# A Different Way of Knowing: Tools and Strategies for Managing Indigenous Knowledge

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There is a growing need to preserve indigenous knowledge, as indigenous communities around the world face ongoing threats to the survival of their traditional languages and cultures. Although libraries have not traditionally focused on this area, libraries and information professionals can play an important role in assisting indigenous communities with the management and preservation of traditional knowledge through providing resources and expertise in collection, organization, storage and retrieval. Indigenous knowledge, however, differs greatly from Western knowledge and so it must be managed in unique and sensitive ways that may challenge conventional knowledge management tools and processes, as well as prevalent assumptions about knowledge and information. Indeed, information professionals should work with indigenous communities to develop unique solutions that meet local needs. Three indigenous knowledge management projects in Australia, Canada and the United States are examined to illustrate the different methods and tools that can be used for managing indigenous knowledge to accommodate oral traditions, holistic belief systems, security and access concerns, and technological limitations.

## Introduction

There has been a rise in interest recently in the management of indigenous knowledge due to many different factors. For example, digitizing objects and making them available on the World Wide Web has raised concerns about cultural appropriation and treatment of sacred cultural objects. Concurrently, the availability of digital technology has greatly expanded possibilities for preserving indigenous knowledge that are more sensitive to the unique characteristics of indigenous knowledge and the needs of indigenous communities. Bio-prospecting by pharmaceutical companies, for instance, has prompted questions about who owns indigenous knowledge and how ownership can be asserted and knowledge protected. Repatriation of objects from cultural institutions to indigenous communities has also led to an interrogation and development of best practices for

managing this process. A widespread recognition by governments and non-governmental organizations of the importance of indigenous knowledge for development and planning has increased the need to make this knowledge available in a usable format. And concern in some indigenous communities over the loss of their knowledge due to colonization and globalization has raised interest in recording and preserving the knowledge in non-traditional formats.

Despite the benefits of recording and preserving indigenous knowledge as outlined above, some individuals question whether traditional knowledge management techniques can be used effectively because indigenous knowledge is oral and passed on through storytelling and experience. Indeed, because indigenous knowledge is different from western knowledge in many ways, it must be managed differently. As well, every indigenous community has different needs and these must be

accommodated in order to ensure that collections can be used and accessed by the communities. Libraries and information professionals can play an important role in providing resources and expertise in collection, organization, storage and retrieval of indigenous information if they are willing to challenge prevalent assumptions about knowledge.

This article explores in more detail some of the reasons for preserving indigenous knowledge, important issues to consider in managing indigenous knowledge and potential tools and solutions that can be used to address these challenges. At the end, the article looks at three projects which attempt to manage indigenous knowledge in ways that are sensitive to local needs.

### *Should indigenous knowledge be recorded and preserved?*

It is difficult to define indigenous knowledge because it is as varied as the many groups of indigenous peoples around the world. However, researchers have identified common features of indigenous knowledge across cultures and created working definitions such as this one provided by UNESCO:

> Indigenous or local knowledge refers to a complete body of knowledge, know-how and practices maintained and developed by peoples, generally in rural areas, who have extended histories of interaction with the natural environment. These sets of understandings, interpretations and meanings are part of a cultural complex that encompasses language, naming and classification systems, practices for using resources, ritual, spirituality and worldview. It provides the basis for local-level decision-making about many fundamental aspects of day-to-day life: for example hunting, fishing, gathering, agriculture and husbandry; food production; water; health; and adaptation to environmental or social change. Non-formal knowledge – in contrast to formal knowledge – is handed over orally, from generation to generation, and is therefore seldom documented. (Boven and Morohashi 2002, 6)

