A Comparison on the Implementation Approaches for the e-Bario and e-Bedian Projects

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Abstract. The e-Bario project, a project on community informatics for rural community liberalisation and development, has been cited and referenced as a model for projects in many countries. A second similar project, e-Bedian, was initiated and implemented in Sarawak, Malaysia, based on the e-Bario Model. However, the e-Bedian project took less than 5 months to be initiated and implemented, compared to the e-Bario project. This paper will examine how the e-Bedian project was initiated and implemented in such a short period of time and will attempt to study and compare the approaches used in e-Bario and e-Bedian.

Keywords. e-Bario, e-Bedian, Bottom-up approach, Top-down approach.

1. Introduction

Information and communication technologies (ICTs) have brought great waves of revolution around the world including in many developing countries. The rapid extension of "global villagisation" and the diminishing boundaries of digital divide are among the issues advocated by this fifth wave revolution.

In Malaysia, the government aspires to become a fully developed nation with an emphasis on knowledge-based economy by the year 2020. Though the government has been pushing aggressively for one house to own one computer and an internet connection at least, it is difficult to see the desires and plans of the Malaysian government going beyond the borders of small towns due to the limited infrastructure and amenities. In Sarawak, it has been noted that there are limited mechanisms to ensure that remote rural populations are able to get the same benefits as their urban counterparts due its vast undeveloped area and the majority of its population living in this rural undeveloped areas. Harris (1999) has remarked that even though Sarawak's rural population was promised a full and equitable share in the benefits of national development, it has great potential to be sidelined in the nation's quest towards a knowledge society. This situation, if left unchecked, would produce an "unbridgeable" digital gap between the developed urban and the technologically impoverished rural communities.

Nevertheless, this should be considered as temporary setback as recent developments in ICTs have made it possible for the technologically impoverished remote communities to enjoy the benefits of connectivity which are now part and parcel of the lives of their urban cousins (Harris, Bala, Songan, Khoo, and Trang, 2001). It can be seen worldwide that comprehensive and extensive radical efforts being taken by certain agencies or governments to promote the use of ICT by rural communities. Balaji and Harris (2000) have identified that in India the M.S. Swaminathan Research Foundation had established six Village Information Shops enabling rural families to access and exchange information using ICT. Harris (1999) highlighted Massachusetts Institute of Technology's (MIT) "digital town centres" in remote villages in Costa Rica.

These initiatives spurred Universiti Malaysia Sarawak (Unimas) to conduct similar research projects to introduce ICT to remote communities in Sarawak, Malaysia. The first of the projects was e-Bario, which is now internationally acknowledged for its success. The second project is e-Bedian which was modelled after e-Bario. The projects are an effort to understand how ICT can be used directly to achieve sustainable human development and improve the lives and livelihood of the rural communities. The projects also aimed to identify the needs and opportunities which can be met by the innovative use of ICTs by facilitating communication and access to information and knowledge resources in the areas of agriculture, health, education, commerce, local governance and general development. It is hoped that the research project would provide learning opportunities, stimulate local capacity for informed decision-making to enhance personal, institutional and community development (Bala, Songan, Khairuddin, Harris, and Khoo, 2002).

2. Background

Bario and Long Bedian are two remote villages located in Upper Baram, Sarawak, Malaysia. Though on the map (Figure 1) they might look as if they are close to one another, there is no direct travelling connection to one another. Anyone wishing to travel to Bario from Long Bedian or vice-versa has to travel to Miri, the nearest town, before continuing to their actual destination. However, one could always track the jungles of Upper Baram region for about 2 weeks to travel to and from one of this village from and to another.

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Figure 1. Map of Sarawak with Bario and Long Bedian highlighted.

The only practical way of reaching Bario from Miri is by plane (twin-otter), which takes about an hour; or if over land and river, it would take 2 days by river from Miri and another 3 days trekking. There are two flights per day to Bario, again depending on the weather condition. On the other hand, there are two ways to get to Long Bedian from Miri town. The first way is to take an express boat from Kuala Baram, Miri to Marudi, and then transfer to another express boat to Long Lama. The total express boat journey takes about 7 hours. Then from Long Lama, take an hour's drive using a 4-wheel drive (4WD) to Long Bedian. The second alternative, which was just introduced recently, is to take a 4.5 hours drive from Miri. The journey takes about 3.5 hours through the timber logging route, nicknamed the 'bone-shaker route' using a 4WD vehicle.

