Role of ICTs in Indigenous Knowledge Conservation

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ICT for DEVELOPMENT
ICT4D vis-à-vis UNIMAS-ISITI

- Social Informatics
- Technological Innovations

Design & Context of Use
Technology & Innovations
Usage & Impact
Institute of Social Informatics & Technological Innovations (ISITI) (2011)

Centre for Rural Informatics (CRI) (2007-2010)

Faculties of:
1. Social Sciences
2. Engineering
3. Computer Sc. & IT
4. Cognitive Sc. & Human Dev’t
5. Economics & Business
6. Applied and Creative Arts

Centre of:
1. Language Studies
2. Applied Learning and Multimedia

• **VISION:**
  – Communities transformed into a knowledge-based society by leveraging on ICT and ICT innovations

• **MISSION:**
  – To generate, disseminate, apply and preserve knowledge through innovative and multidisciplinary approaches to empower society to sustainably address their developmental needs in a wider social and economic contexts
Communities

- Bario: Kelabit
- Ba’Kelalan: Lun Bawang
- Long Lamai: Penans
- Pulau Larapan: Bajau
- Kpg. Buayan: Dusun
- Pos Sinderut, Pos Lenjang: Semai
- Pos Gob, Pos Balar: Temiar
- Bau districts: Bidayuh
- Yan district: Malays
- Daro: Melanau
- Meradong, Engkilili, Lubok Antu: Iban
- Sungai Asap: Kenyah, Kayan, Penans
Living Labs - Locations

Southern Region:
- PI1M-Bowang
- PI1M-Guar Chempedak
- PI1M-Yan Besar
- PI1M- Bukit Besar
- PI1M-Kuala Sala
- PI1M-Limau Dalam

Northern Region: Jerlun, Pokok Sena, Langkawi
- PI1M: 6 in Perlis

Central Region:
- PI1M x 4: Putrajaya

Central Region:
- PI1M-Bogag
- PI1M-Skio
- PI1M- Kg Serasot
- PI1M- Krokong
- PI1M-Sibuluh

Central Region:
- PI1M-Daro
- PI1M-Meradong

Central Region:
- PI1M-Engkilili
- PI1M-Lubok Antu

Map locations:
- Gua Musang
- Kelantan
- Kuala Lipis, Pahang
- Bario
- Lamai
- Ba’Ke-lalan
- Buayan
Collaborators

- Sponsors
  - JAKOA
  - EPU
  - MOSTI

- Academic Partners
  - SGI
  - UTM
  - JAIST

- Technology Partners
  - TM
  - Embedded Wireless
  - NTT
  - Mitsubishi Electric
  - Sumitomo Electric
  - TTC

- Corporate Social Responsibility Partner
  - City-Link Express

- Local Gov’t & Community partners
  - Maxis
  - Ericsson
  - Tanoti
Bario, Top 7 Intelligent Communities 2001
World Teleport Association

Bario Radio, Malaysia’s First Community Radio

Bario Innovation Village: Best Telecentre Innovation 2013
Telecentre.org Spain

IT Premier Award 2003
Prime Minister of Malaysia

Winner International Innovations Awards 2006 (Sydney, Australia)
Commonwealth Association of Public Administration (CAPAM)
Of 112 submissions from Commonwealth Countries

IFIP Interaction Design for International Development Award
INTERACT 2015 Conference Germany
(651 paper submissions)

IFIP Brian Shackel Award
INTERACT 2015 Conference Germany
(651 paper submissions)

ISIF Innovation Award 2013
Internet Society Innovation Fund

Best of ACM CHI 2015
Honorable Mention Award
The top 5% of 2,150 submissions, South Korea
Work with (very) Remote Communities
Telecentres
Objectives

• To define the extent to which contemporary ICT could deliver **sustainable social and economic development** to remote rural communities

• To identify further **needs and opportunities** within such communities that can be satisfied by the **innovative use** of contemporary ICT

#Development Agents & ICT Advocates
Bario, where it all started
How to get there?

About one hour.