Indigenous communities have their own tools for preserving and transmitting their traditional knowledge: oral storytelling and experiential instruction. Indigenous knowledge systems can only be understood through the traditional teaching methods of the particular community, such as apprenticeships, ceremonies and practice, and in

the ecosystem in which the knowledge system originates (Battiste & Henderson 2000). However, in many communities, "the traditional media for transmitting aboriginal knowledge have become largely unavailable to many aboriginal people, especially the young. The young people no longer have daily access to experiential learning on the land; they have decreased levels of fluency in aboriginal languages that would keep them in communication with elders; and they spend much of their time in educational institutions that socialize them into dependence on the written word. There is a real danger that the elders who still retain traditional and spiritual knowledge, and who know the context in which empirical observations must be evaluated, will join their ancestors without passing on what they know." (Castellano 2000, 32)

Other threats to indigenous knowledge include education programs that promote foreign values, science, language and history; health programs that downplay the importance and effectiveness of traditional medicine; and, most significantly, the loss of land, "which displaces communities and separates them from the environment associated with their knowledge" and displaces traditional food-gathering practices (Tobin 2004, 25). Recognizing the land rights of indigenous communities is paramount to protecting and preserving their knowledge (Twarog & Kapoor 2004). It is important to understand and tackle the root causes of the loss of indigenous knowledge through advocating for recognition of land rights and the development of laws, policies and programs to protect, promote and strengthen indigenous knowledge and traditional practices (Tobin 2004). However, these solutions take time to implement, and some indigenous communities may also see a benefit in recording, preserving and transmitting their knowledge in non-traditional ways to ensure that it is not lost.

There is considerable skepticism over whether indigenous knowledge that is recorded and removed from its original context can still have value. Michael Christie, an Associate Professor involved with the research project Indigenous Knowledge and Resource Management in Northern Australia, points out in his essay "Computer Databases and Aboriginal Knowledge" (2004) that digital objects do not contain knowledge itself, but rather information. "The digital object is a repre-

sentation or an artefact of an earlier act of knowledge performance/production" (Christie 2004, 1). He compares a database with a Garma, or ceremonial ground, which is an important cultural site for the Yolngu people of Australia. Neither the database nor the ceremonial ground contains knowledge, but they are both sites where knowledge is produced. Thus, digital objects in a database can be used as tools and incorporated into future productions of knowledge, or education, the same way that other tools, such as books, photographs or maps, would be used. This demonstrates that the preservation of indigenous knowledge should not be seen as a means of replacing traditional forms of education in indigenous communities, but rather as something that will enhance or be used as an additional tool in this process.

There can be other benefits in recording indigenous knowledge beyond preserving it for future generations. One potential benefit to making traditional knowledge accessible in a digital format is that this may make it more appealing to youth or others who may see traditional knowledge as 'old-fashioned' (Twarog & Kapoor 2004). Another benefit is that putting traditional knowledge in an accessible format for restricted use by governments, non-governmental organizations and other organizations increases the likelihood that indigenous needs, rights and perspectives will be considered in policy development and resource management, and that indigenous knowledge will be integrated into development projects. Some indigenous communities have also used GIS technologies to map their traditional land use and land boundaries, which can then be of assistance in asserting land claims (Hunter 2005). In addition, there can be economic benefits for indigenous communities who build digital libraries through the creation of training and employment opportunities and possibly sharing knowledge for commercial use (Sullivan 2002).

Some communities have perceived the need to document their knowledge as a means to assert ownership over it and protect it from improper commercial use. Pharmaceutical companies have presented the biggest threat in this area, as some have attempted to patent plants that have been used by indigenous people for thousands of years. Concerned that they will lose control and rights over their own knowledge, some communities have created registers documenting prior use.

However, Tobin identifies that there is a misperception in some indigenous communities that recording knowledge in registers and databases is a means of asserting rights of ownership over the knowledge: "These registers have little, if any, force in law to protect right over the information they hold and registration may result in placing the information in the public domain, and deemed to amount to a renunciation of rights over the relevant knowledge" (2004, 14). Placing the knowledge in a publicly accessible database can enhance its accessibility for bio-prospectors while giving little benefit to the holders of the knowledge. In order to have a protective function, databases and registers must be part of a wider legislative system that recognizes rights over knowledge recorded in databases or registers. There has been a great deal of research published on the topic of legislative protection of indigenous knowledge and the inadequacy of intellectual property rights in this regard, but a deeper examination of this topic is beyond the scope of this essay.

