# The Role of Information and Communication Technologies in Indigenous Knowledge Preservation

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## 1.    Introduction

Information and Communication Technologies (ICT's) and digital technologies are omnipresent in the global information society. With the digitalisation of knowledge, including indigenous knowledge (IK), ICT's are offering alternative perspectives of knowledge. IK is intricate knowledge acquired over generations by communities as they interact with the environment (Seepe, 2001). IK, like any other knowledge, needs to be constantly used, challenged and further adapted to the evolving local contexts in the global information society. However, sometimes "ICT's are ill-equipped to handle … context-dependent cultural knowledge since there is a difference between how Westernised cultures and Indigenous cultures view "fact and knowledge … and information and understanding" (Oppenneer, 2010). In this article, the role of ICT's for IK preservation is discussed.

The article is organised as follows: The concept of knowledge is introduced. ICT's and IK are then explored. ICT's and IK are then synthesised and discussed. Thereafter some concluding remarks are made.

## 2.    Knowledge

The question of defining knowledge has occupied the minds of philosophers since the classical Greek era and has led to many epistemological debates (Alavi and Leidner, 2001: 109). Knowledge is processed in the mind of an individual – it is internalised information related to facts, concepts, ideas and observations. Nonaka (1994) explicated two dimensions of knowledge:

- Explicit knowledge which is articulated, codified and communicated in symbolic form and/or natural language; and
- Tacit knowledge which comprises both cognitive (an individual's mental modes) and technical (concrete know-how, crafts, skills) elements.

Explicit knowledge can easily be encoded, explained and understood. Tacit knowledge is highly subjective and personal, making it difficult to formalise and encode and susceptible to change. IK, as an example of tacit knowledge, is generally stored in people's minds and passed on through generations by word-of-mouth rather than in written form; it is vulnerable to rapid change (Sithole, 2006). While knowledge has two dimensions, a discussion on the different perspectives of knowledge *per se* will be given later in this section. Let us first examine IK as a category of knowledge.

The term 'indigenous knowledge' refers to knowledge that an indigenous (local) community accumulates over time. This description of IK encompasses all forms of local knowledge acquired experientially – arts, languages, understanding, practices, technologies and beliefs – that enables a community to achieve stable livelihoods in its geographical residence. Some terms are used interchangeably to refer to the concept of IK, including traditional knowledge and Indigenous Knowledge Systems (IKS). Building on IKS empowers local communities. However, innovative ICT approaches are required since existing arrangements may not be applicable to the specifics of IK. For example, traditional IK is usually preserved through oral tradition rather than documentation. Semali and Kincheloe  (1999) suggest that the design of ICT's does not accommodate IK since the nature of which is cast in terms not typically set with Western knowledge (such as local, holistic and agrapha).

While it is not necessary in this article to engage in debates to probe, question or redefine the root-term *knowledge*, it can be viewed from many different perspectives *e.g.* Knowledge vis-à-vis data and

information, State of mind, Object and Process. The implication of these differing perspectives of knowledge is that each perspective suggests a different strategy for managing knowledge (including IK). This implies that from each knowledge perspective, there is a different implication for IKS – see Table 1.

**Table 1. Knowledge perspectives and their implications for indigenous knowledge systems (IKS)**
(Adapted from Alavi and Leidner, 2001: 111)

| Perspectives | | Implications for IKS |
|---|---|---|
| Knowledge vis-à-vis data and information | Data is facts, raw numbers. Information is processed/interpreted data. Knowledge is personalised information | IKS focus on exposing individuals to potentially useful information and facilitating assimilation of information |
| State of mind | Knowledge is the state of knowing and understanding | IKS involve enhancing individual's learning and understanding through provision of information |
| Object | Knowledge is an object to be stored and manipulated | A key IKS issue is building and managing knowledge stocks |
| Process | Knowledge is a process of applying expertise | IKS focuses on knowledge flows and the process of creation, gaining, sharing and distributing knowledge |

### 3. Information and Communication Technologies (ICT's)

ICT's are broadly "defined as computers, software, networks, satellite links and related systems that allow [end-]users to access, analyse, create, exchange and use data, information and knowledge" (Dyson *et al.*, 2007: 319). The multi-media capabilities (*e.g.* digital video and recording devices), storage capacity (*e.g.* online databases) and communication tools (*e.g.* the Internet and digital technologies) offered by ICT's "provide new opportunities to preserve and revitalise indigenous cultures and languages" (Dyson *et al.*, 2007: xvi). Knowledge of ICT applications bears the potential to generate and share indigenous narratives, stories and experiences as a source of meaning that is "lived and made transparent in everyday relations, rituals and activities" (NAHO, 2001: 3). ICT applications can store local content on Internet web pages.

While local content is critical for Africa's full participation in the global knowledge society (Mutula, 2008: 113), the absence of information systems in digital/electronic format for IK perpetuates the paucity of local content found Internet web pages and the misperception of 'information-poor' societies. According to South Africa's Science and Technology Minister Naledi Pandor, there is a strong need to protect IK "in order to drive innovation among local communities" (Kaye, 2009). However, buy-in from local communities for the transfer of IK to digital resources is often unenthusiastic because of the absence of appealing local content, thereby inhibiting digital literacy and local communities becoming 'digital'. It is thus appropriate for information and resources centres (including municipal libraries) to solicit, using ICT's, the indigenous local communities, their cultures and heritage, to become part of the global information society.

