

## Role of ICTs in Indigenous Knowledge Conservation

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ISITI-CRI is supported by:

Long Lamai JKKK, Rurum Kelabit Sarawak



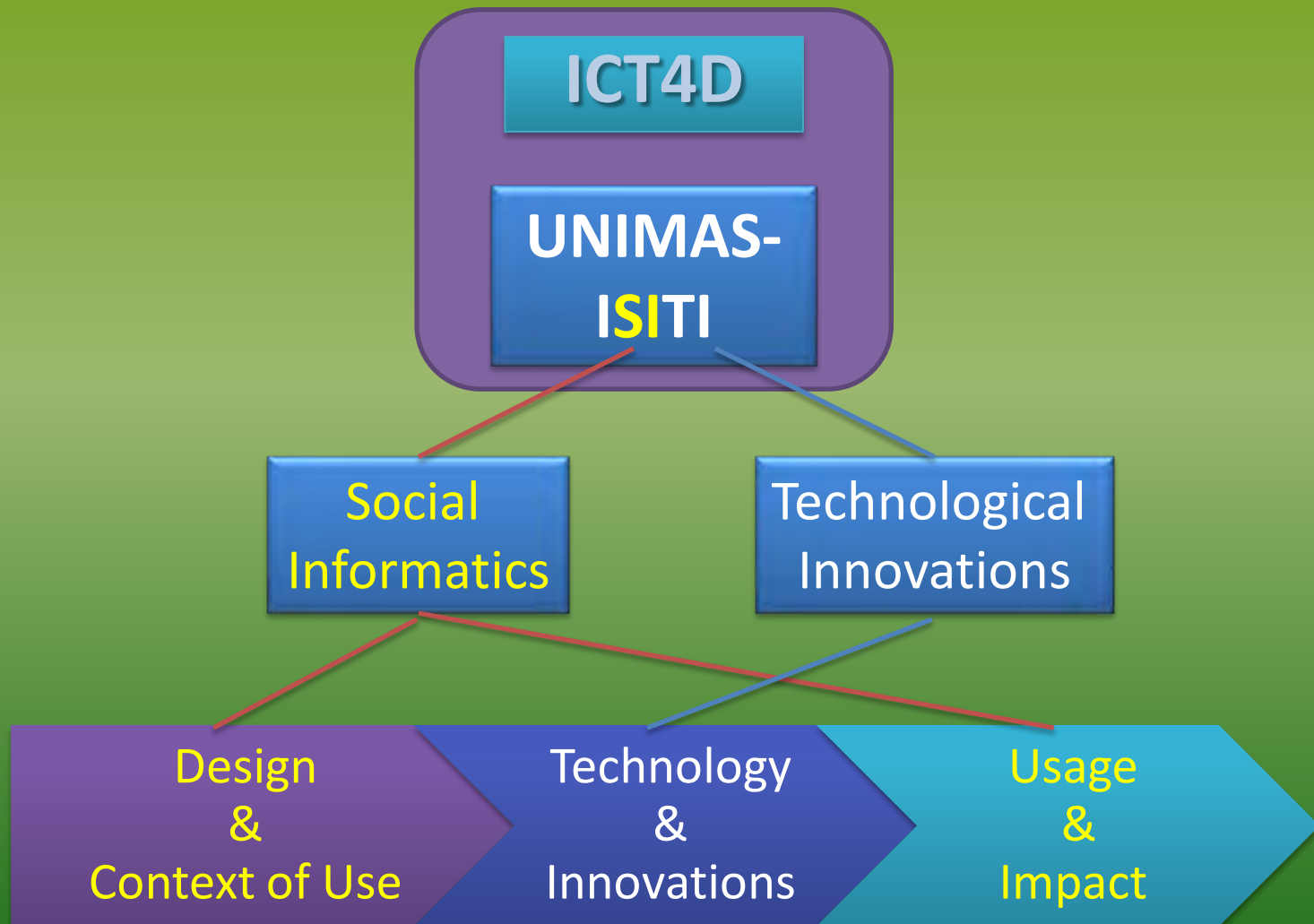


# ICT for DEVELOPMENT



1 NO POVERTY 	2 NO HUNGER 	3 GOOD HEALTH 	4 QUALITY EDUCATION 	5 GENDER EQUALITY 	6 CLEAN WATER AND SANITATION 
7 CLEAN ENERGY 	8 GOOD JOBS AND ECONOMIC GROWTH 	9 INNOVATION AND INFRASTRUCTURE 	10 REDUCED INEQUALITIES 	11 SUSTAINABLE CITIES AND COMMUNITIES 	12 RESPONSIBLE CONSUMPTION 
13 PROTECT THE PLANET 	14 LIFE BELOW WATER 	15 LIFE ON LAND 	16 PEACE AND JUSTICE 	17 PARTNERSHIPS FOR THE GOALS 	

# ICT4D vis-à-vis UNIMAS-ISITI



# 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



PI1M- Yan Kecil  
PI1M-Guar Chempedak  
PI1M-Yan Besar  
PI1M- Bukit Besar  
PI1M-Kuala Sala  
PI1M-Limau Dalam  
PI1M: 6 in Perlis  
Northern Region: Jerlun,  
Pokok Sena, Langkawi

Gua Musang-  
Kelantan

Kuala Lipis,  
Pahang

Central Region:  
PI1M x 4: Putrajaya

PI1M-Bowang  
PI1M-Bogag  
PI1M-Skio  
PI1M- Kg Serasot  
PI1M- Krokong  
PI1M-Sibuluh