Two days &…

A few weeks’ trek
The Kelabits of Bario

• ~1,000 tribal Kelabits remaining in Bario
• 12 villages (longhouses)
• Religious community
• No telephone service
• Gravity-fed water
• electricity by generators/solar
Infrastructure

VSAT At School

VSAT At Telecentre
Approach (Bala, Harris & Songan, 2003)

- Participatory Action Research
- Community Engagement
- Rapport building
- Community acceptance (Bala, 2011)
Roles and Impact of eBario
eBario in SAR

- Helicopter crash: 12 Jul ’04
- Search and Rescue: 16 days
  - Hampered by bad weather & inaccessible terrain
  - Sophisticated technologies
  - Police, Military, Royal M’sian Air Force, Allies, locals
- Required much coordination and communication
- Bario: Operations centre
  - Phones, fax, Internet
  - Press release/reports direct from Bario
Tourism Impact

- Homestay/lodge owners
  - Email and phone to liaise with tourists
  - Initiative by lodge owners to put lodge information online
- Increase in number of tourists
  - Enhance employment opportunities
  - Increase in homestays/lodges
- Reduce rural-urban migration
  - Increase urban-rural migration
- Telecentre played an important role in tourism development in Bario (Lo et al., 2013)
eBario Telecentre today

- **eBario Telecentre**
  - Run by local community
  - Solar powered; VSAT connectivity

- **Event management & Tourism**
  - eBario Knowledge Fair
  - Pesta Nukenan (10th Year)

- **Facilities**
  - 13 years on, some villages have 24-hour power
  - Mobile coverage

- **Living laboratory: Incubation centre**
  - Community radio, Long range wi-fi
Long Lamai and the surroundings
Ngerabit eLamai

• **Problem**
  – Very remote and lack of connectivity
  – Limits educational and economic opportunities

• **Solution**
  – Ngerabit eLamai
  – Socio-technical solution
  – Integration of ICT & Social Systems
eLamai: Integrated ICT Systems

- **Power**
  - Solar Power (Photo-voltaics)
  - 10 kWh & 20 batteries

- **Telecommunications**
  - Very-Small Aperture Terminal
  - 256 kbps link

- **Computers & LAN**
  - 3 Dell Desktop Mini
  - 3 Dell Netbooks

- **Telephones**
  - 2 public phones

- **Telecentre building**
  - Designed by and for community use
Inclusiveness

• Participatory Action Research

• Involvement of all in:
  – Making decisions
  – Planning, Implementation, Maintenance

• Community dialogue
  – “YES” from the community

• Social equity
  – E.g. boat service (turn taking)
Ngerabit eLamai: Social Systems

Sustainability

• Empowerment

Telecentre: Financial and Human Resource

– Volunteering and continuous training

– Governance

  • Ngerabit Lamai committee

eTabung (Savings/fund)

– Percentage of profit gained from phone cards and future homestays

• Running for over 5 years
Ngerabit eLamai: Social Systems

• **Address community needs**

• **Improved connectivity (Social Relations)**
  - Before: 1-hour walk to Long Banga
  - FaceBook and telephone to keep in touch
  - Cater for young (FaceBook) and old (phone)

• **Use of ICTs**
  - Checking SPM (national exam) results
  - Looking and applying for jobs and further studies
  - Coordinating logistics and project management
  - Advertising and sale of handicrafts
  - Citizen Journalism
Ngerabit eLamai
Agent for Social Transformation

• **Increased ICT Literacy**
  – Each household in Lamai has one person who is computer literate

• **Improvement of Lives**
  – Keeping in touch with families
  – Coordination of projects
  – Volunteers
    • Increase English passes (in national-level primary-6 exam) by 25% (2011); 50% (2012)

• **Window to the world**
  • Job and education opportunities
  • Obtained scholarships on tourism related activities in KL and willing to return
Ngerabit eLamai: Catalyst for Growth & Economic Transformation

- **Recognition of Community & eLamai**
  - Knowledge Transfer Programme Project (116 successful out of over 300 submissions)
  - Japanese Gov’t funding: Micro-hydro Dam

- **Responsible Rural Eco-Tourism**
  - Wilson Bian Headman

- **Alternative income**
  - Homestays (7 as of today)
  - Boats (from 3 in 2008 to 30)
  - Handicraft (500 baskets Facebook order) & Tourist Activities

