INTERNATIONAL TELECOMMUNICATION UNION

TELECOMMUNICATION DEVELOPMENT BUREAU

ITU-D STUDY GROUPS

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RAPPORTEUR'S GROUP MEETING ON QUESTION 10-1/2 - GENEVA, 30-31 MARCH 2004

Question 10-1/2: Communications for rural and remote areas

STUDY GROUP 2

SOURCE: VICE-RAPPORTEUR FOR QUESTION 10-1/2

TITLE: FORMAT FOR SUBMISSION OF CASE STUDIES ON SUCCESSFUL PRACTICES IN TELECOMMUNICATION FOR RURAL AND REMOTE AREAS

Submission of case studies

The case study submission constitutes of two parts:

- The Case Study Summary Information form (Section a) to be completed, preferably, in electronic format using the template provided
- The Detailed Project Description and Analysis (Section b) to be provided in free text form

The Case Study should by submitted **by 30 July 2004 to:**

BDT Secretariat

Fax: +41 22 7305484

E-mail: devsg2@itu.int

Any queries about the methodology or the meanings of the questions should also be addressed to **BDT Secretariat**.

Language and length

Reports may be submitted in English, French or Spanish; the description and analysis shall be 7 to 14 pages of A4 sized paper single space, according to the categories specified in Section b.

Coverage

Case studies normally cover a single telecommunications project in a rural or remote area. It is, however, permitted to base the case study on several **closely related** projects, instead of a single project, provided that the recommended length and format of the submission is respected.

The following types of projects are acceptable:

1. Operational (ongoing) projects

Contact point: Mr. John B. Rose, UNESCO, Paris, France, tel: +33 1 45684529, fax: +33 1 45685583, e-mail: j.rose@unesco.org

2. Projects completed within the past three years.

In choosing the project(s), members are invited to ensure coverage of one or more of the topics of concentration defined in the terms of reference of Question 10-1/2:

- Development of multi-purpose community telecentres (MCT), public call offices (PCO) and community access centres (CAC);
- Provision of telecommunication services to rural and remote areas;
- Sound and television broadcasting for rural and remote areas and linkages to MCT's, PCO's, or CAC's;
- Impact of the provision of ICT in rural and remote areas, and in previously unserved or underserved urban and semi-urban areas, particularly in furthering the economic, social and cultural development of the area that meets the needs of both women and men in the community.

Particularly welcome are examples of technologies which are especially relevant for use in harsh climatic or geographic conditions of remote and rural areas, such as solar-powered equipment, and/or of development applications such as e-health and tele-education.

a) Case Study Summary Information

1. **Title of case study: Cracking the Digital Divide—How we connected more than 60 remote rural schools in Cambodia to the Internet.**

2. **Details of the person preparing the case study:**

   Name and title of person preparing the case study: **Bernard Krisher, chairman**

   Organization submitting the case study: **Japan Relief for Cambodia/American assistance for Cambodia**

   Address: **4-1-7-605 Hiroo, Shibuya-ku, Tokyo, Japan**

   E-mail: **bernie@media.mit.edu**

   Website: www.cambodiaschools.com, www.villageleap.com, www.futurelight.org, www.save3lives.com, www.cambodiadaily.com, www.sihosp.org, www.ratanakiri.com, www.TravelWithaHeart.com, www.povertyredux.com (under construction)

3. **Status of project(s):**

   X☐ Operational

   ☐ Completed

4. **Location and population of the project area**

   Location (village, district, etc.) **village**

   Population of the project area **100,000 ultimately 1,000,000**

5. Type of application / service check one or more boxes)

X☐ Multipurpose telecentres, community development

X☐ E-governance, e-administration

X☐ Support for small business, e-business

X☐ E-health

X☐ Tele-education, e-learning

X☐ ICT training

X☐ Emergency support / disaster mitigation

☐ Environmental monitoring / protection

☐ Radio or TV broadcasting

X☐ Others (please specify) **Participatory democracy, e-mail exchange with children in Cambodia and overseas.**

6. Type of technology (check one or more boxes)

☐ Wired local loop: Copper, optical fibre, etc.

☐ Wireless local loop

☐ Fixed wireless access

X☐ Mobile wireless access

☐ Satellite two-way communications: VSAT, GMPCS, etc.

☐ Radio LANS and IP-based related networks

☐ Terrestrial voice, data, sound or television broadcasting

☐ Satellite voice, data, sound or television broadcasting

☐ Others (including hybrid technologies, please specify) _____

7. Organizations involved in the project:

American Assistance of Cambodia/Japan Relief for Cambodia, First Mile Solutions

8. 150 word summary of the project indicating its expected social /economic impacts

Our organization has built more than 260 primary schools in Cambodia of which more than 50 are now linked to satellite communications or can send or receive e-mail via wireless access boxes placed on the back of moving motorcycles. This project has cracked the digital divide by opening up remote, rural villages to e-commerce, telemedicine, participatory democracy, e-mail exchanges among children in-country and overseas, e-learning and in toto opens the path to poverty reduction and economic development. It can eventually provide employment opportunities in the rural areas, such as in data entry,

greater localized governments so that rural populations do not have to move to the inner cities and potentially make them richer than those who have moved to inner cities.