PI1M-Daro  
PI1M-Meradong

PI1M-  
Sungai  
Asap

Buayan

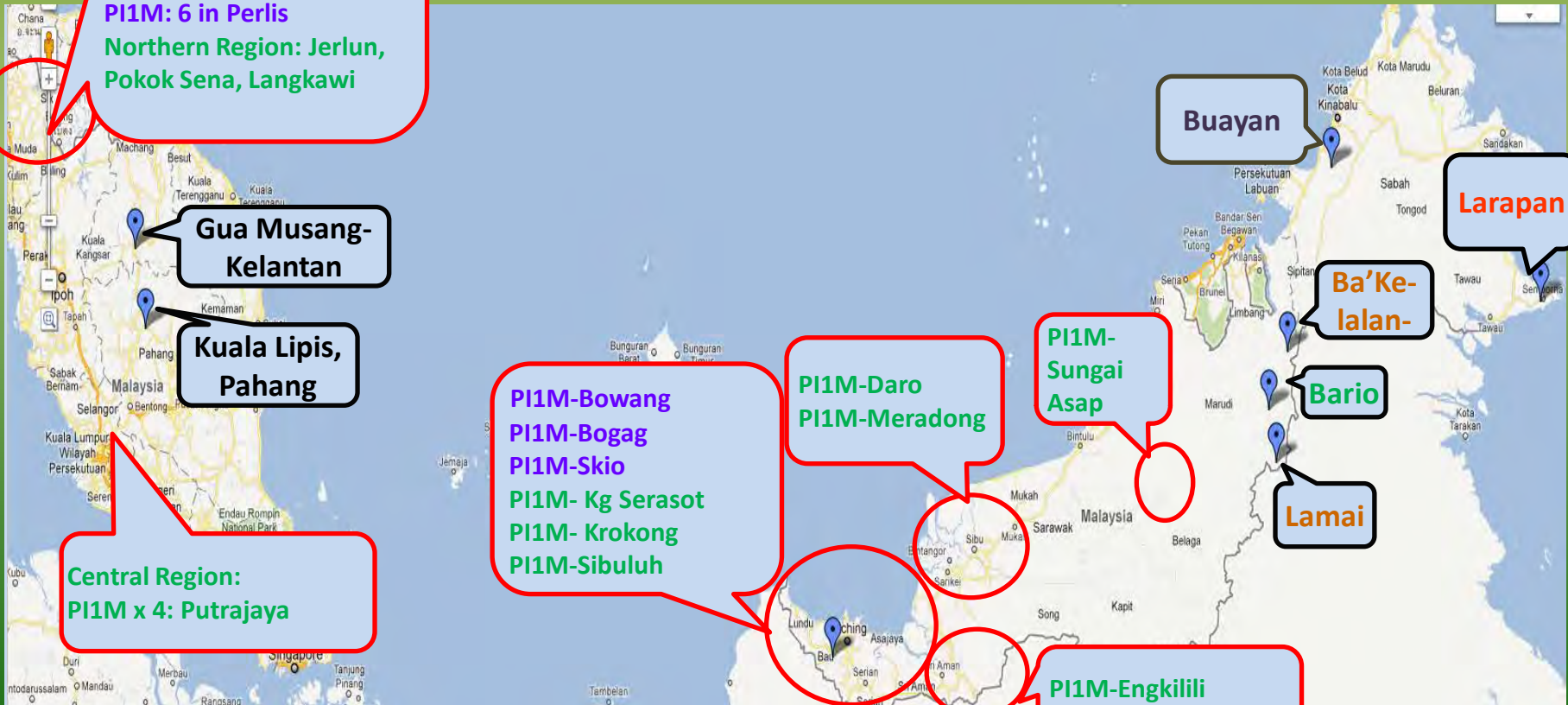
Larapan

Ba'Ke-  
lalan-

Bario

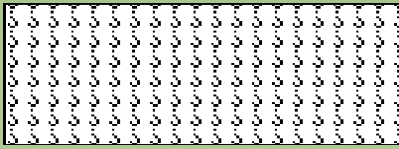
Lamai

PI1M-Engkilili  
PI1M-Lubok Antu

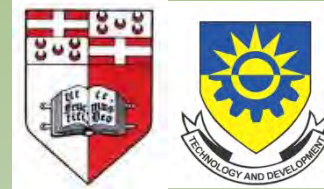


# Collaborators

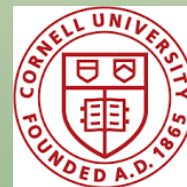
## Sponsors



## Academic Partners



## Technology Partners



## Corporate Social Responsibility Partner



## Local Gov't & Community partners

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



Bario Innovation Village:  
Best Telecentre Innovation 2013  
Global Community Choice

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)



ISIF Innovation  
Award 2013  
Internet Society  
Innovation Fund

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

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**

# CoERI Replication Model (Yeo et al., 2011)



**Social Scientists  
Technologists**

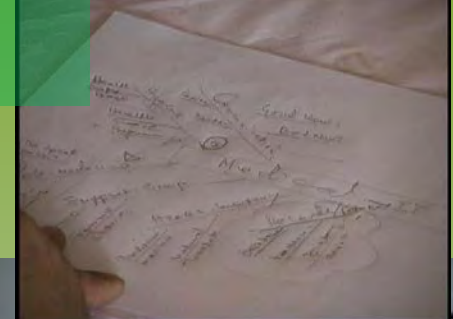


**Social Scientists  
Technologists  
Economics & Business**



Community  
Engagement  
& Needs  
Analysis

Planning &  
Design



Evaluation &  
Reflection

Technology  
access &  
Deployment



**Social Scientists  
Technologists  
Economics & Business**

**Technologists  
Economics & Business**



# Bario, where it all started





About one hour.

How to get there?



Two days &...



