	1	3	0
SNOWCHANGE COOPERATIVE	1	2	2
STORYTELLING IN A DIGITAL AGE: DIGITAL STORYTELLING AS AN EMERGING NARRATIVE METHOD FOR PRESERVING AND PROMOTING INDIGENOUS ORAL WISDOM	1	0	0
THE IGLINIIT ("TRAILS") PROJECT	1	1	3

THE INUIT QAUJIMAJATUQANGIT ADVENTURE	2	1	1
THE ROLE OF INDIGENOUS KNOWLEDGE IN ENVIRONMENTAL HEALTH RISK MANAGEMENT IN THE YUKON ENVIRONMENTAL HEALTH RISK MANAGEMENT IN YUKON, CANADA	1	0	0
THE SAMI RESEARCH AND PROJECT DATABASE RADJU	0	1	1
THE TRAIL AS HOME: INUIT AND THEIR PAN-ARCTIC NETWORK OF ROUTES	1	0	0
VIEWS FROM THE NORTH ATLAS	0	1	0
YU'PIK ENVIRONMENTAL KNOWLEDGE PROJECT	1	0	0
TOTAL	88	48	44

Appendix 2: Data Abstraction Forms.

Part A: Data Extraction Form – Published Literature

All data categories with a ★ can be multiple choice.

Project Name: _____

URL: _____

Active: Yes ☐
No ☐

Date:_____

Case Study Location(s) ★:	Alaska	☐
	Canadian Arctic, Northwest Territories	☐
	Canadian Arctic, Nunatsiavut	☐
	Canadian Arctic, Nunavik	☐
	Canadian Arctic, Nunavut	☐
	Canadian Arctic, Yukon	☐
	Finland	☐
	Greenland	☐
	Sweden	☐
	Russia	☐
	Norway	☐

Researcher(s) Location:_____

Digital Heritage Category★:	Archaeological	☐
	Historical	☐
	Contemporary	☐
	Unknown	☐
Type of Data Collected★:	Architecture/monuments	☐
	Tools	☐
	Art	☐
	Clothing	☐

	Photographs	☐
	Language	☐
	Oral History	☐
	Toponomy	☐
	Personal Biographies	☐
	Music	☐
	Maps	☐
	TEK, Flora	☐
	TEK, Fauna	☐
	TEK, Landscape	☐
	TEK, Climate /Meteorological	☐
	TEK, Celestial /Astronomical	☐
	Other	☐
Dissemination Process★:	Facebook	☐
	Twitter	☐
	YouTube	☐
	Website	☐
	Vimeo	☐
	Podcast	☐
	Blog	☐
	CDROM	☐
	DVD	☐
	Games, Online	☐
	Games, Computer	☐
	Television	☐
	Film	☐
	Radio	☐

	Virtual and Augmented Reality	☐
	EBooks	☐
	Digital Database	☐
	Other	☐
	Unknown	☐
Digitisation Process★:	Reality capture, Laser Scanning/LiDAR	☐
	Reality Capture, Photogrammetry	☐
	Reality Capture, UAV/Drone	☐
	Visual Recording	☐
	Audio Recording	☐
	GIS	☐
	Digital Database	☐
	EBook	☐
	Ejournal	☐
	Other	☐
	Unknown	☐
Access Method★:	Tablet	☐
	Smart Phone	☐
	Desktop	☐
	Laptop	☐
	Smart TV	☐
Cyber-Infrastructure★:	Internet, Fibre Optic	☐
	Internet, Satellite	☐
	Internet, Dial Up	☐
	Server, School	☐

	Server, Community Centre	☐
	Server, Band Office	☐
	Flash Drive, Project/Institutional	☐
	Flash Drive, Personal	☐
	Hard Drive, Project/Institutional	☐
	Hard Drive, Personal	☐
Purpose of Project★:	Pure Research	☐
	Applied Research, Education	☐
	Applied Research, Knowledge Repatriation	☐
	Applied Research, Object Repatriation	☐
	Applied Research, Archival	☐
	Applied Research, Citizen Research	☐
	Unknown	☐
Accessible to Northern Users?★:	Yes	☐
	No, Bandwidth Limitations	☐
	No, Internet Reliability Issues	☐
	No, No Access to Hardware	☐
	No, Barriers to Access for People with Disabilities	☐
	No mention made at all	☐

