Tools and Strategies for Managing Penans' Indigenous Botanical Knowledge.

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Abstract:

The formalised storage of Indigenous Knowledge (IK) is gaining increasing currency across the globe. There are many initiatives of using ICT tools for documenting IK implemented by various organisations around the world. However, technology and databases alone do not provide adequate management system for IK. In this paper, we will briefly present the approach used in eTORO project by the Institute of Social Informatics and Technological Innovations, Universiti Malaysia Sarawak with active participation of the local community in Long Lamai, Sarawak. The main objective of the eTORO project is to facilitate the community in preserving and transferring their indigenous botanical knowledge through proper documentation processes.

Keywords: indigenous knowledge management, indigenous knowledge governance, ICT4D, TORO, eTORO.

1.0 Introduction.

As the specific domain knowledge and the needs vary among different indigenous communities so the diverse nature of IK poses a challenge that no standard and single solution can be proposed for indigenous knowledge management. For each situation, the knowledge engineers and information systems professionals should work closely with the knowledge holders to determine specific needs before making decisions about the collection, organization, storage, and access of IK. To make decisions that work well for the owners of the knowledge, require long term deeply negotiated and collaborative processes where questions of the nature, politics, and creation of knowledge remain central (Christie, 2004).

However, there are common concerns and challenges to manage IK and potentially useful tools or solutions that the current research would like to explore. This paper highlights the methodological approaches jointly used in eTORO project by the Long Lamai community and reserachers. Forest is the centre of Penans' life and knowledge about the plants is the Penans' identity which is at stake because of the modernisation. In the first part of the paper we will present the background of research and the problem statement. In the second part we will discuss the project implementation phases and methodology and in the third part we will conclude the paper with lessons learned.

The authors' previous research Indigenous Knowledge Governance Framework (Zaman, Yeo, & Kulathuramaiyer, 2011b), Tacit, Implicit and Explicit (TIE) knowledge creation model (Zaman, Yeo, & Kulathuramaiyer, 2011a) and assessment tool for IK management processes (Zaman, Kulathuramaiyer, & Yeo, 2010) helped in developing methodology of this research.

2.0 Background.

2.1 Introduction of the community.

The Penans constitutes some 10,000 people in the Borneo region (BBC, 2008), often described as being divided between Eastern and Western Penans (Needham, 1954). Long Lamai is one of the biggest and oldest settlements of the Eastern Penans in Sarawak. Flying from Miri to Long Banga (or 10-hour drive over logging roads) and one and half hour on the boat (or an hour of hiking through the dense rainforest) to Long Lamai is the only way to get there. There are approximately 450 Penans living in Long Lamai. Penans, the nomadic of the recent past, are living from farming today, but still depend on the forest for hunting and for collecting various forest products (Donovan & Puri, 2004). They have a detailed classification system for the plants and recognize many useful wild plants, but their use of knowledge is relatively simple and differs from that of other ethnic groups of Borneo (Koizumi & Momose, 2007).

2.2 Problem statement.

Like other indigenous communities the rapid change in the way of Penans' life has largely accounted for the loss of their IK (Brosius, 2006). Among other causes the reluctance of elders to transmit IK to uninitiated youth, and disenchanted youth seeking solutions to their needs from modern science in place of IK are significant (Brown, 1973).

2.3 The concept 'eTORO'.

The concept of eTORO is based on TORO, an activity based knowledge sharing and mentoring journey that links community elders and members of the younger generations in grooming future guardians of the rainforest. eTORO is a platform where the elders and the youth of the Long Lamai will gather and document the indigenous botanical knowledge with the help of modern ICT tools.

3.0 Project implementation and methodology.

The methodology of eTORO project has five main phases. These are: designing a process flow diagram, developing cultural protocols, developing data instruments, developing prototypes, requirement analysis and testing and conducting capacity building trainings.