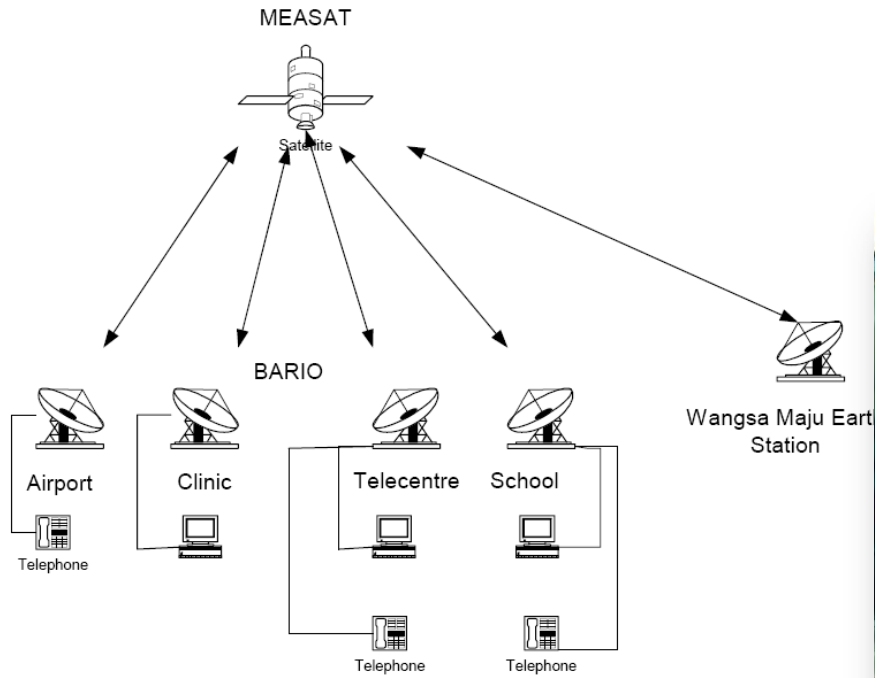
A few weeks' trek

# 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



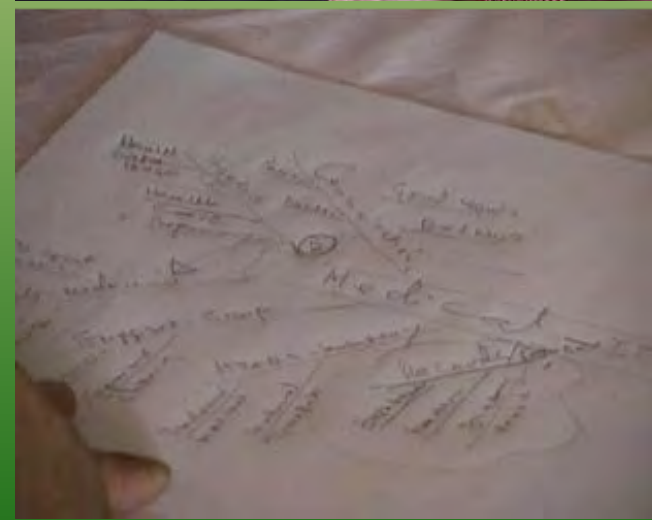
VSAT At Telecentre

22 10:36





# Approach (Bala, Harris & Songan, 2003)



- Participatory Action Research
- Community Engagement
- Rapport building
- Community acceptance (Bala, 2011)

*"Technology Touching Lives"*

# 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

## HOME

### Chopper with six on board gone missing

Adeng Hj Idrus

Jul 13, 2004

LIMBANG – A helicopter flying from Bario to Bal...

## HOME

### Seven still missing, search operations to continue today

Jul 14, 2004



# 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 (10<sup>th</sup> Year)
- **Facilities**
  - 13 years on, some villages have 24-hour power
  - Mobile coverage
- **Living laboratory: Incubation centre**
  - Community radio, Long range wi-fi

# Living Labs-Locations



# Long Lamai and the surroundings

A satellite map showing a dense green forested area. A winding river or road is visible, starting from the top left and moving towards the bottom right. Several locations are marked with blue labels: 'Long Banga' is located near the top center, 'Long Banga Airport' is to its right, 'Long Puak' is on the left side, and 'Long Lamai' is at the bottom right. The terrain appears to be hilly or mountainous, with some cleared areas and buildings visible near the labeled locations.