Copyright/Intellectual Property:	Yes	☐
	No	☐
	No mention made at all	☐
Project Lead★:	Academic Researcher(s)	☐
	Community Individual	☐
	Community Institution	☐
	Unknown	☐
	Government Researcher(s)	☐
	Industry	☐
	Museum	☐
Successful Project:	Yes	☐
	No	☐
	No mention made at all	☐
Funding:	Academic	☐
	Combination	☐
	Government	☐
	Industry	☐
	Other	☐
Partnerships:	No	☐
	1 to 2 Partners	☐
	3 to 5 Partners	☐
Partnership Participants★:	Academic	☐
	Community	☐
	Government	☐
	Industry	☐
	Other	☐

Associated Peer Reviewed Articles: _____

_____

Associated Books: _____

_____

Associated Popular
Publications:

Part B: Circumpolar Indigenous Digital Heritage Project (CIDHP) Questionnaire
This survey is to help assist with a University of Calgary project designed to assess the different types of Indigenous Digital Heritage being used today by different groups, organizations, corporations, governments, etc. in the Circumpolar regions. Questions? Please contact me, Colleen Hughes, at cfhughes@ucalgary.ca
[Square bullet points means ability to chose multiple answers, Circle bullet point means ability to chose only one answer]

* Required
Date *

MM/DD/YYYY
2016

Author (Names of authors /organizers) *

Your answer

Affiliations / Organization *

Your answer

Title of Indigenous Digital Heritage Project *

Your answer

If your organization is working on more than one Digital Heritage Project please list them below.

Your answer

Brief overview of project

Your answer

Source Community *

- Alaska
- Canadian Arctic - Nunavut
- Canadian Arctic - Northwest Territories
- Canadian Arctic - Yukon

- Canadian Arctic - Nunavik
- Greenland
- Finland
- Sweden
- Norway
- Russia
- Required

Time Period Covered by Project *

- Archaeological: Pre-contact
- Historical: Early contact to 1950
- Contemporary: from 1950 onwards

Type of Data Collected *

- Architecture / Monuments
- Archaeological Collections
- Traditional Clothing
- Traditional Art
- Photographs
- Language
- Oral History
- Toponymy (Place Names)
- Personal Biographies
- Music
- Maps
- Traditional Ecological Knowledge (TEK) - Flora
- TEK - Fauna
- TEK - Landscape
- TEK - Climate / Meteorological (especially dealing with climate change)
- TEK - Celestial / Astronomical
- Other: Required

Digitization Process *

- Reality Capture - Laser scanning / LiDAR
- Reality Capture - Photogrammetry
- Reality Capture - Drones / Unmanned Aerial Vehicle (UAV)
- Video
- Film
- Audio Recording
- GIS
- Digital Database
- Other: Required

Dissemination Method of Digital Heritage *

- Social Media - Blogs
- Social Media - Twitter
- Social Media - Facebook
- Social Media - Website
- Social Media - Youtube
- Social Media - Vimeo
- Social Media - Other
- CDROM
- DVD
- Computer / Online Games
- Television
- Film
- Radio
- Podcasts
- Virtual and Augmented Reality
- e-Books
- Local Area Networks (LAN) / Intranets
- Other: Required

Please provide the URL for any Internet Sources

Your answer

Projected life-span of digital project?

- 0-5 years
- 5-10 years
- 10-15 years
- 15-20 years
- 20 years or more

Is the digital project currently accessible?