Bario and Long Bedian were chosen as the location for Unimas' research project, as they are both extremely remote, particularly from mainstream development. Both the villages do not have government supplied basic amenities such as electricity, water supply and telecommunication. They rely very much on personally owned generators, gravity-feed water system and rain water supply. The communities are completely isolated in terms of modern communication. In addition to its remoteness, Bario and Long Bedian do not have 24-hour electricity supply. Their electricity supply is mainly generated by generator sets running on diesel (diesel fuel in Bario costs 6 times more than in the city, as the fuel has to be flown in). The rationale for selecting an extremely remote location, such as Bario, was that, if the project succeeded in the "worst possible" context (in terms of remoteness), then future projects would be relatively easier.

The Bario community, which is 100% made up of Kelabits, is one of the most remote living communities in Sarawak, leading a peaceful and tranquil life amid the cool highlands of Bario. The majority of them are Christians (97.9%) with 2.1% of them being Muslims. The population is mainly aged between 31-60 years old (72.9%), with an approximate 83% of the population in the actively working group age. The educational level of the Kelabits living in Bario is quite varied. Approximately 19% of the population has completed primary education, 27% completed lower secondary education, 20.7% finished their upper secondary education and only 0.7% completed their tertiary education. About 29% of the population had not attended any formal schooling before. Many of the educated Kelabits have left their highlands to seek well paid jobs in the cities and overseas.

The Bario community are mainly farmers (67.2%) planting both wet and hill paddy. About 18.6% of them are government servants, 10.7% of them are small time business persons, 2.1% are pastors and about 1.4% of the population work in the private sector. Nevertheless, most of these people are involved in farming on a part-time basis. A majority of the Bario community (70.7%) earn less than RM500 per month, while only 10.7% earn more than RM1000 per month. The remaining earn a monthly living of RM500-RM1000. The mean monthly income of a household in Bario is RM597.

The Long Bedian community on the other hand, comprises of several ethnic groups, such as, Kayan, Kelabit, Kenyah, Morek, and Punan. The Kayans are the biggest group in the village making up 95% of the population, while the Kelabits consists about 3.9%. The remaining 1.1% of the total population in Long Bedian comprises of the Kenyahs, Moreks and Punans. The Long Bedian community are all Christians. The population of Long Bedian consists of about 1,686 people and is relatively a young age group community with 76% of them ranging between 1 to 35 years old. Those who are below 6 years of age only make up 13.4%, while 22.6% are between the ages of 7 to 12 years old, and those between the ages of 13 to 19 make up 22.4% of the population. While 20.7% range between the ages of 36 to 55 years old, only 3.2% are more than 56 years of age.

Approximately 32.2% of the population have completed primary education, 27.1% finished their secondary education and only 4.9% completed their tertiary education. About 35.8% of the population had not attended any formal schooling before. Many of the educated Long Bedian folks have left in search of better prospects and well paid jobs in the cities and overseas.

The Long Bedian folks are mainly farmers (68.4%) planting paddy, oil palm trees, pepper, and others. About 5.2% of them are government servants, 10.8% of them are small time business persons and about 9.8% of the population work in the private sector. Nevertheless, most of these people are involved in farming on a part-time basis. A majority of them (53.8%) earn less than RM500 per month, while only 19.9% earn more than RM1000 per month. The remaining earn a monthly living of RM500-RM1000. The mean monthly income of a household in Long Bedian is RM830.20.