Cracking the Digital Divide

How we connected more than 60 remote rural schools

in Cambodia to the Internet.

1 Introduction

The Internet Village Motoman project connects small villages in Cambodia to the Internet and e-mail communications through an innovative, yet surprisingly simple, system. Solar-powered village schools, telemedicine clinics and the governor's office have been connected to the larger world, through five Honda motorcycles equipped with Mobile Access Points and a 256 Kb/s Satellite uplink. Each of the schools in surrounding villages can send and receive email.

Many of these villages had no previous communications infrastructure. No postal system, no telephones. Many villages can only be reached via ox-cart or motorcycle. It is a vital, first step for these villages in gaining access to much needed educational, medical and economic opportunities that they would otherwise not have.

CambodiaSchools.com operates 225 rural schools throughout Cambodia with funding from private donors and the World Bank. More than 50 of these schools are linked to the outside world via Internet with Mobile Access Point (MAP) placed on motorcycles.

2 Configuration of the project

Objectives of this communication system is to provide very low-cost system for villages that lack communications infrastructure, like phone line or cellular coverage, but have vehicles that pass by frequently. The system gives village people, not-always-on, store-and-forward connections, sharing its access device, i.e. computers plus WiFi access point, located at schools and village kiosks.

The system has three main components:

Hub (Hub Internet Access Point): This is a place in a town (not rural village) where there is a reliable connection to the Internet (dial-up, fiber or Satellite)

Mobile Access Point (MAP): A wireless device mounted on a vehicle that travels from the Hub to the villages and back. In this project in Cambodia, motorcycles and sometimes ox-carts are used as the vehicle for MAP. In other project, for example in India, buses were used as MAP.

Contact point: Mr. Bernard Krisher, Japan Relief for Cambodia/American assistance for Cambodia, e-mail: bernie@media.mit.edu

Village Fixed Access Point (FAP): Schools or village Kiosk where computer(s) are installed. Villagers and school children use them to send and receive messages. Messages to be exchanged are temporary stored in a PC-box connected to the computers until they are collected by MAP. In this way, messages can be retrieved even if users turned off the computers.

Operations of the communication systems is as follows:

Motorcycles (MAP) drives by village to pick up message from village access point that stores message originally created at the computers. Motorcycles need not stop for pick-up, only drive slowly at the village access point.

The motorcycle visits other villages on the pick-up route for more messages.

When returned to Hub place, MAP sends its stored messages to the hub and onto the Internet.

Next day, or in next pick-up ride, motorcycles obtain messages at the hub. They, then, drop off messages at village access points and at the same time pick up new messages.

This collection and delivery cycle creates a “store-and-forward wireless network” with a large capacity - average volume of 40Mbytes per village access point.

Technical characteristics for WiFi access points (Hub, MAP, and FAP):

