Use Models of Technology – Project Completion Report

Bal Krishna Bal
Language Technology Kendra, Nepal
bkbal@ltk.org.np

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Contents

1. Background

In today's world, it is absolutely an irrefutable fact that Information Communication Technologies (ICT), as a tool of development has enormous potentials to transform any society in a rapid scale. However, this cannot be taken as something for granted. We have witnessed enough situations whereby numerous efforts and initiatives have ended up fruitless and in vain. Sustained use of ICT and sustainability of the initiatives have been a major issue and without enough homework and thoughts in this front, almost any endeavor in this direction is bound to fail.

The Language Technology Kendra (LTK), Nepal conducted the Use Models of Technology Project (August 1, 2011 – March 2012. Under the Project, we helped establish a Community e-Center at Tangting, a remote village to the north-eastern part of Pokhara, the second biggest city of Nepal. The Project was basically focused in investigating the sustainable use models of technology. In the sections that follow, we take a walk through of the different stages of the Project starting from the inception till the implementation and analysis of the outcomes.

2. Project Objectives:

2.1. General Objectives:

- Examine the process of learning technology across different end-user groups
- Investigate the effective mechanism for transferring knowledge and technology skills among the end-users of non uniform capacities and skills.
- Assess the impact of the introduction of technology in the individual and social lives of the end-users.
- Investigate the requirements for a self-sustainable use model of technology.

2.2. Specific Objectives:

- Research into the learning process and effective transfer of knowledge and technology skills to the end users.
    - Investigate the pace of learning technology among different end-user groups categorized by gender, privileged and underprivileged classes, castes, age groups etc.

  - Investigate the learning capabilities of end user groups versus a particular set of technology.
  - Investigate the effectiveness of the transfer of the technology skills and knowledge through different training modalities.

- Research into the impact of the introduction of technology.
  - Investigate the positive influence of technology in the individual and social lives of the end-users.
  - Investigate the negative influence of technology in the individual and social lives of the end-users.

- Research into self-sustainable use models of technology
  - Investigate what it means by a self-sustainable model from a financial perspective.
  - Investigate what it means by a self-sustainable model from a technological perspective.

3. Scope of Work

- Conduct a base line study of the infrastructure and technology awareness levels of the end-user in the selected sites.
- Develop effective end-user trainings of technology and test their applicability.
- Conduct a study on the perception and learning capacities\skills of technology across the end-users of varying gender, privileged and under-privileged classes, castes, age groups and so on.
- Suggest a self sustainable model for the long term adoption of technology for the selected sites.

4. Activities and Outputs

Below, we describe the different activities and respective outputs of the Project which were formulated and executed based on the objectives and scopes set for the Project.

4.1. Selection of site and Baseline study

Figure 1: Location of Tangting in Google Maps

Courtesy: Google Maps

The selected site – Himalaya Milan Secondary School, Tangting is approximately located at a 2 hrs bus ride from Pokhara followed by another 4 hrs uphill climb on foot. The site has been chosen primarily taking into consideration the following:

- Despite of its remoteness, the site represents itself as an example of a struggling society for development on its own on all aspects – education, health, economy etc. The school, for example, is completely community-run and so are the health posts and other services available in the village. Sustainability of any program or activity much depends upon how much ownership is taken towards the program by the local community.
- It has the necessary infrastructure and other pre-requisites to operate the community e-center: electricity is available through the local power micro-hydro plant, internet connection is available through Nepal Telecom's Satellite, there is a dedicated room as a computer lab for the center, and there are sufficient highly motivated people to support the new technology technically as well as financially.

Figure 2: Himalaya Milan Secondary School, Tangting

The baseline study of the site revealed the following:

School Demography

Total population: around 300

Average students per class: 25-30

Composition of Class

Ethnicity wise: Gurung (85 %), Dalits (15%; Nepali, BK and Pariyar)

Gender wise: nearly 50/50

Toppers in class: Males from Gurung community

Absentees:

Dalits more than Gurung

Males more than Females

Dropouts: 0 %

ICT Infrastructure

Electricity: Present in the mornings and evenings, diverted during daytime to run the local mill

Computers at the lab:

Total number of computers: six, (only 3 working properly at present)

Operating System: Windows 7

RAM: 1 GB

Hard Drive: 160 GB

Internet Bandwidth (using NT SAT): 128 Kbps

For Nepali Typing they use non-unicode fonts, not initiated in Unicode so far!