Long Banga

Long Banga Airport

Long Puak

Long Lamai

# 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



# Ngerabit eLamai: Social Systems



## 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



## eCommunity



- 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



Paintings

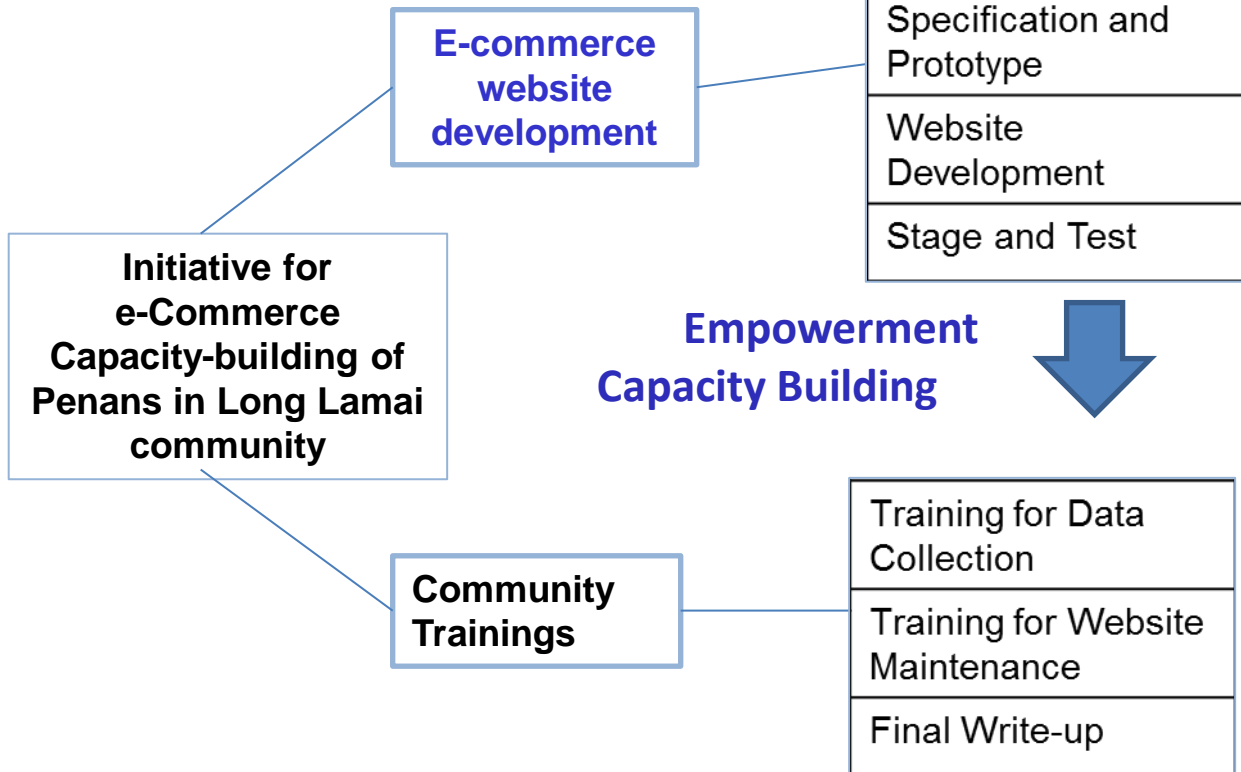


Handicrafts



Homestays

Cultural Activities



eLamai Telecentre manager [Garen Jengan](#)  
 susilanatasya@gmail.com



# [7] Methodology





**Mat**



**Hunting**



**Musical Instrument**



**Pencil Holder**



**Rattan Bracelets**



**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.

	No. of products	Total Sales (RM)	No. of artisans involved	Average RM per person
2012	5	10	1	10.00
2013	57	824	13	63.38
2014	232	4,593	25	183.72
2015	531	10,744	67	160.36



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.*

Institute of Social Informatics and Technological Innovations  
Centre for Rural Informatics  
(ISITI-CRI)

*"Technology Touching Lives"*



# Technological Innovations

Indigenous Knowledge Conservation



# Forest walks with Garen

*“If you don't know about your origin [forest], you are not a Penan”*





# Example of transcription of Oroo:



## Sign:



## Objects:

Branch, twig or stick

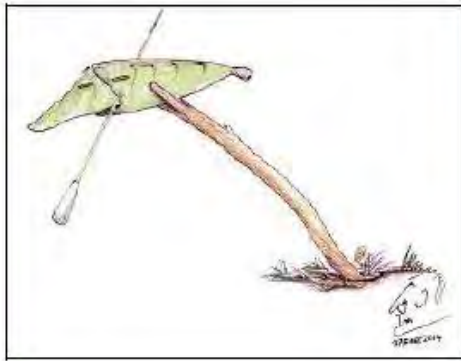
## Interpretation:

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)

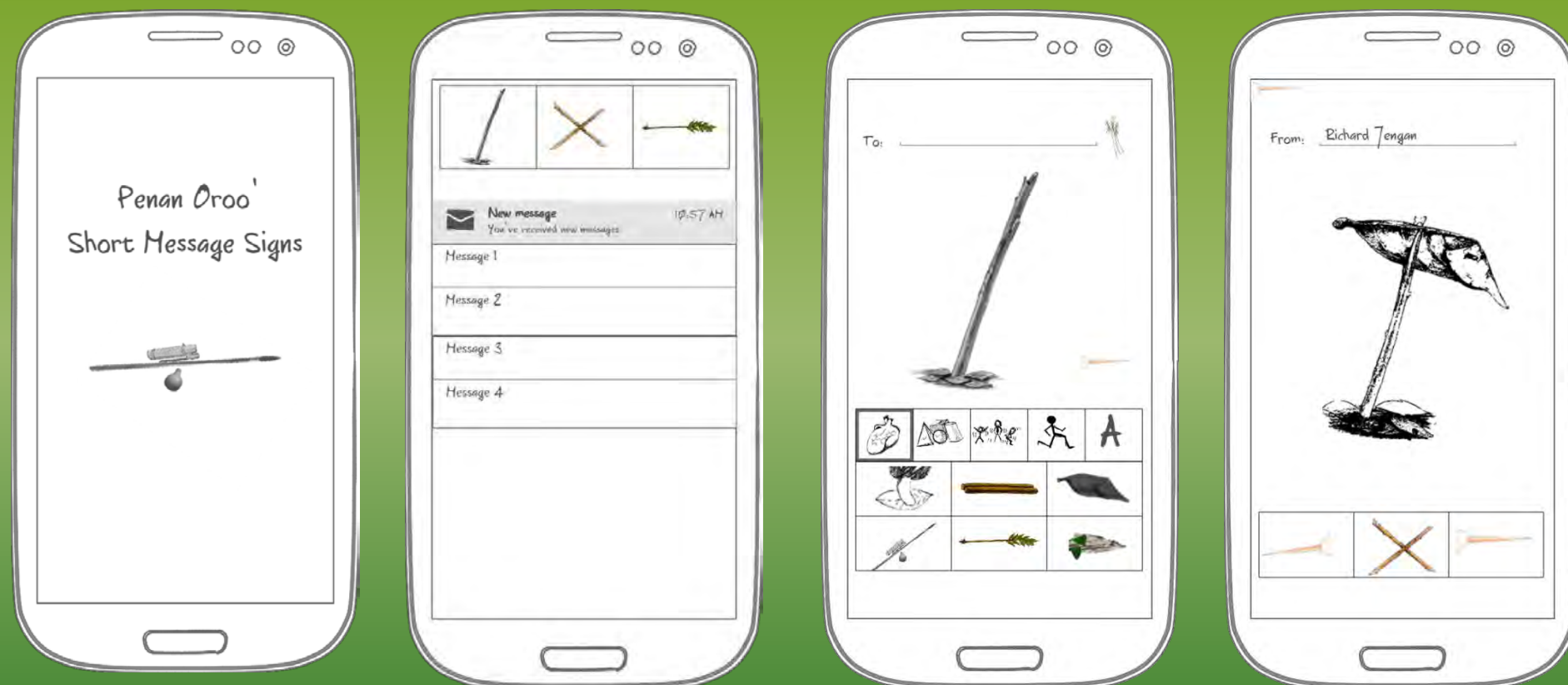




# Creating New Signs to Revitalise the Sign Communication (Zaman & Winschiers-Theophilus, 2015)



# PO-SMS: App Screen Layout Design (Zaman & Winschiers-Theophilus, 2015)



eToro & eOroo': 20 publications (10 indexed)  
9 International and national awards  
2 international grants; 3 fellowships

# Jian Kenin

## Q & A