- Yes
- No
- Other: Required

What types of devices has the project been designed for? *

- Tablet
- Smartphone
- Laptop
- Desktop

- Smart TV
- Multi-platform

Purpose of Project *

- Pure Research
- Applied Research - Education
- Applied Research - Knowledge Repatriation
- Applied Research - Object Repatriation
- Applied Research - Archival
- Citizen Project
- Other: Required

Cyber-Infrastructure (i.e. what kind of cyber-structure was the project designed to accommodate?) *

- Internet - Fiber Optic
- Internet - Satellite
- Internet - Dial Up
- Internet - Cloud Storage
- Server - School
- Server - Community Center
- Server - Band Office
- Flashdrive - Project/Institution
- Flashdrive - Personal
- Hard Drive - Project / Institution
- Hard Drive - Personal
- Other: Required

Is Digital Content Satisfactorily Accessible to Northern Users? *

- Yes
- No - Bandwidth Limitations
- No - Internet Reliability Issues
- No - No Access to hardware (tablet, laptops, etc.)
- No - Barriers to Access for people with disabilities
- No - Natural phenomenon barriers (solar flares, icebergs, etc.)
- No mentions made at all

Were there concerns about copyright /intellectual property issues within source communities *

- Yes
- No
- No mention made at all

Who is leading the digital heritage project? *

- Community Institution (ex. church)
- Community Group (ex. Heritage Society)
- Community Individual
- Academic Researcher (s)
- Government Researcher (s)
- Museum (s)
- Industry
- Other: Required

Is the project based on a Partnership? If so, with how many partners?

- No
- Yes - 1 to 2 Partners
- Yes - 3 to 5 Partners
- Yes - 6 to 10 Partners
- Yes - 11 to 20 partners
- Yes - more than 20 partners

Who are you partnering with?

- Community
- Government
- Industry
- Academia
- Other: Required

Are funding sources public or private?

- Academic funding
- Government funding
- Industry funding
- Private funding
- A combination of funding types
- Other: Required

Was the Overall Project Considered A Success by Community Members?

- Yes
- No
- No Mention Made
- Project is ongoing - Feedback to date is mostly positive
- Project is ongoing - Feedback to date is mostly negative
- Other : Required

Is there anything else you would like to add about your Indigenous Digital Heritage project?

Your answer

Appendix 3: List of Search Terms for Part A.

- List of search terms created
  - Digital
  - Heritage
  - Arctic
  - North
  - Language
  - Culture
  - Archaeology
  - Photographs
  - Music
  - Recordings
  - Landscape
  - Traditional Land use
  - Preservation
  - Data
  - Virtual
  - Conservation
  - 3D Capture
  - Art
  - Dying cultures
  - Culture revitalization
  - Innu
  - Inuit
  - Eskimo
  - Sammi
  - Family
  - Maps and map biographies
  - AudioVisual
  - Stories (Oral Histories)
  - “On the Land”
  - Dress
  - Websites
  - Artefacts
  - Collaboration
  - Community
  - Museum
  - Grassroots
  - Industry
  - History
  - Anthropology
  - Issues
  - Climate
  - Finland
  - Sweden
  - Denmark/Greenland
  - Russia

