

Some challenges for Information and Communication Technologies in Indigenous Knowledge preservation

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Abstract

Information and Communication Technologies (ICTs) are the basis for social appropriation in local communities. ICTs hold significant potential for positive benefits for local communities to deal with ‘digital’ connectivity and global knowledge contexts. With the digitalisation of knowledge, including indigenous knowledge (IK), ICTs are offering alternative perspectives of knowledge in the global information society. However, sometimes ICTs are ill-equipped to handle context-dependent cultural knowledge since there is a difference between how Westernised cultures and indigenous cultures view data, information and knowledge. This shortcoming may lead to digital preservation challenges. In this article, we discuss some challenges faced by ICTs for IK preservation.

1. Introduction

In the emerging discipline of Community Informatics (CI), Information and Communication Technologies (ICTs) are the basis for social appropriation in local communities. ICTs hold significant potential for positive benefits for local communities to deal with ‘digital’ connectivity and global knowledge contexts. With the digitalisation of knowledge, including indigenous knowledge (IK), ICTs are offering alternative perspectives of knowledge in the global information society. IK is intricate knowledge acquired over generations by communities as they interact with the environment (Seepe, 2001). Like any other knowledge, IK needs to be constantly used, challenged and further adapted to the evolving local contexts in the global information society. However, sometimes “ICTs 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” (Oppenheimer, 2010). This shortcoming may lead to digital preservation challenges. In this article, some challenges faced by ICTs for IK preservation are discussed.

Our article is organised as follows: The concept of knowledge is introduced. IK and ICTs are then explored, 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 relating to facts, concepts, ideas and observations. However, knowledge building is a social process in local communities. 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).

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. 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 (Oppenheer, 2010).

4. The potential of Information and Communication Technologies (ICTs) in Indigenous Knowledge preservation

ICTs 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, Hendriks and Grant, 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 ICTs “provide new opportunities to preserve and revitalise indigenous cultures and languages” (Dyson *et al.*, 2007: xvi). Knowledge of ICT applications bears the challenge and 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 such local content on Internet web pages. However, the potential of ICTs depends on how they are used and not merely in their presence – this remains a challenge for IK preservation. Ranganathan (2005) indicates how ICTs may be used to facilitate a bottom-up process in which IKS “are placed at the heart of ... sustainable development”. CI encompasses an implicit shift away from a technocratic top-down approach recognising that bottom-up approaches and solutions can (and do) emerge from within local communities.

4.1 *Bottom-up approach using ICT in IK preservation: a case study*

Illustrating the bottom-up approach, the eThekweni Municipal Libraries’ ‘Ulwazi Indigenous Knowledge’ program facilitates engagement at all levels within local communities in the eThekweni Municipal Area (EMA) thereby empowering these communities to adopt the development solution (Greyling, 2007; Greyling and Zulu, 2010).

eThekweni Municipality’s existing public library ICT infrastructure provides free Internet access to local communities. This allows community members to add local knowledge content to the Ulwazi website and thereby become ‘digital’ and information-wise. The municipal library acts as custodian of the information and knowledge resource by managing the online database. This enables communities to manage their own IK in an economically viable manner and establish a participative virtual information resource with local content relevant to local communities in the eThekweni Municipal Area (EMA). At the same time the stability of local government structure safeguards the institutional repository that is created and ensures the repository’s long-term sustainability. Open source social software based on Web 2.0 technology is used to create a database of IK (in the form of a local Wikipedia). The high degree of flexibility with social software enables a dynamic environment which can be tailor-made to serve indigenous groups and local communities. The online database setup takes into account end-user needs at all levels of local communities. New software releases and enhancements are supported by a development agency – there is thus seamless ICT transition to the end-user. In this program, ICTs are an enabler to preserve and revitalise IK, indigenous cultures and languages. For a fuller discussion of the eThekweni Municipal Libraries’ ‘Ulwazi Indigenous Knowledge’ program, see Greyling and Zulu (2010).

4.2 *Digital preservation of IK: a gateway to the global knowledge society*

While local content is critical for local communities' 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 on 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 resource centres (including municipal libraries) to solicit, using ICTs, the indigenous local communities to become part of the global information society (Greyling and Zulu, 2010). By getting communities involved in the use, customisation and development of applications, ICT adoption by its members is likely to follow, with all the numerous benefits attached to it (Michael and Dunn, 2006: 173).

While it seems sensible to utilise ICTs 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 (Oppenheer, 2010). This challenge may require further exploration to gauge how these ICTs respond to the nature of IK digital preservation initiatives. While good at preserving tangible knowledge, ICTs have difficulty with treating tacit knowledge since the output, however well presented, is largely one-dimensional (Michael and Dunn, 2006: 173). It tends to disregard embedded concepts of creativity and the use of figurative speech and symbolism to articulate and share insights and intuitions in the recording of tacit knowledge (Nonaka, 1998). Innovative ICT approaches are required for the digital preservation of IK 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 ICTs 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). Michael and Dunn (2006: 173) point out that cultural IK preservation cannot be achieved by ICT alone; it requires a spiritual element entrenched in the community to ensure a long-lasting presence.

5. Synthesising ICTs 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 availability and access, some indigenous groups have taken advantage of new technologies, including ICTs; 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 (Oppenheimer, 2010). By harnessing ICTs, these indigenous groups and local communities have crossed the digital divide and are becoming part of the global information society on their own terms, as is well-illustrated by the outputs of the Ara Irititja Project in Southern Australia (Hughes, 2006: 146-158). 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, ICTs have marginalised indigenous communities ever further and this challenge needs to be addressed.

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 ICTs 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 ICTs do not always operate in a manner that responds to the nature of IK. Landzelius (cited in Oppenheimer, 2010) suggests this requires us to adopt a new paradigm: one that acknowledges that “indigenization means not just enlisting ICTs to do things with tradition, but enlisting tradition to do things with ICTs”.

Herselman and Britton (2004) indicate that successful participation is not practical when potential end-users do not know what the alternatives actually are. ICTs 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 challenge and a need for indigenous users to assimilate and adapt chosen ICTs to their own contexts.

6. Concluding remarks

While ICTs 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 digital preservation which is in isolation *e.g.* IK stored in an online database. Oppenheimer (2010) suggests 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. There is also the challenge for future ICTs to be designed to cater for cultural assumptions about what knowledge is to indigenous groups and to local communities and thereby contribute to the social appropriation in local communities.

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8. Suggested further reading

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