3.   Approaches and Implementation

e-Bario was undertaken in the wake of the government's adoption to use ICT as the base for national development financially, academically and socially. The need for the nation to rely on k-economy for development and not mere industrialisation and to build a knowledge-based society had spurred the government to take several initiatives, particularly introducing ICT and its extensive usage in schools through various concepts such as "Smart school". Picking on this cue, the researchers from Unimas decided to embark on ICT and Internet connection beginning with the school. The physical limitations, particularly in connection to travelling and basic amenities, had provided a perfect avenue to build and test research in bridging the digital divide. The school was chosen first, as it had already had the infrastructure (building and day time electrical supply). It also provided a platform to train and prepare the community, besides the teachers and students. In addition to ICTs provided to the school, the eBario project also provided Internet and computer access to the community through a telecentre. The telecentre was set up in the heart of the community 'township'.

e-Bedian is an offshoot of the e-Bario project success. After the many acknowledgements e-Bario received, invitations to set up many other telecentres throughout Sarawak were extended to Unimas. One particular invitation that interested Unimas was an invitation to set up a telecentre in Long Bedian, a village accorded an award similar to national model village. The approach and implementation for this project was to be based on the e-Bario model. This is summarised in the framework shown in Figure 2.

The Approach. Prior to the eBario project, an approach to bridge the digital divide was initially difficult to be determined as this was a pilot project in Malaysia. After much research done on the approach to be used, and taking cues from experiences shared by Anderson, Crowder, Dion and Truelove (1998), and Garcia and Gorenflo (1998), the researchers decided to adopt and embark their project on active Participatory Action Research (PAR) model. Anderson et al. (1998), and Garcia and Gorenflo (1998) have stated that the focus should be on the people and the process, and not the technology.   There was also an emphasis that equal importance should be placed in understanding the context of the social, economic and political systems where the technology will be employed. Anderson et. al. (1998) also remarked by quoting FAO (1995) that continuous dialogue and consultation with the committee should be held to facilitate participatory problem analysis and development planning to ensure information flow, and empower the community to take control of their own development process.

Anderson et al. (1998) further warned that ICT awareness, familiarisation and literacy training have to be provided to the community, or else the telecentre stands the risk of being "alien" to the community, with the community neglecting and not wanting to own it. The local community have to be trained and awareness instilled in them to take up the responsibility for the management and maintenance of the operations of the telecentre.

Figure 2. The e-Bario implementation framework

Realising the importance in engaging and empowering the community, it was deemed necessary that:

- *"The researchers should learn about life in the village from the community;*
- *The community should learn about ICTs from the researchers;*
- *Community members should perform major portions of the research;*
- *The researchers should be able to identify with the community;*
- *As a team, the community-researchers should be capable of critically reflecting upon iterative cycles of action in order to achieve mutually beneficial outcomes of the project;*
- *Useful information systems will be embedded in the needs of the community;*
- *Specific actions are required by both the researchers and the community in order to articulate those needs;*
- *Methodologies for designing and implementing useful information systems will emerge from participatory action-oriented research activities; and,*
- *Data would be obtained using a combination of surveys, direct interviews, workshops and discussion groups."* (Bala, Harris and Songan, 2003:118)

A framework to implement the project was then identified, which outlined the following steps:

1. *Feasibility study* - Conduct a feasibility study to determine if project meets requirements, and issues to be considered during implementation

2. *Community discussion* - Conduct a dialogue with the community to share the idea with them.

3. *Community participation* – Get the community involved in the planning by encouraging them to share their views, opinions and ideas. Then, convince them to accept ownership and be committed to the project. A steering committee comprising of members of the community is to be set up to steer and take ownership of the project.

4. *Baseline study* – A study need to be conducted with the help of community members to understand, and outline the social, economic and political systems and needs of the community, in order to deploy the technology effectively.

5. *ICT literacy training* – Once the baseline study is conducted, an ICT literacy awareness and training programme need to be conducted for the community in order for them to effectively utilise the technology provided.

6. *ICT provision/deployment* – When the community has been given ICT training, the telecentre can then be fully deployed for the community to utilise.

7. *Community development* – Ideas and development plans that have been planned for the community through the deployment of the technology can now be looked into.

8. *Research and development* – The researchers would then need to conduct impact studies on the deployment of the telecentre and look into further development opportunities, particularly in self-sustaining the telecentre in the future.

