



# DIGITAL TECHNOLOGY AND INDIGENOUS KNOWLEDGE

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# INTRODUCTION

Although the term is disputed, many people consider us to be living in the Digital Age (Ginsburg, 2008). The influx of new technology and methods of communicating are changing how we access knowledge. These digital technology changes are having an effect on cultural knowledge and communication and create new challenges for Indigenous communities. Consideration should be given to how these technologies are used to maximise the benefits and lessen the negative side effects. Some digital technologies are helping Aboriginal groups record and share their traditional knowledge with other Aboriginal groups, the wider world, and future generations. While new challenges are presented to Aboriginal cultural identity, these emerging technologies also provide new ways to protect traditional Aboriginal knowledge and heritage.

Each individual Aboriginal community can be expected to have differing experiences and attitudes toward using digital tools and online social interactions. This paper explores Indigenous traditional knowledge as a concept, and then looks at the issues surrounding traditional knowledge preservation as a whole.



*Ribes aureum. Golden current.*

Makes excellent jam/jelly and wine.

(Dodd & Jankunis, n.d.)



*Aremisia cana. Sagebrush.*

Leaves were chewed to relieve thirst and a tonic of leaves was said to be a hair restorer.

(Dodd & Jankunis, n.d.)



*Phlox hoodia. Moss phlox.*

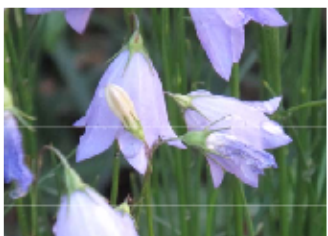
Use to make a yellow dye.

(Dodd & Jankunis, n.d.)

# PRESERVING TRADITIONAL KNOWLEDGE

## WHAT IS TRADITIONAL KNOWLEDGE?

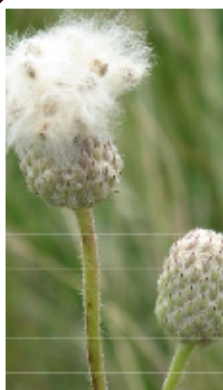
Traditional knowledge, also called Indigenous knowledge or 'native ways of knowing', is a term used to describe the world view of indigenous groups. It is highly linked to location and reflects the way the people see themselves in relation to their environment (Semali, & Kincheloe, 1999). The land is the base to which knowledge and traditions are tied and it also impacts their social interactions. Traditional knowledge is the result of the interactions of the social and physical environment as created by a specific geographic area (Viergever, 1999). It is a topic which is surrounded in conflict and confusion as it can be unclear what the parameters of the topic are and who should be discussing it (Semali, & Kincheloe, 1999).



*Campanula rotundifolia*. Harebell.

Dried roots can be used as a compress to stop bleeding and reduce swelling. Roots can also be chewed to prevent heart ailments.

(Dodd & Jankunis, n.d.)



*Anemone multifida*.  
Cut-leaved  
anemone  
windflower.

Smoke from burnt ripe seed heads was inhaled for headaches.

(Dodd & Jankunis, n.d.)

## WHY IS TRADITIONAL KNOWLEDGE IMPORTANT?

Traditional knowledge provides a different viewpoint of the world and a different method of interacting with it (Semali, & Kincheloe, 1999). It is connected to the cultural heritage of an Indigenous group, and is often integrated into cultural practices (Simeone, 2004). Traditional knowledge is important to the communities from which such knowledge originated as it is the basis for everyday living and the health and welfare of the community. It is becoming more prominent in western interests because of the emphasis on sustainability, especially in the fields of medicine, commercially valuable biodiversity, or conservation of biodiversity (Viergever, 1999). Policy makers are now using traditional knowledge to help inform them in a variety of areas, and efforts are being made to not only promote but also protect indigenous knowledge from appropriation (Simeone, 2004).

## HOW IS TRADITIONAL KNOWLEDGE BEING PRESERVED?

One method which has been gaining interest in recent years is the creation of databases for traditional knowledge, which hopefully will be useful in potential legal battles for intellectual property. However, it is difficult to reconcile traditional knowledge with western patent law because the creation process is quite different. Also the cost of registering intellectual is prohibitive and it is impractical to register all the knowledge of an entire culture. There is increasing pressure from international organizations on countries to make more efforts in preserving traditional knowledge (Simeone, 2004).

As community members gravitate to urban centres it becomes increasingly difficult to retain and build upon the traditional knowledge held by those people. As traditional knowledge is so closely tied to geography and place, it is also important to

protect Indigenous land as well as the cultures that produced the knowledge. This means protecting ancestral land and allowing Indigenous groups to be self-determining, as well as supporting educational initiatives and supporting research completed by indigenous groups (Viergever, 1999).

There are efforts being taken to protect indigenous knowledge and practices from appropriation. Not only must the knowledge and practices be accepted and passed on, but the culture, people, and land must also be protected (Viergever, 1999). Efforts must be made to prevent unauthorized use of indigenous knowledge and practices, as well as ensuring that images and portrayals of Aboriginal peoples and culture are correct. In some areas, specific legislation has been put into place for these issues, while in others existing legal tools are being used (Simeone, 2004).