- **Population growth: Rural-rural Migration**
  - 2009: 99 h-holds; 2015: 116 h-holds (600 people)
• **Tourism Projects** (Chin et al., 2015)

• **Tourism Development**
  – UCTC Project
  – Homestays Evaluation and Development
  – Infrastructure Development
  – Training workshops on Handicrafts

• **Responsible Rural Tourism Destination**
  – Carrying capacity
  – Environmental Issues
[7] Methodology

Initiative for e-Commerce Capacity-building of Penans in Long Lamai community

Empowerment Capacity Building

E-commerce website development

Need Analysis
Website proposal
Specification and Prototype
Website Development
Stage and Test

Community Trainings

Training for Data Collection
Training for Website Maintenance
Final Write-up

eLamai Telecentre manager Garen Jengan
susilanatasya@gmail.com

Paintings
Handicrafts
Homestays
Cultural Activities
Musical Instrument
Hunting
Rattan Bracelets
Pencil Holder
Mat
Cooking Utensils
Rattan Handicrafts by Long Lamai Artisans (Osman et al., 2013; Osman et al., 2014)

Long Lamai - Basketry Paradise

The Penan peoples of Sarawak are originally a nomadic tribe, known to be hunter gatherers found in the northern interiors of Sarawak. In the 1950s, a group of Penans settled near Balong River along one of Sarawak’s remaining virgin rainforests and started a settlement known as Long Lamai. Now amounting to approximately 450 people, this community still practise traditional handicraft making and observe other unique aspects of Penan heritage.

The weaving of handicraft products using rattan has played a fundamental role in their village economy as more and more artisans emerge from this small population. Basketry from Long Lamai has captured the attention of many local buyers and public institutions, and it is now the desire of Universiti Malaysia Sarawak & Tanoti to introduce this incredible craft to the world.

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of products</th>
<th>Total Sales (RM)</th>
<th>No. of artisans involved</th>
<th>Average RM per person</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>5</td>
<td>10</td>
<td>1</td>
<td>10.00</td>
</tr>
<tr>
<td>2013</td>
<td>57</td>
<td>824</td>
<td>13</td>
<td>63.38</td>
</tr>
<tr>
<td>2014</td>
<td>232</td>
<td>4,593</td>
<td>25</td>
<td>183.72</td>
</tr>
<tr>
<td>2015</td>
<td>531</td>
<td>10,744</td>
<td>67</td>
<td>160.36</td>
</tr>
</tbody>
</table>
March 5, 2012

Education a lifeline for Penan kids

Wilson Bian, Long Lamai Headman, says that the Internet has opened their eyes to the world outside and to tourism, which many welcome as a sustainable source of badly needed income.

“I understand tourism can bring about changes. There are fears of negative influences, but we have faith that we can manage these changes with clearly set rules. There are many ways to make a project successful so that it benefits the community. We are keen to learn new things,” says Wilson.
Technological Innovations

Indigenous Knowledge Conservation
Forest walks with Garen

“If you don’t know about your origin [forest], you are not a Penan”
PRiSMA (S) Methodology

1. Obtaining consent
2. Needs Assessment
3. Problem Agreement
4. Hypothesis formation

Social change process

Software development process

(1) Obtaining consent
(2) Needs Assessment
(3) Problem Agreement
(4) Hypothesis formation

(5) Hypothesis formation
(6) Implementation & Testing
(7) Reflection
(8) System Evaluation

PRiSMA (Siew, Yeo & Zaman, 2013)
Example of transcription of Oroo:

**Sign:**

![Image of a branch with objects](image)

**Objects:**
- Branch, twig or stick

**Interpretation:**
This symbol used to tell Penan people that we are friends. The whole picture bring out the meaning of I am your friend and I am hungry.

**Rules:**
- Bend the twig or stick into two equal length.
Oroo’ Tangibles: Tools for learning secret sign language of forest (Plimmer et al., 2015)
Creating New Signs to Revitalise the Sign Communication
(Zaman & Winschiers-Theophilus, 2015)
PO-SMS: App Screen Layout Design
(Zaman & Winschiers-Theophilus, 2015)

Penan Oroo’
Short Message Signs

eToro & eOroo’: 20 publications (10 indexed)
9 International and national awards
2 international grants; 3 fellowships
Jian Kenin
Q & A