- Canada Yukon, NWT, Nunavut
- Alaska

- Refinement of search terms
  - digital AND (cultural heritage OR culture OR heritage) AND (Arctic OR North OR Polar) AND (Indigenous OR aboriginal)
  - digital AND (cultural heritage OR culture OR heritage) AND (Fin* OR Swed* OR Greenland OR Russia* OR Canad* OR Alask* OR Nor*) AND (Indigenous OR aboriginal)
  - digital AND (cultural heritage OR culture OR heritage) AND (Arctic OR North OR Polar) AND (Innu OR Inuit OR Eskimo OR Sami)
  - digital AND (cultural heritage OR culture OR heritage) AND (Fin* OR Swed* OR Greenland OR Russia* OR Canad* OR Alask* OR Nor*) AND (Innu OR Inuit OR Eskimo OR Sami)
  - digital AND (archaeology OR anthropology OR history) AND (Arctic OR North OR Polar) AND (Indigenous OR aboriginal)
  - digital AND (archaeology OR anthropology OR history) AND (Arctic OR North OR Polar) AND (Innu OR Inuit OR Eskimo OR Sami)
  - digital AND (archaeology OR anthropology OR history) AND (Fin* OR Swed* OR Greenland OR Russia* OR Canad* OR Alask* OR Nor*) AND (Indigenous OR aboriginal)
  - digital AND (archaeology OR anthropology OR history) AND (Fin* OR Swed* OR Greenland OR Russia* OR Canad* OR Alask* OR Nor*) AND (Innu OR Inuit OR Eskimo OR Sami)
  - digital AND technolog* AND (cultural heritage OR culture OR heritage) AND (Arctic OR North OR Polar) AND (Indigenous OR aboriginal)
  - digital AND technolog* AND (cultural heritage OR culture OR heritage) AND (Arctic OR North OR Polar) AND (Innu OR Inuit OR Eskimo OR Sami)
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  - digital AND technolog* AND (archaeology OR anthropology OR history) AND (Fin* OR Swed* OR Greenland OR Russia* OR Canad* OR Alask* OR Nor*) AND (Indigenous OR aboriginal)
  - digital AND technolog* AND (archaeology OR anthropology OR history) AND (Fin* OR Swed* OR Greenland OR Russia* OR Canad* OR Alask* OR Nor*) AND (Innu OR Inuit OR Eskimo OR Sami)
  - digital AND (3D capture OR laser scanning OR LiDAR OR photogrammetry) AND (cultural heritage OR culture OR heritage) AND (Arctic OR North OR Polar) AND (Indigenous OR aboriginal)

- digital AND (3D capture OR laser scanning OR LiDAR OR photogrammetry) AND (cultural heritage OR culture OR heritage) AND (Arctic OR North OR Polar) AND (Innu OR Inuit OR Eskimo OR Sami)
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- digital AND photo* AND (cultural heritage OR culture OR heritage) AND (Arctic OR North OR Polar) AND (Indigenous OR aboriginal)
- digital AND photo* AND (cultural heritage OR culture OR heritage) AND (Arctic OR North OR Polar) AND (Innu OR Inuit OR Eskimo OR Sami)
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- digital AND photo* AND (archaeology OR anthropology OR history) AND (Fin* OR Swed* OR Greenland OR Russia* OR Canad* OR Alask* OR Nor*) AND (Indigenous OR aboriginal)
- digital AND photo* AND (archaeology OR anthropology OR history) AND (Fin* OR Swed* OR Greenland OR Russia* OR Canad* OR Alask* OR Nor*) AND (Innu OR Inuit OR Eskimo OR Sami)
- digital AND (recording OR audio OR visual) AND (cultural heritage OR culture OR heritage) AND (Arctic OR North OR Polar) AND (Indigenous OR aboriginal)

- digital AND (recording OR audio OR visual) AND (cultural heritage OR culture OR heritage) AND (Arctic OR North OR Polar) AND (Innu OR Inuit OR Eskimo OR Sami)
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- digital AND (recording OR audio OR visual) AND (archaeology OR anthropology OR history) AND (Fin* OR Swed* OR Greenland OR Russia* OR Canad* OR Alask* OR Nor*) AND (Innu OR Inuit OR Eskimo OR Sami)
- digital AND (web* OR social media) AND (cultural heritage OR culture OR heritage) AND (Arctic OR North OR Polar) AND (Indigenous OR aboriginal)
- digital AND (web* OR social media) AND (cultural heritage OR culture OR heritage) AND (Arctic OR North OR Polar) AND (Innu OR Inuit OR Eskimo OR Sami)
- digital AND (web* OR social media) AND (cultural heritage OR culture OR heritage) AND (Fin* OR Swed* OR Greenland OR Russia* OR Canad* OR Alask* OR Nor*) AND (Indigenous OR aboriginal)
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