### The role of libraries in indigenous knowledge management

When determining whether or not to digitize the culture or history of a community, one should ask whether the creation of these collections will assist in the process of strengthening the identities of the communities or whether it will "simply reproduce the western conception of storing in 'museums and libraries' what those in the west deem to have cultural value" (Worcman 2002, par. 11). One needs to ensure that knowledge is being preserved for the use of the community itself and the community is being included in "the process of formation and diffusion of their knowledge" (Worcman 2002, par. 11). Otherwise the process of preservation may be a continuation of the long history of colonization and appropriation of indigenous culture by Western culture.

Although projects to preserve indigenous knowledge must be driven by indigenous communities and serve an immediate benefit to the communities, libraries and information professionals can play an important role in assisting with the management of indigenous knowledge. In partnership with these communities, institutions such as libraries, museums and universities,

can provide valuable resources and expertise for collection, organization, storage and retrieval of information. In fact, some institutions are already in possession of indigenous materials that they are repatriating or trying to make accessible to indigenous communities and others are working in cooperation with indigenous communities to establish collections.

Ngulube points out in his essay "Managing and Preserving Indigenous Knowledge in the Knowledge Management Era: Challenges and Opportunities for Information Professionals" (2002), that libraries have not been particularly active in managing indigenous knowledge because they have traditionally focused on managing recorded and codified knowledge. Indeed, indigenous knowledge has fundamental differences from Western knowledge and so management of indigenous knowledge requires the non-indigenous information professional to reconsider not only his/her tools and processes, but also his/her entire way of thinking about knowledge and information. Christie expands on this view in stating that technologies carry "particular culturally and historically contingent assumptions about the nature of the world, and the nature of knowledge; what it is, and how it can be preserved and renewed" (2004, 1). Through the organization of data, we apply structure to knowledge that reflects certain philosophies. Christie argues, "for it to be an indigenous database, its architecture and structure, its search processes and interfaces, its ownership and uses must also reflect and support context specific indigenous ways of being and knowing, and people's control over their own knowledge" (2004, 5).

## Finding tools and strategies to accommodate unique characteristics of indigenous knowledge

There is no single solution to indigenous knowledge management because the specific knowledge and needs will vary among different communities. For each situation, the information professional should work with the community to analyze the project and determine specific needs before making decisions about collection, organization, storage, and access. Christie states that making decisions that work well for the owners of the knowledge "requires long term, deeply negotiated and

collaborative processes where questions of the nature, politics, and creation of knowledge remain central" (2004, 8). However, there are common concerns or challenges to managing indigenous knowledge and potentially useful tools or solutions that I would like to explore.

One major difference between indigenous knowledge and western knowledge is that indigenous knowledge systems usually do not have separate categories for science, art, religion, philosophy, nature, and culture (Battiste & Henderson 2000). Instead, indigenous knowledge systems are holistic, with all elements of matter viewed as interconnected and not able to be understood in isolation (Kargbo 2006). Indigenous knowledge is also inextricably bound to the land or ecosystem in which the people live. In *Protecting Indigenous Knowledge and Heritage*, Battiste and Henderson describe this relationship as follows:

> Knowledge is the expression of the vibrant relationships between the people, their ecosystems, and the other living beings and spirits that share their lands. These multilayered relationships are the basis for maintaining social, economic, and diplomatic relationships – through sharing – with other peoples. All aspects of this knowledge are interrelated and cannot be separated from the traditional territories of the people concerned (2000, 42).