On the use of computers by the students

- Students highly interested in using the computers
- 9th & 10th standard students practice Microsoft Word, carry out some 'google search' of the subject matter they come across in class. (N.B.: The students better in English language generally take control of the computer while doing the google search!)
- Not started yet with emails, and facebook
- Encarta and Oxford Dictionary etc displayed in classrooms using LCD projector
- Teachers would rather prefer the OS in English language, as they think 'it would make the students more compatible with the world at large'. However, they opined that applications like Nepali Dictionary, Spell-checker etc would indeed be of help
- Mr Prakash Gurung (Head Master of the school) including other teaching staff were also positive to the idea of equipping the students with video cameras, audio-recorders, letting them document various aspects of Tanting, and uploading to youtube, or a dedicated website
- The school staff suggested that the target students for the project could be of 8th, 9th & 10th standard (if so we will have a total of 75-90 students, and 25-30 students to cater to in each shift)

4.2. Development of Manuals

In order to facilitate the trainings, we developed some user manuals. These covered the following topics:

- Basic tips on Google search
- Some tips for setting the environment for Nepali Unicode in Windows and Linux and basic typing
- Some tips using Mirage and Audacity software to edit pictures and videos
- Using the Libre Office Write – How to?

Unlike conventional user manuals, which provide exhaustive instructions on how to use, these manuals are mostly developed to provide only the basics of the area and rather were used to encourage the trainees to participate actively trying to explore more on their own through certain tasks that were provided at the end of each session.

4.3. Lab setup and Deployment of Technology in the site

Under the lab setup and technology deployment, we set up a lab of 11 machines all connected to a local area network (LAN). Out of the 11 machines, 5 machines were part of the Project's support whereas 6 machines were contributed by the site. As part of the lab setup, the Project also provided 10 webcams, 5 headphones, 2 digital cameras, 1 recorder etc. The lab was provided internet connection through the locally available V-SAT technology.

We installed Ubuntu 11.4 in the lab which was customized by the technical team of the Project with the following localized applications:

- Nepali locale and input
- Nepali Spell checker integrated with Libre Office
- Nepali Sabdakos (offline version)
- School Wikipedia (offline version)

Besides, we also installed the off-line version of the E-Pustakalaya in the lab, which was kindly provided by the Open Learning Exchange (OLE) Nepal.

4.4. Trainings and Evaluation Methodology

We organized the training into two phases, the first one being the Trainers' Training and the other one being the End Users' Training. In the Trainers' Training, the teachers and the community people were trained on the system, which basically included:

- Using the system and trouble shooting
- Basic networking and system support

- Basic orientation on the applications

Altogether, 11 people attended the trainers' training out of which 9 were teachers and 2 were community representatives. The teachers from the school who participated in the training were Mr. Om Prakash Gurung, Mr. Sangam Bhusal, Mr. Dilli Jung Gurung, Mr. Khagaraj Kuikel, Mr. Madhav Acharya, Mr. Jas Bahadur Gurung, Mr. Bhimkasi Gurung, Ms. Nismi Gurung and Ms. Hira Gurung whereas the community representatives were respectively Mr. Karna Gurung and Mr. Japan Gurung.

Prior to the Trainers' Training, a survey was conducted on the competencies and computer literacy of the participants on the site.

The second phase of the training included the Users' Training to students. The students were provided training on the following:

- Typing in Nepali Unicode
- Using Office Applications
- Using E-mail, Internet, Skype, browsing web pages and Googling
- Working with images and videos (recording and basic editing, uploading on the web)

We provided the Users' Training to 14 students from Grade 10, 29 students from Grade 9, 16 students from Grade 8, 30 students from Grade 7 and 34 students from Grade 6.