A variety of digital technologies are also being explored as a method of preserving indigenous knowledge and heritage. For example, audio and video recordings are being made to capture stories, songs, dances, and other aspects of oral-visual culture (Hunter, 2006). 3D printers are being used to replicate artifacts for museums allowing the originals to remain with or be returned to their indigenous owners. These knowledge items can be collected into a compilation and accessed through a digital library interface (Hunter, 2006).



*Linum lewisii*. Blue flax.

Crushed leaves were used as an eye poultice and to treat boils.

(Dodd & Jankunis, n.d.)

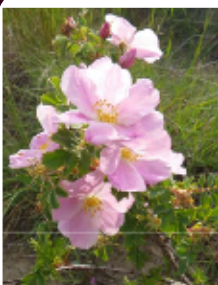


# USING DIGITAL RESOURCES TO PRESERVE TRADITIONAL KNOWLEDGE

## WHAT ARE THE CHALLENGES TO USING DIGITAL RESOURCES?

One challenge in using digital resources to preserve knowledge is digital technology itself. The choice of technology is very important and must fulfill many criteria. It should be easily affordable and simple to use; but, more importantly, it should be secure and private in order to protect the knowledge and the rights of the indigenous group (Hunter, 2006). Many rural communities also have unreliable access to electricity which can be more problematic for some technologies than others (Ginsburg, 2008). In some cases the technology is used to preserve knowledge within the community and is not intended for a wider distribution (Hunter, 2006). Additionally, consideration should also be given to the type of technology used and its longevity (Ngulube, 2002).

There are also important cultural challenges presented by digital technologies. The use of digital technologies may also challenge traditional thoughts on ownership of knowledge, and this can result in a loss of stewardship by indigenous communities who are publishing content on the Internet (Ginsburg, 2008). While the Internet is also culturally biased in favour of western culture, this should not prevent people of First Nations heritage from accessing and producing internet media. Instead it should help them make informed decisions about how to use digital technologies in their best interests (Howe, 1998).



*Rosa arkansana.*  
*Prairie rose.*

Hips mixed with fat were used as a first food for babies.

(Dodd & Jankunis, n.d.)



*Sphaeralcea coccinea.* *Scarlet mallow.*

Crushed leaves were used as a dressing on sores and wounds. Chewed roots could be placed on wounds to stop bleeding and promote healing, and a paste rubbed on skin prevents scalding.

(Dodd & Jankunis, n.d.)

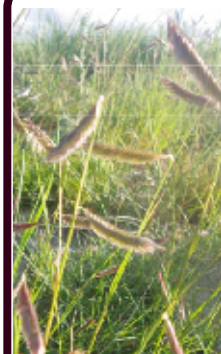
## WHAT ARE THE BENEFITS OF USING DIGITAL RESOURCES?

Technologies that enhance communications can be very helpful, allowing people that are widely distributed to communicate with each other easily and efficiently. Many Indigenous groups have also been successful in using digital technology to bring a wider awareness of their culture to the world (Ginsburg, 2008). By using mainstream communication methods they can bring awareness of their issues to a wider audience, as well as connecting with other indigenous groups around the world (Coombe, 2000).

When used correctly, with Indigenous groups in control of the production, technology can help to increase cultural activism by enabling indigenous groups to take control of how their culture is portrayed and how their message is spread to national and international forums (Ginsburg, 2008). Digital technologies can be a cost efficient way to create and publish information and allowing individual and community ownership over digital productions. Additionally, if desired, certain aspects of a website can be made private to

community members only, while allowing public access to selected sections (Coombe, 2000).

For knowledge that we could consider to be part of the physical sciences, digital data bases are being compiled to keep a record of information such as the biodiversity in a particular area (Coombe, 2000). Exciting advancements are being made with digital cartography, which can provide multisensory, interactive maps of various types of knowledge, including subjects previously unable to be mapped (Engler, Scassa, & Taylor, 2013). More importantly, digital cartography is able to link multiple “subjects” using location as the main organizational thread. As much of Indigenous knowledge is based on location, this is an innovative way to combine the two world views (Engler et al., 2013).



*Bouteloua gracillis.*  
*Blue grama grass.*

Used to forecast the severity of the coming winter.

(Dodd & Jankunis, n.d.)



*Symphoricarpos albus.* *Snowberry.*

Twigs could be made into arrow shafts and shrubs were used as brooms.

(Dodd & Jankunis, n.d.)

# TRADITIONAL KNOWLEDGE OF ETHNOBIOLOGY



*Clematis ligusticifolia*. Western clematis.

Bark can be made into tea to treat fever and chewed leaves help heal colds and sore throats.

(Dodd & Jankunis, n.d.)

## WHAT IS ETHNOBIOLOGY?

Ethnobiology is the study of the biological knowledge of a particular group of people, but more importantly, it deals with the relationship between people and their surroundings (Anderson, 2011). Although once comprising of list making, ethnobiology is now an interdisciplinary field, as the western worldview classifies knowledge streams, blending together the social sciences and the hard sciences, in hopes of learning more about culture, land, and the state of our environment (Nolan & Turner, 2011).