In his essay, "Computer Databases and Aboriginal Knowledge" (2004), Christie looks at how the interconnectedness of the language and culture of the Yolngu people of Australia can be incorporated into database design. In Yolngu, a person's name is also often a place, a ceremonial object, or a state or process in which they are invested, and so the Yolngu people may be frustrated by the separation of metadata into particular fields in a database. Christie believes that in order for a database to be useful, all metadata and all of the text in each object should be equally available to search, and only a single field should be used for each metadata object. He recommends focusing not on describing the content of the objects but on ensuring their retrievability by working with the indigenous community to determine how they would search for particular objects and then incorporating these search options into the database. Christie also suggests that databases incorporate options to search for objects in multiple formats other than simply text, such as map-based and graphic interfaces, photographs, and 3D representations of objects.

In his discussion of his experience collecting oral histories of indigenous communities in Argentina, Civallero (2005) mentions that the indigenous communities who used the collections often did not understand broad subject classifications assigned to objects such as "religion" or "philosophy" because they do not distinguish between these areas in their own culture. They do, however, have a vast number of categories of natural sciences. In response, Civallero needed to invent new categories which reflected terms that would be meaningful to people in the community.

Another unique characteristic of indigenous knowledge is that it is communicated orally through stories or through observation and hands-on experience in the ecosystem from which the knowledge originates. Methods of preservation should be adapted to this process as much as possible. Fortunately, digital technologies facilitate this in ways that were not previously possible. Audiovisual digital recording devices can be used to capture oral stories in original indigenous languages, as well as techniques, practices, songs, and dances, often performed in context. Photographs, manuscripts, and physical artifacts can be closely represented using scanners and 3D scanners. Connections between knowledge and the ecosystem can be enhanced through the use of maps and GIS technology (Hunter 2005).

Indigenous communities often have complex laws regulating which particular individuals or groups can access certain types of knowledge. Jane Hunter's (2005) analysis of tribal laws in indigenous communities found that there are common restrictions across communities that include membership of a particular clan or tribe; status within the tribe; role within the tribe; gender; relationship of a person to people, animals, or objects depicted in a representation; death of people recorded in a representation; and context in which a resource will be reused or reproduced. Therefore, when determining how knowledge should be stored and accessed, tools should be chosen that allow communities to control and establish different levels of access for different people (Hunter 2005).

The community must also be able to control access by people outside of the community. Each community and project will have different needs around security depending on the knowledge itself and how it is meant to be used. In some cases,

communities may be storing the knowledge so that it can be accessed by outsiders – for example, knowledge that will be used by government departments for natural resource management. Or some communities may wish to record indigenous knowledge related to plants so that pharmaceutical companies that use these plants for product development will recognize prior use by indigenous communities and benefit them accordingly. These things need to be determined prior to choosing tools or developing systems, and appropriate security measures need to be incorporated into the systems.

There are other concerns related to technology. Indigenous communities are often remote and therefore may have limited Internet connectivity or technical support. This is another area where libraries and other institutions can provide needed resources. Systems can also be designed or chosen that function independently of Internet connections. Indigenous communities often have limited funding to undertake knowledge management projects. Therefore, communities must be able to access technologies at a low cost or for free (Hunter 2005). Open source software programs, which can be downloaded and used for free, should always be considered as an alternative to proprietary software. Also, programs should be able to be used on different operating systems so that they can be run on any available technology, and they should be able to incorporate future technologies that may be developed. Systems should also be built to handle a great deal of information to allow for unlimited growth and use (Hunter 2005).

Another thing to consider when making decisions about tools that will be used to store and access knowledge is that users in indigenous communities may have limited computer literacy and keyboarding skills. This means that search interfaces should be simple and should allow users to search and browse using graphics and other non-text-based features. The system should also be able to cope with unexpected input by inexperienced users (Hunter 2005).

The final consideration in the organization and retrieval of indigenous knowledge is that standard thesauri and classification systems have been developed with a Western bias and lack the complexity of words and concepts of particular indigenous languages and cultures. Thus, when managing indigenous knowledge, one may need to seek

out alternative thesauri and classification systems or develop new ones to suit the local knowledge system one is managing (Civallero 2005).