In the second phase itself, we also provided refresher training to those who had attended the Trainers' training.

Once the Users' Training was provided to the students, we conducted the lab sessions in basically two modes:

- Unsupervised sessions, whereby the students were left on their own independently to explore and use the applications as per their own interests.
- Supervised sessions, whereby the students were asked to accomplish certain tasks like working with Office Applications, saving the files, searching the materials on the web etc.

The students' activities in the lab were minutely observed in both the sessions using manual and automatic methods. In the manual observation method, students' activities were manually entered into the spreadsheet file like (active versus not so active, eager and asking questions versus quiet and not inquisitive etc.). In the automatic observation method, individual student activities were recorded via Desktop screen capture applications and tracking the web pages browsed by going through the "History" menu of the browser.

4.5. Study on the Use and Perception of Technology

For the study on the use and perception of technology, we formulated the following research questions:

4.5.1. Research Questions

- How would the students respond to the introduction of ICT?
- Will the gaps in the learning curves of ICT for different gender and castes be the same as for usual academics?
- Will ICT throw up surprises? Will it help narrow down the gaps?

4.5.2. Research Objectives

- To compare the performance of students from different ethnic, gender backgrounds in regular classes and ICT lab
- To observe the role of language, previous experience/exposure to electronic gadget/s in technology adoption
- To note the most in-demand application sought by the students, teachers and community members

4.5.3. Methodology

Survey, Participant Observation, and In-depth Individual Interviews

Survey:

For the research project, an initial survey of 80 students from grade VI to IX was undertaken in which information regarding the gender, ethnic background, occupation of parents, family size, current ranking in the class, their knowledge or exposure to computers, internet, or other ICT tools were noted.

Participant Observation:

Participant Observation Method was adopted to gather qualitative data on the students' performance (task-based as well as non-task based: observing their typing ability in Nepali and English, use of search engine, key search themes, use of social networks, educational contents, popular application in terms of use), their inquisitiveness and inhibitions regarding asking questions to the teachers, sharing newly-learned computer skills with friends, formation of groups among students when a single computer had to be shared by more than one student etc.

Individual Interviews:

After the observation period, semi-structured interviews were conducted with all the users. The objective of this process was to assess how much the users had learned, the perception regarding the entire process of learning ICT, and to collect evidence as per the theme of the objectives as stated above.

Observations:

Previous Exposure to ICT

- Barring very few, most of the students had no previous experience of computer use. Most of the students had no idea as to the basics of a computer, like the hardware and the software, how a computer is switched on or shut down. They had seen a 'computer' but had not had any opportunity to use it. However, several had heard about internet, email and social networking sites like facebook. Of the few who had previous exposure to computers, some had the opportunity to use the few computers that were in the school for at most a couple of times. Some had used computers while visiting Pokhara, the city a day's distance from Tangting. However, none of the 80 students owned a personal computer at home.

- Only few even had a television set at their homes. Of those with TV some had used TV remotes. Nevertheless, save two exceptions, at least one member of the family owned a cell phone with which the students had got some exposure to the digital world, like taking photographs and videos, sending and receiving texts, listening to songs, watching videos, and playing games. It would be interesting to observe how much this experience of ICT through cell phones, or with TV help in learning computers.

- After the survey, the students were introduced to computers, basic operations, and using the applications of Libre Office, including the Nepali Unicode Typing. The training was conducted in collaboration with the school's science-cum-ICT teacher.

Patterns of Learning:

Three different patterns of learning were observed among the students. For convenience we have classified them as following:

- **Group 1:**

  They (males and females) are relatively quick to grasp the computer lessons, and are more interactive in the computer class. Those happen to be the good students that also do well in the school exam system.

- **Group 2:**

  These are average students, less interactive in the class, but they have become more interactive, more open, shown more enthusiasm, and learned faster in the computer class, their performances being better than expected by their teachers.

- **Group 3:**

  There are several students from the Dalit community, and some female students below average students who do not have good academic records, earlier hardly asked questions or interacted with teachers in the classroom- who have displayed enthusiasm for computers, and look forward to learn more.