*Sisyrrinchium montanum*. Blue eyed grass.

Used for digestive disorders.

(Dodd & Jankunis, n.d.)

## TRADITIONAL ETHNOBIOLOGY

Indigenous groups have a very specific, localised, and highly accurate understanding of their natural surroundings, and, more importantly, traditional knowledge examines the whole issue instead of compartmentalizing it to specific subject parts. There are no divisions between knowing about flora or fauna, or even about human nature or society, it is all interconnected and shared through stories and experience (Pierotti, 2011). Specific to biology, traditional knowledge can include topics such as: habitat management, soil fertilization, and plant propagation, as well as information on nutrition, medicine, and production of goods. Finally, there is information about respecting and maintaining the environment (Turner, Ignace, & Ignace, 2000).

Historically, ethno-biologic knowledge was appropriated from Indigenous groups and subsumed into western practices or dismissed as superstition. These practices have been slow to change, but some people are optimistic that digital tools will give Indigenous people the tools they need to protect this information (Ford, 2011).

## WHY IS ETHNOBIOLOGY IMPORTANT?

Ethnobiology is an important part of the Indigenous culture. It is both practical and spiritual, not taught as a separate science but in combination with cultural engagement in the environment. As such, the conservation of ethno-biologic knowledge is important for the knowledge itself and its connection to culture (Anderson, 2011). Ethnobiology

is also helping Indigenous people make land claims and assertions about environmental issues (Ford, 2011).

Ethnobiology is also important for ecological conservation and environmental resources (Anderson, 2011). Indigenous ethnobiology has helped to create the field of ecology, and introduced important information about ecosystems and conservation (Ford, 2011). Now that the world is becoming cognisant of environmental issues, ethnobiologists, both Aboriginal and white, are working to present traditional knowledge as an important source of ecological information. Ethnobiologists play an important role in understanding the human relationship to nature and can have an important influence on educating community members and students beyond the field of environmental research, thus potentially affecting policy decisions (Nolan & Turner, 2011).

Preserving traditional knowledge of plants and ecosystems helps to create better environmental management systems. Additionally, as the cultural identity of Indigenous people is tied to a specific geographic location, preserving the natural environment and knowledge about it also protects the cultures that live there (Coombe, 2000).



*Hierochloa odorata*. Sweetgrass.

Used dry to scent a variety of items. Also mixed with tobacco for ceremonial smoking, and smoke from burning leaves was inhaled to treat colds.

(Dodd & Jankunis, n.d.)





### WHAT TYPES OF DIGITAL RESOURCES ARE AVAILABLE TO PRESERVE TRADITIONAL ETHNOBIOLOGY?

Ethnobotany is making effective use of digital databases. As the field, in western science, started out with categorization and list making (Ford, 2011) it seems natural that it should take advantage of this form of digital technology. These technologies are helping to bring traditional ethnobotanical knowledge to a wider audience. For example, the University of Michigan – Dearborn, has created an easily searchable database of Native American Ethnobotany and made it available on the internet for searching by anyone who is interested. Search for a plant name provides the common and scientific names of the plant and a brief description of what it was used for. This database also uses hyperlinking technology and provides a direct link to the USDA database where more information can be found (University of Michigan - Dearborn, 2003). These types of databases are becoming increasingly common.

Geographic Information Systems (GIS) is becoming more common as a tool to collect and preserve indigenous knowledge. The advantage of using GIS technology over conventional mapping techniques arises from

the digital nature of the technology. It allows a variety of topics and formats, including audio-visual, to be presented in relation to a specific location (Chambers, Corbett, Keller & Wood, 2004). There are a number of these maps available for public use on the Internet, including several brought together by the Aboriginal Mapping Network (Aboriginal Mapping Network & Ecotrust Canada, 2013). These living atlases show many different pieces of information, including changes over time. For example, the living atlas of the Nuu-chah-nulth First Nations in British Columbia presents information on culture, climate, economics, health, and several other categories in a variety of interactive searches (Nuu-chah-nulth First Nations, 2015). Although, this technology is relatively new and there is much debate surrounding its use, it could be used as a collaborative tool to both learn and record information, as well as illustrate the interconnectedness of this knowledge (Chambers et al., 2004).

***Pedimelum esculentum.***  
**Indian breadroot.**

Roasted and ground into a meal to mix with other foods. Chewing on roots can help with teething.

(Dodd & Jankunis, n.d.)



***Erigeron caespitosus.*** Tufted fleabane.

Smoke from burning plants repels gnats and fleas. Boiled roots and leaves make tea to treat rheumatism, haemorrhoids, and diarrhea.

(Dodd & Jankunis, n.d.)

## CONCLUSION

Indigenous traditional knowledge is becoming more interesting and more important to western understanding due to the increased focus on environmental issues. Additionally, Indigenous groups are looking to recapture their heritage after all of the social and cultural upheavals they have been subjected to and preserve their cultural knowledge for future generations. Digital technology is providing new tools to help with this mission; however, as there is limited understanding of long term cultural effects of these technologies they should be used with care. When used correctly, and under Aboriginal control, digital technologies can be useful in sharing their cultural heritage with the world.

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