The framework has also identified what the telecentre aims to provide:

- Increased ability to communicate with the rest of the outside world
- Increased ability to maintain and promote links between members of the community
- Increased access to information and communication in relation to
    - General knowledge
    - Education
    - Health
    - Agricultural practices
    - Government
    - Recreation and entertainment
- Online promotion of the local community, culture, village, locality.
- Digital library facilities through the creation of an electronic/digital database on various matters, such as, genealogies, traditional songs and dances, stories and 'adat' (tribal laws).
- Opportunities to develop cottage and light industries.

The researchers have identified the approach used for the telecentre development as the "Bottom-Up Approach". The key essence of the projects is that the community must want to own the project. The people are the "driving force" to propel the project to further development and sustainability.

Project and approach evaluation. The evaluation presented in this section is strictly based on observations and discussions between the members of the research group. An in-depth study on the impact of the approach used and the project is still being planned.

The e-Bario project took a good two-and-a-half-year to be fully implemented with the initial works beginning in 1999. Numerous lessons were learnt through many trials and errors throughout the journey, particularly the problems of transportation limitation. Nevertheless, every step of the Bottom-Up approach was followed through intensively, with the community being involved right from the beginning. Discussions with the community and community leaders were done repeatedly (not on one time off basis) until they really understood and appreciated what they were committing to. The people were initially engaged in the identification of problems, and they were also involved in finding the solutions to the problems.

After a year from the start of the project, the first computers were brought into Bario. The teachers and the community members were trained. The teachers then became trainers themselves and trained the students at the school. The teachers and the students, then indirectly helped training of the community. After 2 years of project initialisation, Internet was brought in. The connection to the Internet is via a VSAT satellite system. The VSAT is solar-powered. The students were able to access the Internet from the school labs. A telecentre was then built to provide Internet and computer access to the community. The telecentre was set up near the shops as these shops were frequently visited by the community. Volunteers were easily obtained to manage and maintain the telecentre. There is daily occupancy in the telecentre, and the users are charged a nominal fee which went towards the maintenance and management of the telecentre.

Today, four years after the inception of the project, the computers are being fully utilised by the students and teachers at the school. In addition, the computers at the telecentre are being used by the community for communication with families and friends, as well as for conducting their businesses. In particular, some lodge owners are using the Internet to communicate with their clients in booking accommodation and transportation. Guides and trekkers can also be reserved by e-mailing the lodge owners.

Unlike the e-Bario project, the e-Bedian project was initiated by a community leader of Long Bedian, who is the State Assemblyman for the Telang Usan constituency. Long Bedian is located in this constituency. Initial discussions between the statesman and Unimas was held at the end of 2003, and took about two to three months for Unimas to clearly explain the purpose of the telecentre, the Bottom-Up Approach and the framework to be taken. A feasibility study was done and the village met the requirements needed for the telecentre to be set up. Unimas researchers then committed themselves to the project and identified a period of 8-12 months to conduct dialogues with the community, getting them involved in the planning, and to conduct a baseline study. The baseline study was to be conducted to understand, and outline the social, economic and political systems and needs of the community, in order to deploy the technology effectively. Furthermore, future plans included looking for

financial grants to support the project; before providing the community trainers with the necessary ICT awareness and training.

The whole plan took a sudden turn, when the then Prime Minister of Malaysia (PM), the Honorable Datuk Seri Dr. Mahathir Mohamad, decided on a short notice (3 weeks) to visit Long Bedian and to officiate 'the telecentre'. The news came as a shock to the researchers, as the telecentre was far from ready. Moreover, they did not anticipate Steps 2-5 of the approach to be skipped completely. Nevertheless, since commitments were already made to the PM, things had to be done, and done fast. In Long Bedian, the community was already building the physical structure of the telecentre. On the other end, Unimas was looking for sponsors for the computers. Little did the researchers realised that the PM's name could carry such weight. Within two weeks, more than 20 computers were supplied, each with a colour printer. The VSAT Satellite system, (which took close to 6 months to apply for and then installed in Bario) was completed in less than 2 weeks in Long Bedian. Everything appeared to progress without any hiccups. The then PM came, officiated, and shared his views on how the telecentre and ICT should play a role in the rural regions, which were quite similar to our framework. Immediately after the launching week, a baseline study and ICT awareness and literacy training were conducted for a week with some of the community trainers identified by the statesman. Unfortunately, commitment for the training was quite poor. Attendance was usually half, with only the women folk turning up. This was the beginning of many unforeseen problems.