In the eThekwini Municipal Libraries' 'Ulwazi Indigenous Knowledge' program, the eThekwini Municipality's existing library ICT infrastructure provides electronic access to local communities. It allows community members to add local knowledge content via the Internet and thereby become 'digital' and information-wise. In this program, ICT's are an enabler to preserve and revitalise IK, indigenous cultures and languages. For a fuller discussion of the eThekwini Municipal Libraries' 'Ulwazi Indigenous Knowledge' program, see Greyling (2007) & Greyling and Zulu (2010). However, for this IK program, two salient questions arise:
- which knowledge perspective was 'adopted'; and
- whether the ICT's used operate in a manner that respond to the nature of IK in the EMA.
The exploration of these questions, may well serve as an area for future research.

While it seems sensible to utilise computers and online databases to store facts and knowledge, "there is a difference between how Westernized cultures and most Indigenous cultures view these concepts" of computers and online databases (Oppenneer, 2010). This may require further exploration to gauge how these ICT's respond to the nature of IK preservation initiatives.

## 4.    Indigenous Knowledge (IK)
IK is an integral part of the culture and history of any local community. IK is defined "as the basis for community-level decision making in areas pertaining to food security, human and animal health, education, natural resource management and other vital economic and social activities" (Gorjestani, nd). However, around the world, indigenous peoples face difficulties in gaining adequate recognition (Kinuthia, 2006: 107). Miller (2003) argues that in Africa the concept of 'indigenous' is inappropriate since the situation on this continent is too complex, there are too many Indigenes and identities are too tangled.

IK has multiple descriptors, many of which refer to the unique, traditional knowledge existing within and developed around the specific conditions of local people resulting from their long-term geographical residence (Kinuthia, 2006: 108). This knowledge should therefore be seen as part of cultural heritage and not as a detached concept. The ability to utilise this knowledge forms part of indigenous peoples' understanding of themselves and their worldviews. This suggests viewing this knowledge from a State of mind perspective. For example, storytelling and oral tradition are not simply about the transfer of knowledge, they involve the negotiation of knowledge (Oppenneer, 2010).

## 5.    Synthesising ICT's and IK
Pacheco and Abbagliati (2006) suggest that digital preservation and the promotion of local knowledge provide a means for isolated communities (*e.g.* in Chile) to become part of the global information society. IK faces possible extinction unless it is properly documented and disseminated (Nyumba, 2006). Depending on the availability and access, some indigenous groups have taken advantage of new technologies, including ICT's; for example, by using digital video and audio recording devices and Internet technologies to capture, store and retrieve aspects of their arts, language and understanding (Oppenneer, 2010). By harnessing ICT's, these indigenous groups and local communities have thereby crossed the digital divide and are becoming part of the global information society. As Pacheco and Abbagliati (2006) indicate, "having access to computers and the Internet is essential in order to be informed and be part of the world today". However, for those groups who have not been able to cross the digital divide, ICT's have marginalised indigenous communities even further.

Kinuthia (2006: 109) suggests that "when misapplied, the consequences of ICT can be repercussive: When it is introduced to indigenous groups it brings along mass media, popular culture and global languages that can potentially conflict with local traditions". Sillitoe (1999) argues that the challenge for ICT's is to make it relevant to the end-user – not to assume that it is in 'great' demand by all peoples – users should be aware of the 'alternatives' available. There is a further concern in that ICT's do not always operate in a manner that responds to the nature of IK. Landzelius (cited in Oppenneer, 2010) suggests this requires us to adopt a new paradigm: one that acknowledges that "indigenization means not just enlisting ICT's to do things with tradition, but enlisting tradition to do things with ICT's".

Herselman and Britton (2004) indicate that successful participation is not practical when potential end-users do not know what the alternatives actually are.  ICT's therefore require a significant learning cycle and may have pre-conditions attached which may be 'forced' onto users since the ICT investment is by donor organisations. Such conditions may result in the 'forced' utilisation of a particular selected ICT whereas an alternative ICT may have been more appropriate and yielded a significantly better adoption by the end-users. There is a need for indigenous users to assimilate and adapt chosen ICT's to their own contexts. The inherent problem with ICT's is that while it may be good at preserving explicit indigenous knowledge, there is difficulty in how to treat tacit IK. Embedded within tacit knowledge is the concept of creativity which includes use of figurative language and symbolism to articulate and share insights and intuitions (Nonaka, 1998).

## 6.      Concluding remarks

While ICT's and digital technologies may seem to answer some of the problems of 'preserving' forms of IK, it should be remembered that IK is situated within a (local) human community and subject to change. The opposite is true for preservation which is in isolation *e.g.* IK stored in an online database. Oppenneer (2010) suggest that "… the nature of digital technology is antithetical to Indigenous ways of knowing". There is thus a need for IK to be further explored, from an appropriate knowledge perspective, so that future ICT's may be designed to cater for cultural assumptions about what knowledge is to indigenous groups and to local communities and thereby contribute to the global information society.

## 7.      Suggested further reading

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