Radio card: IEEE 802.11b/g interface at 2.4 GHz, 100-mW output

Interface: 2 x 10/100 Mb Ethernet ports

1 x serial port

CPU: custom embedded PC running Linux

Memory: 64MB SDRAM, 256 – 512MB compact flash memory

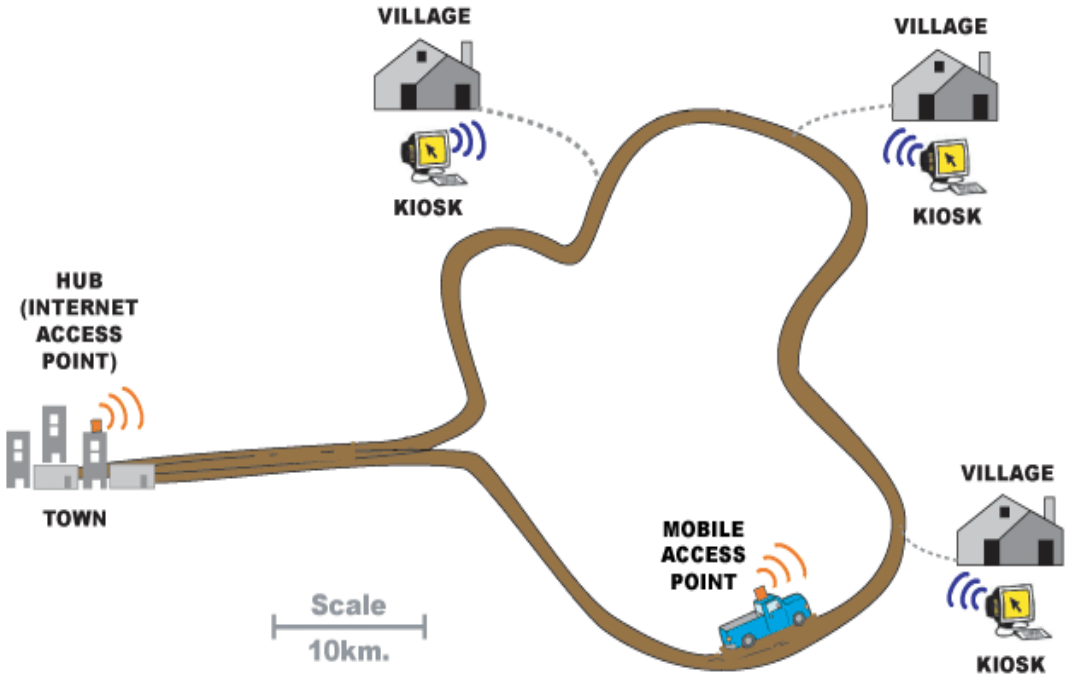
Power: accepts 8 – 14v DC power supply

Environment: operation temperature 0 -60 degrees

The prices for access points are about US$600, slightly different depending on the type of access points in the communication system

When a motorcycle comes within the range of Village Fixed Access Point, a “session” occurs. During this period motorcycle transfers data with the FAP. The average length of a session is about 2 minutes and 20Mbytes of data could be sent from motorcycle to FAP and the same amount of data FAP to motorcycle. This 40Mbytes corresponds to 2,000 e-mails, or if photo is sent, 200 pictures.

The following is the conceptual illustration of this store-and-forward system.



School and Village Kiosk (Village Fixed Access Point)

Motorcycle (Mobile Access Point)

Hub Internet Access Point

4 Benefits of the project

Internet opens the large knowledge sources for the school children. If some children can be educated to benefit from their knowledge of computers, English and in maneuvering the Internet, the future prospect of bringing computer-related work into these villages can raise the economic level and well being of its people.

We are in the process of helping to construct 200 rural schools in Cambodian villages, under a matching-fund program where donors contribute $14,000 to build a three-to-five room school with their name on it and this contribution is matched by the World Bank through Cambodia's Social Fund, for an additional $12,000. The donor may add an optional $1,700 to cover the cost of solar panels, placed on the roof, which provide sufficient energy to operate a computer (donated by Apple-Japan, The MIT Media Laboratory, Deutsche Bank in Tokyo and several others) for five-six hours a day so the schoolchildren can get some training in working with computers.

Children in these villages are taught how to use computers by orphans aged 8 to 11 who have mastered computer literacy and Internet surfing over the past year and a half at a computer center we helped to establish at the Future Light Orphanage in a village outside of Phnom Penh. The Computer Center was built with a donation.

These orphans have been transferring to the rural schools, as they go up, where we have set up computers, and are teaching the other children and teachers how to work on a computer.

The Media Lab gives technical advice to this Motoman project. Components for the communication system are products of First Mile Solutions based in Boston, USA. WiFi store-and-forward systems from First Mile Solutions have been adopted by similar projects in India, Nigeria, Jordan and Colombia.

Contributions were also made by Honda for the motorcycles for Motoman, as well as by Sanyo for the solar panels at the schools.

The Internet Village Motoman project was first established to provide rural children opportunities to learn the computers and communicate with the world by e-mails. This infrastructure gave the opportunity to establish a tele-medicine program by enabling to send medical photos. In a village visited, doctors transmit their findings via the Internet, with digital photo attachments, to the charity Sihanouk Hospital and to Doctors of Telepartners at the Massachusetts General Hospital in Boston, USA for diagnosis and evaluation. Based on the findings transmitted back within hours, the patients are taken to Provincial Hospital (two hours away) or to Phnom Penh, the capital of Cambodia, if the case is serious.

5 Conclusions

This project has cracked the digital divide by opening up remote, rural villages to e-commerce, telemedicine, participatory democracy, e-mail exchanges among children in-country and overseas, as well as to e-learning. It opens the path to poverty reduction and economic development. It can eventually provide employment opportunities in the rural areas, such as in data entry, greater localized governments so that rural populations do not have to move to the inner cities and potentially make them richer than those who have moved to inner cities.

6 References

Website:

www.cambodiaschools.com

www.villageleap.com

www.futurelight.org

www.save3lives.com

www.cambodiadaily.com

www.sihosp.org

www.ratanakiri.com

www.TravelWithaHeart.com

www.povertyredux.com(under construction)

7 Contacts

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