## Indigenous knowledge management projects

There have been many projects undertaken around the world to preserve indigenous knowledge for a myriad of reasons and using various tools. A look at the three following projects illustrates how each has dealt with the considerations discussed above. One is a partnership between the University of Queensland in Australia and the Smithsonian National Museum of the American Indian in the United States, in which the Smithsonian designed an open source system for managing virtual repatriation of cultural objects to Native American communities. The second is a GIS database developed to map knowledge of the Inuit people of Nunavut on the migratory patterns of caribou. The final program is delivered by the libraries of the Northern Territory in Australia to engage aboriginal peoples in digitizing their traditional knowledge.

### Smithsonian National Museum of the American Indian

Distributed Systems Technology CRC (DSTC) at the University of Queensland in Australia has designed an open-source software system for indigenous knowledge management (IKM) to manage the process of virtual repatriation of objects by the Smithsonian National Museum of the American Indian to their original owners. [1] The system was designed to be flexible and able to be used for other indigenous knowledge management projects as well. In 1989, the U.S. Congress passed an act that established the National Museum of the American Indian (NMAI) as part of the Smithsonian Institution, transferred ownership of more than 800,000 indigenous cultural objects to the museum and required the Smithsonian to repatriate these objects to their indigenous communities of origin. The repatriation process includes identifying the original owners of the objects and in some cases returning the physical objects to the community, while, in other cases, communities are content to have access to virtual representations of the objects and

the physical objects themselves only when requested (Hunter 2005).

Jane Hunter, a Research Fellow at the DSTC, describes the IKM system in her article, "The Role of Information Technologies in Indigenous Knowledge Management" (2005). The system "was designed to enable Indigenous communities to develop, support, and maintain their local knowledge bases and to define access constraints and rights management in compliance with traditional laws" (Hunter 2005, 116). Thus, it incorporates many of the considerations discussed above in relation to the unique nature of indigenous knowledge.

The IKM system has been designed to allow communities to control security and access. To use the system, each user must set up a login ID, password, and user profile, which can include tribal names, native/non-native heritage, tribal/clan membership, gender, status, role and other characteristics that often determine access to knowledge across communities. Limitations on who can access particular objects according to customary laws can be set by the community, and so certain users can be restricted from viewing certain objects (Hunter 2005).

The IKM system also supports oral tradition by allowing authorized users to describe, contextualize, and annotate objects in their own words by attaching text, spoken annotations or hyperlinks to objects that can then be heard or seen by other users (Hunter 2005). This feature also accommodates users with low computer literacy, as does the ability to search using Web browser technologies that would be familiar to many users.

The system was designed to be adapted by different communities to suit their needs. Users can edit the metadata scheme used to describe objects. The system was built using international standards such as Dublin Core and XML so that it can be used by indigenous communities around the world. It also provides Schema editing tools to allow for customization of the software to suit the highly varied customary laws and intellectual property needs of indigenous communities worldwide (Hunter 2005).

### The Tuktu and Nogak Project

The Tuktu and Nogak Project is a community-driven project to share Inuit Quajimajatuqangit (IQ), or traditional ecological knowledge of the

Inuit people of Nunavut, of caribou migration and calving areas of the Kitikmeot region. The purpose of the project was to improve caribou management in the region for present and future generations (Eyegetok *et al.* 2001). Support for the project was derived from a number of sponsors, made up of educational institutions, private companies, government organizations and societies.

An advisory board made up of indigenous people from a group of communities was established to oversee the project and decide how IQ would be collected, stored, and used in the future. Elders and hunters were interviewed and their stories were recorded and then transcribed. The stories were also recorded by video and photography so that they could be accessed by community members in non-textual form. In addition, maps, mylar overlays and felt pens were used to mark out caribou migrations, hunting areas, calving grounds and other important land features. All of this information was digitized and entered into a database using GIS technology that allows one to search by keywords through interview transcripts and connect to related maps, or vice versa (Eyegetok *et al.* 2001). The results of the study were also compiled and published in a book titled *Thunder on the Tundra: Inuit Quajimajatuqangit of the Bathurst Caribou* and *The Tuktu and Nogak Project Final Report: a Caribou Chronicle*, which is available online.