3.1 Designing process flow diagram.

The Process Flow Diagram (PFD) helped the community to understand the stakeholders' roles in project implementation. The initial PFD is designed with ICT tools describing the concepts with scientific symbols. The PFD is provided to the community in second visit. During the third visit community shared their own amended version of PFD , explaining the concepts in local language and with local contents (symbols).

3.2 Developing cultural protocols.

Given the negative impact of inappropriate research with indigenous communities, there is an urgent need for an ethical research approach based on consultation, strong community participation, and methods that acknowledge indigenous ways of knowing. For building a trust relationship with the community in eTORO project, one of the initiatives was to develop instruments under the guiding principles of international standards and protocols. The First instrument, that is developed is the cultural protocol for researchers working with eTORO project and the second is Free, Prior and Informed Consent (FP&IC) agreement between ISITI-CoERI and Long Lamai community. The protocols and agreement are translated in the local Penan language and fixed in the telecentre for community and researchers.

3.3 Developing data collection instruments.

In developing phase of the data collection instruments three groups, researchers (knowledge engineers, software developers, botanist, and environmentalist), Long Lamai Diaspora living in urban location (Kuching) and the community made active interaction with each other. The system end users and data collectors are the Long Lamai community so a questionnaire is designed with the community participation. Mainly the questionnaire is based on the detailed information that the community wants to collect and store in digital format.

3.4 Prototype for IKMS, requirement analysis, testing.

In the software part, two prototypes customized Open Data Kit (ODK) platform and Indigenous Content Management System (iCMS) are developed. The ODK is an extensible, open-source suite of tools designed to build information services for Android system. It currently provides four tools to this end: Collect, Aggregate, Voice, and Build (Hartung et al., 2010). In eTORO, the customized ODK is used to fulfill the requirements of Penans indigenous botanical knowledge management. The Data collection form has been manually designed by the community so ODK build function help in integrating the manual data collection form into the digital ODK survey form for mobile devices.

As demanded by the community the iCMS database is a closed system, and the collected Penans' indigenous botanical knowledge is not available and accesable publicly. The community is in control to make decisions regarding why, how and by whom data is collected, used or shared. The community catagorised the users of the system in three groups:

1. IK Manager, responsible for overall management of the ICT Tools and repositories;
2. Community Elders will have access to all information that are available in the repositories;
3. Youth will have full access to the data related to the plants but only limited access to the data of the piousness plants.

Given the potential for misuse of data collected in eTORO, the security of the database is primordial. The data would be generally considered as confidential and conserved with *e-insitu* concept while governed by the local customary laws. The *e-insitu* is the physical database storage design where the iCMS will have the facility to store community collected data on external drives. The *e-insitu* is providing the physical control of the data and storage device in addition to the logical data protection mechanism. To ensure the security, one method proposed is through custody of a code registry. An additional security feature of this approach is the the use of stand-alone computers for handling so as to reduce the risk of unauthorised access of networked computers.

3.5 Capacity building for participatory digital data collection and processing.

The trainings for eTORO Participatory Digital Data (PDD) collection and processing comprised of using the customized ODK platform and iCMS. During the testing phase of customized ODK the researchers felt that the tablet technology is quite user friendly for the Long Lamai Penans community. After the trainings, the trained community members are able to use digital equipments for data collection and to upload the information in iCMS.

4.0 Challenges faced and lesson learned.

There were numerous challenges, faced by researchers when conducting the project. For instance, the seasonal cycle of paddy harvesting activity in Long Lamai, the community had difficulty in finding time to contribute in the project activities because paddy farming is their main source of livelihood. Another challenge was the remoteness of Long Lamai, the research team had difficulty in finding time and resources to make frequent visits to the community, so a good lesson learned, is the engagement of Long Lamai Diaspora and student living in a nearest urban location for initial preparation and translation work. There are also technical difficulties faced in the structure of iCMS and to make the community user requirement explicit.

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