Language & Technology Adoption

Despite the fact that most of the students were using computers for the first time, and given that initially they found even the handling of the mouse difficult, they expressed joy at being able to type their feelings in the Nepali language. Their initiation of ICT has been a smooth one perhaps Nepali being the language they study in, can understand and speak, contrary to the English language in which they happen to be considerably weak.

4.5.4. Results and Discussion

On the performance of students, the first group can be explained as normal outcome. After all, the students who have been excelling are expected to do well also in something like ICT, a field that is perceived as a tool of learning. The emergence of the second group – the average students who have shown some promise- is an encouraging one. If ICT can make average students (i.e. most of the students in a class) more attentive and open this might also have some positive influence not only in the learning of the ICT, but with their regular classes as well. However, another contributing factor to this phenomenon could be the more congenial and interactive atmosphere of the ICT lab as compared to regular classroom. Also, students learning something entirely new and the subject they had already been looking forward to learn could also have triggered the enthusiasm that was observed. The most encouraging trend was observed in group three, the users at the bottom rung of the academic ladder, the majority of whom consisted of female students and those from the Dalit community that exhibited a desire to learn that the teachers of the school previously had not observed.

It would have to be a long-term project to assess whether doing better in ICT also equates to doing better in classes in the similar way that students doing better academically also did better in ICT as observed in Group First. However, there is enough scope to suggest that if the students are interested in ICT, they will certainly be better placed to search and use the required educational materials available in the web, which are -unlike the conventional educational materials- interactive and hence in most cases easier to comprehend.

In positing the positive role of ICT in education and particularly that of the marginalized communities/ ethnicities, we cannot altogether avoid bringing to the picture the overall socio-economic scenario and the role that ICT can potentially play in the larger scheme of things to empower and lessen the socio-economic divide. To put it more simply, say, if the ICT intervention can help increase the quality of education in Tangting village and produce better students, which the current initial observations indicate to, it will also play a role to lessen the marginalization of the community, i.e. the marginalization of Dalits and further uplifting of the Gurungs.

In that vein, given that modern life is increasingly dependent on information technology, the sooner we can introduce information technology to rural areas the better it appears. If they are not able to join the IT revolution, the already marginalized populations of Tangting village, who have been victims of both socio-political prejudice and at the receiving end of the utter disregard by the state will be further marginalized and alienated from the mainstream society. Also, we have to be

careful to not be over optimistic and wish that merely providing the students with computer and access to internet will help solve the issue brought about by marginalization of communities since centuries or millennia. After all, digital divide is just the continuation/reflection of the social divide in the digital world. Hence, one may not be entirely off the mark if she assumes that if the socio-economic disparities among ethnicities and communities are reduced, the digital divide will automatically lessen. However, the moral as well as practical issue is whether it would be humane to wait out the ages of time such an optimistic recourse might require. Whereas, in the relatively nascent field of the digital world, there is still an opportunity to not let the disparity swell up to the level, that has been extant among communities since historical times.

Regarding the role of previous exposure to ICT or related stuff on the adoption of technology, it was found that students who had previously used television remote controls and/or various applications mobile phones were able to familiarize with the computer mouse in relative shorter duration. However, those who had earlier not used a television remote, or apps in mobile phones like texting, media player, camera etc required more time to be able to control the mouse.

Similarly, regarding the role of language, we observed that initially the students queried whether more computer applications were available in Nepali, as they were unknowingly seeking the middle-path of opting for Nepali which was easier for them than the English language, Gurung being the first language of the village. Hence, the trainers were a bit apprehensive in conducting the training in Nepali. However, in the post-training interview, when the users were asked which language they would prefer for using ICT, most of the participants expressed, though without being categorical, that English was necessary, and Nepali was essential up to an extent. The majority of them avoided opting for the Gurung language. Perhaps they had this perception about the power of English language in the present day market economy and the benefits that might come from its proficiency.