The database has only been made available to the indigenous communities who own the knowledge and selected government departments for specific purposes. This is partly because information in the database would not be protected under Canada's intellectual property rights laws. Thus, the main purposes of the database have been the promotion and preservation of IQ for the Inuit people themselves and the incorporation of this information into government planning and policy (Alexander *et al.* 2004).

*Northern Territory Library*

Indigenous peoples make up twenty-five percent of the population of the Northern Territory of Australia and most live in remote areas (Beale 2003). In 1979, the Northern Territory Government began establishing community libraries in remote areas to serve these populations. However, it was recently acknowledged that traditional libraries were not serving all of the needs of the people and in 2002 the Government implemented a Libraries and Knowledge Centres program (LKC) to be delivered through the Northern Territory Library. One initiative of LKC was to develop Indigenous Knowledge Centres in three communities to provide access to information, similar to traditional libraries, except with a stronger emphasis on the use of multimedia technologies to create information that is culturally valid and independent of the western print media tradition (Beale 2003; Richmond n.d.).

The Galiwin'ku Indigenous Knowledge Centre was established under LKC in 2003 for the Yolngu people of Elcho Island. The Centre includes a database that was developed specifically for the management of Yolngu knowledge and is structured to reflect the Yolngu knowledge system (Beale 2003). The database allows the community to digitize objects that have been repatriated by museums and other institutions and record other cultural knowledge in audio, text, video, and photograph media to be accessed by the community or sold to universities and other researchers. Rights and responsibilities for Yolngu knowledge are divided between two different clans, and so the database was designed to reflect this. Knowledge is also separated into public, restricted, and highly restricted knowledge, and it is separated by gender. Access to restricted and highly-restricted knowledge is controlled by assigning people in the community user ID's with specific levels of access designated to certain groups, while public knowledge can be accessed by anyone (Scott 2004).

In 2004, the Northern Territory Library implemented a new component of the Libraries and Knowledge Centres Programme called the Our Story database in eight communities. With the Our Story database, communities can "digitally record, store, and access their historical and contemporary culture" through their local libraries (Richmond n.d., 14). The database uses Ara Iritigja software, which was developed for the Pitjantjara communities in Central Australia (Richmond). It has a simple, user-friendly interface through which all types of media can be accessed and the ability to control access to certain items by different groups in the community. The software is proprietary but the NTL was able to acquire a Territory-wide license that allows them to use the software at all libraries at no cost to individual communities. Although the NTL owns the soft-

ware, the communities own all of the content in the databases and communities decide how the data is stored (Richmond n.d.).

Each of these projects illustrates how knowledge management tools can be implemented and adapted to accommodate indigenous knowledge systems and community needs. They also demonstrate how partnerships between communities, institutions, governments and other organizations can lead to creative solutions, sharing of resources, and projects that benefit multiple stakeholders.

## *Conclusion*

As demonstrated in this article, indigenous knowledge can be managed in ways that are respectful and useful to indigenous communities when the particular characteristics of indigenous knowledge and particular needs of communities are considered when making decisions about the collection, storage, organization and retrieval of the information. Thus, the non-indigenous information professional who participates in this process must be willing to constantly adapt, negotiate and question not only his/her knowledge management tools and strategies, but also his/her entire understanding of knowledge. The long term effects of this could be changes in library collections, services and methods of preserving and conveying knowledge that are more sensitive to and inclusive of all marginalized groups.

## *Note*

1. The software is available for free download and use on the DSTC website: <http://www.itee.uq.edu.au/~eresearch/projects/ikm/index.html>

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