The planned dialogue sessions with the community never took off, as the statesman and the community were busy with their daily tasks and responsibilities. Nevertheless, a steering committee had been set up, with the statesman as the advisor. However, the committee seemed inactive as two attempts were made to meet the committee members and discuss issues relating to the telecentre, but they seemed reluctant to meet and make decisions without the statesman's presence. Efforts to identify someone from the community to manage and maintain the telecentre often failed even though there were volunteers as the statesman himself wanted to identify and appoint the person. Instructions and decisions were passed top-down from the statesman to the committee. So, the researchers decided to call the approach employed for this project as the 'Top-Down Approach'.

Today, after nearly 10 months of setting up the telecentre, the telecentre has yet to have a manager to manage, and a technician to maintain it like in Bario. The community have yet to fully receive ICT awareness and literacy training, as not many want to be committed to this. The problem identified is that they do not see, understand nor appreciate the importance of ICT in their daily lives. The warning identified by Anderson et. al. (1998) as highlighted in the beginning of this section can now be seen. The telecentre is an "alien" white elephant to the majority of the community.

The project has yet to secure any financial support from any agencies to pay the internet and satellite system bill. The ompany hosting this service was kind enough to hold on the bill for a few months till some form of financial support could be found.

Nevertheless, the statesman, in his own capacity as a representative for his constituency, had arranged for various community leaders around Long Bedian to undergo ICT awareness and literacy training at the telecentre. The trainers were from the State government's ICT Unit. Tourism had picked up a little ever since the launching of the telecentre, but it is more due to the "Visit Long Bedian Year" promotion done by the State Tourism Ministry.

A member of the Long Bedian community, who is living and working in Miri, has set up on his own initiative a website (http://www.longbedian.com) to promote Long Bedian and tourism.

All is not lost, the payphone service in the centre is highly utilised. On weekends, the queue for the telephone can sometimes stretch up 200 metres in the evening, and there are at least 50 users using the phone daily to call to towns like Miri, Kuching and West Malaysia. The telecentre is in good condition and still accessed by a limited number of users. Once the manager and technician are appointed to manage the centre, a proper awareness and training programme can be arranged for the community. Community development can be addressed and the fruits of the telecentre can then looked forward to.

4.   Recommendations

From the observations and analysis made by the researchers, the following recommendations have been identified.

- It would appear that the Bottom-Up Approach is more appropriate than the Top-Down Approach in engaging the community to participate in the project, so that the community can then feel and appreciate the importance of the telecentre, and have a sense of ownership.
- All the steps identified in the framework should be followed.
- The community should be empowered to think and make decisions, and not just by community leaders.
- It was also found that a lot of time was needed to be in the field with the community throughout the framework implementation period. It will be good if the research staff could commit full time into projects such as this, as it might save costs and time. This was found to be effective in projects such as the ones implemented by the M.S. Swaminathan Research Foundation in India (Balaji and Harris, 2000).
- Private telecommunication companies and internet service providers should take up the responsibility to bear the costs for operating a rural telecentre from the profits they have earned, and to just charge the users a minimal fee for its usage.

5.   Conclusion

Technology is no longer an issue for community liberalisation and development as we have more technology now than we realise and know how to use. The Bottom-Up approach identified by the researchers is more effective and useful, compared to the Top-Down approach. Different experiences from both the projects have demonstrated that ICT and

Internet cannot be just "dropped" in a rural village, without raising proper awareness, familiarisation and literacy training. Nevertheless, technology alone cannot bring about changes. The power lies in the community itself that can be brought together and the collective vision they share for community liberalisation and development. The local communities are and should be the owners of the project. Without them, there will be a lack of driving force to propel the project for further development and enhancement. A sense of ownership should be instilled in the community. Though the long-term effects of the project and Bottom-Up Approach is not clearly apparent, the successes met by the e-Bario project identifies that the participatory Bottom-Up approach is a prerequisite for success and sustainability.

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