Throughout the trainings and observation periods, among the teachers, community members and students, the most popular applications were facebook and skype. However, not all the students had been initiated to Facebook and Skype. Even among the students who were still learning the basics of computer, a strong desire to open Facebook accounts- about which they had heard from their friends- was perceivable; several wanted to talk over Skype with their relatives abroad. The observation indicates that ICT can be a useful and cost-effective tool in providing communications services in the village like Tangting, where almost every household has a member employed outside the country. The ICT center at the school is also being used by the teachers and community members to use social media, and contact families and friends living in various parts of the world. Moreover, several of the female teachers have taken to a special liking for a tool like Skype through which they have been able to converse with their husbands working in the Gulf countries, and some in countries like Malaysia and South Korea. In the long run this desire and demand for communications through ICT can be harvested to lure the users to search for relevant information, educational materials, and embed ICT as a tool in the learning process.

The interest shown by the community members, we have taken it as a positive development, because the possible evolution of the ICT center into a community center holds the prospect for its sustainability. In future if the center can attract regular users from the community, then

charging of a reasonable tariff for using internet and other desktop services may provide just about enough income to pay for maintaining the computers as well as for the cost of the internet.

4.5.5. Further Research Implications

There is further possibility of observing the performance of students on a long-term basis. For instance, their yearly academic performances before and after the introduction of ICT could provide more concrete evidences, for or against, the assumption of the positive influence of ICT intervention. Also, the visible impact of an ICT centre among the community members can provide relevant observations for further anthropological research.

4.6. Website development

As a means to provide a good platform for the users to share information as well as possibly interact with each other, a website was developed namely (http://tangting.com.np). The website contains both static content as well as user generated dynamic contents in the form of blogs. The website can be viewed both in English and Nepali language, i.e., the web interface has been localized. Information about the village and other local attractions like "home stay facilities" have been put as static content. So that the web site contents may be shared with the wider community, special features like "Share this page in Facebook" also have been incorporated. By creating an account at the website, one can even add comments to the blog discussions and writings. The website is targeted to use as a tool to promote Tangting as a tourist destination, disseminate information about the community e-center in the village and at the same time update the different activities of the different groups in the village like mothers' group, youth clubs etc.

4.7. Interaction with the sites people, local governing bodies

The LTK Project Management Team visited the site in early March 2012 to inspect the status of the community e-center. The Team during the visit interacted with the sites people, local governing bodies and other stakeholders. It was during the visit that a formal Memory of Understanding (MoU) was signed between LTK and Himalaya Milan Secondary School, Tangting. The two parties have agreed to render mutual support and co-operation in whatever ways possible for the continuity of the center even beyond the Project life tenure.

The locals were found to be highly supportive towards the center and have taken it as a potential medium to revive their village as a tourist destination. In this regard, they have been constantly updating about their village in the site's website. Mostly inhabited by the Gurungs, who are renowned for their presence in the UK Army as Gurkhas, the village seems to be properly planned in terms of design and construction. Each house has a proper toilet and bathroom, a rare sight in the villages at such a location. Besides, electricity and drinking water is available in the village at every house 24 hrs, something the people in the capital, Kathmandu can only dream of.

The mothers' group from the community seemed to particularly very pro-active in terms of generating awareness campaigns about women health, rights and on becoming self-sustainable. It is on their own initiative that they have maintained a community basket fund by raising NRs. 20

per person per month. The fund till date already amounts to NRs. 5, 00, 000 and this amount is ever increasing. This group also has been collecting small donations from tourists through cultural shows and fun fairs. The interesting discovery was that the mothers' groups are equally active in the development activities in the village. For instance, they have been actively supporting the construction of a sports complex in the village for the youths. The group is also keen towards the running of the center.

Figure 3: Being given a warm welcome

Figure 4: Mothers' group in a function

Figure 5: Addressing the students

Figure 6: Group photo with the students and teachers

Figure 7: Leaving Tangting

4.8. Suggesting a self-sustainable model for the site

Based on our study, observations and analysis of the use of technology in the site, we have suggested the following model, which we believe is self-sustainable and hence suitable for the given site:

From a technological perspective:

- In order to maintain a pool of technical human resources capable of looking after the center, the site has to develop a small core team (7-8 members) comprising of at least two smart students from Grades 8-10 under the leadership of a teacher looking after the center. This way, even if one or more of them would leave the

site for some reason, the site will not be short of technical people to handle technical problems.

- The site has to document the technical problems faced and also the possible solutions in the form of "Frequently Asked Questions (FAQs)" and put it somewhere readily accessible to the Users, for example, in the intranet of the site.

- The site has to use all channels of communication – telephone, SMS, chats, Facebook, emails, mailing lists, forums etc. to communicate with LTK and\or other technical experts regarding any problems that they would face in the sites.

- The major target audience of the site being the students, the site has to gather more useful content meeting the curriculum needs of the students. They have to be trained on the latest tools for teaching and learning.

- The site has to arrange for a balanced time allocation for the students in terms of using the center and the tasks or assignment based learning approach has to be encouraged.

- The site has to arrange the time in the mornings and evenings for the community people and the day time mostly for the students and teachers so that there is no unnecessary conflict on sharing of resources between the school and the community people.

- The site has to be pro-actively engaged in updating its website so that more and more people both within Nepal and outside get to know better about the site thus potentially leading to its revival as a tourist station.

From a financial perspective:

- The site has to charge nominal fee or charge to the students and teachers as well as the community people for taking the services from the center.

- As more tourists flock in to the site in future, the center may also offer internet and other services to the tourists taking some charge or fee.

- The site has to look for subscription to cheaper internet service providers. In order to prevent its machines from possible damage caused by unstable power supply, the site has to invest on voltage stabilizers.

- The site has to use the facilities of the center the maximum possible in order to promote and exhibit its local products, culture and other local attractions.

- The site has to work towards setting up an endowment fund to support the operating costs of the center. The money collected from the center by selling its services could be used as a starter fund for setting up the endowment fund. Additionally, the local governing bodies like the Village Development Committee (VDC), District Development Committee (DDC) should also be contacted for a one-time support contributing to the endowment fund.

- The site has to possibly start thinking of making it a wi-fi enabled village. In that case, the school could act as a service provider. This way too, some revenue may be generated, which can be put in the endowment fund basket. Once the endowment fund basket attains a considerable size or amount, the operating costs of the center can be managed with the interests earned from the fund.

5. Conclusion

To sum up, in the given Research Project, we have:

- Investigated the appropriate and effective use models of technology in the site through participant observation. The current findings suggest that there exist at least three categories or groups of students. The second and third category of students have shown that they pose enough possibilities for improving their overall academic performance if ICT could be properly incorporated in their daily teaching and learning process tool backed up by sufficient homework in terms of trainings and deployments. Not only the students but the Project has triggered enough sparks of interests in the other user categories as well for example, the teachers and the community people. The teachers have been finding the technology useful for gathering lecture materials as well as for presenting the teaching materials in a more understandable and motivating to learn and perceive. The community people on the other hand have identified the technology as a powerful means of communicating with their near and dear ones, with whom they had been communicating not that quite often owing to the need to walk a few hours to get cheap internet phone services.

- A tool has been identified for a continued motivation of the site people in taking the program and activities forward through the development of a website that can be used as a hub for communication between people from the site and their relatives and friends staying away for one or more reasons. The same website can be used as a medium to disseminate information about the site and possibly attract some continuous funding source or some revenue generation directly or indirectly.

- The selected site is an example of a struggling society for development on its own on all aspects – education, health, economy etc. The school, for example, is completely community-run and so are the health posts and other services available in the village. Sustainability of any program or activity much depends upon how much ownership is taken towards the program by the local community.

- Hence, from every angle, the Project has laid the foundation stone in its short tenure of 8 months to build the necessary pre-requisites for establishing a center, trained the site people on the system thus creating seed technical resources and at the same time enough and motivated users base to ascertain the sustained use of technology and make the program sustainable. Undoubtedly, as the users base of Tangting matures, and as the governing model replicates to a few other sites, we would have developed a stronger base for coming up with further empirical data to justify and prove/disprove our numerous assumptions and hypotheses for or against the Use Models of Technology.

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