



The Local Ingenuity: Maximizing Livelihood through Improvising Current Communication Access Technology

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This paper presents what it means for the low income, non user segment to have 'technological voices' and in turn 'be heard' socially and economically. It argues that the ICT liberates low income people to explore ways in which technology might help to support their livelihood. We draw on recent ethnographic research conducted in Bangladesh on the low income, non user segment. Some of the questions this paper seeks to answer are as follows: What constraints do people have when using communication access technology? How do they modify communication access technology to better suit their lifestyle and livelihood? As the provider of service, how can we be constantly aware of the need to modify features and make the necessary modifications?

"Communities have the know how to convert technologies to uses that satisfy their needs in ways often not anticipated by the producers of technology."
Francis Tusubira, Professor, Directorate for ICT Support, Makerere University, Uganda

INTRODUCTION

In many cases, companies find it difficult to integrate unexpected findings from the field into their design of services. This paper examines first, the ingenious and local ways in which individuals living on less than a dollar a day interact with technology, and secondly, the social meaning and implications for technology adoption in lower income segments, especially the non users¹. By understanding the phenomenon of local ingenuity² and adoption, we hope to better predict the sustainability of communication access technologies³ in the longer term.

¹ This paper focuses on the very poor or low income segment and non users. The non users are defined into two categories. First, mobile and PC/Internet non users: people who do not own a mobile phone or have PC/Internet access, and rarely or never use other people's mobiles and Internet access. Second, mobile and PC/Internet users: people who do not have their own mobile and PC/Internet access, but do use other people's mobiles and PC ("non mobile and PC owner" and "users").

² Local ingenuity or borrowing innovations is a concept about an economy or a group or a person being inventive by adapting and modifying original ideas developed by others, thus creating local ingenuities that better suit the local environment and needs.

³ We define communication access technologies as comprising of devices that can access the Internet and/or mobile communication.

THE STUDY BACKGROUND

Our research objectives were to uncover the needs of non users in the low income community, how they might use or adopt mobile and Internet services, and how to design technology based on people's needs, constraints and aspirations. This research was funded by Telenor Research and Innovation Center Asia Pacific.

We did not set out to create a new method; however, a new approach emerged as a result of the research. This paper attempts to demonstrate a more robust way for researchers to elicit 'thick description' not only from the perspectives of the respondents, but also respondents' interactions with their local community. The author experimented and reapplied this method across different domains such as a public call office (PCO); group learning, sharing and experimenting; mini minutes upload; voice news; multiple SIMs; video conferencing-on-the-run and amplifying signals. We interviewed and observed individuals before and after they used mobile and internet services, and based on examples of local ingenuity, identified the relevant dimensions of new services for the non users

FIELD RESEARCH METHODS

We recognized the difficulty of targeting low income, non users for fieldwork. The challenge was: How do we draw out behaviors and create new services when there is little evidence of technology consumption? The fieldwork approach of this project thus reflected these limitations.

Fieldwork

The field studies included about thirty semi urban areas and villages across Bangladesh. In each site, our interviews averaged three to four respondents. We sought to understand the 'wholeness' of the communication access technology adoption and social communicative practice (Borgatta and Borgatta, 1992; Ling and Pedersen, 2005). This fieldwork was conducted through indepth interviews, two person interviews (or sometimes known as friends/intergenerational interviews), contextual observation and shadowing (Kuniavsky, 2003; Rosenthal and Rosnow, 1991; Agar, 1980; Bernard, 1994).

- **In-depth and two person interviews:** The indepth and two person interviews were designed to garner descriptions about the respondents' needs, values, aspirations, daily livelihood, experience with using the Internet and mobile phone, communication and interaction behavior, and social network. We spent approximately three to four hours at each site, soliciting general descriptions as well as specific opinions triggered by the respondents. The indepth interviews often attracted curious onlookers and the interviews turned into ad hoc discussion groups, which enabled us to gather rich, mixed opinions.
- **Contextual observation:** We did walk around the local community to get a sense of the contextual livelihood of the respondents that we interviewed. In many instances, we

found interesting ways in which people interacted with each other and were shown different ways in which people used the mobile phone and Internet.

- **Shadowing:** Whenever we chanced upon an individual who shared information about their friends and surroundings, we asked them to show us what they did on a daily basis.

Analysis

The analysis of transcripts, photos and notes was conducted by three researchers with a background in psychology and ethnography. We spent two to three hours or more each day for 2 months to discuss and analyze the rapid assessment process. In addition, the author of this paper used the traditional grounded theory method (also known as Glaserian grounded theory method) to bring out the “What’s going on?” description in each of the interviews conducted.

FINDINGS: FORMATION OF LOCAL INGENUITY PHENOMENON

Our findings show the prevalence of local community influences in shaping interactions between individuals. There were many facets of influence, including time (duration and period), place (common or private space) and acceptable practices (whether it is encouraged or frowned upon). A respondent that we interviewed openly acknowledged, “*I am doing what other do here. The thing is – when I talk to my friends, I know I am free to talk on certain issues at certain time. I am ‘trapped’ by certain rules, I might say*”. We shall discuss four main points to further understand the formation of the local ingenuity phenomenon.

The Three Constraints

The constraints influence the way an individual thinks about his/her willingness to pay for something that is relevant to his/her lifestyle. These constraints affect the way a technology is developed and deployed. We observed three main constraints experienced by the low income, non users segment. First, people may be ‘trapped’ by infrastructure constraints due to the scarcity of electricity, limited public transportation, restricted communication options and limited entertainment.

“Some of us here listen to voice news through mobile phone. It will be great if we can get some voice entertainment and news at night. Our usage on mobile phone is only voice, and nothing beyond that. Internet is a strange word for me.” A barber quoting his limited knowledge about what else is out there aside from voice calling

Second, individuals are restricted by never-ending financial constraints and a set of inter-related challenges such as poor living conditions, low education, poor health, unskilled work and limited education opportunities.

“I am here to pick up some photocopy documents. No, I haven’t heard of the Internet before and I have no clue what I can do with that. I visited this place quite often, but I

don't have much interest about it. I don't think I am interested anyway. I am kind of nervous, how do I point? How do I know where to go? Is it expensive to access to these pages?" **A teenage youth at one of the photocopy cum cybercafé shops who has never used Internet or mobile phone before due to financial constraints**

Third, initially, people are reluctant to enter in or extract information from devices, and use only the basic functions. They are wary about the need to learn new skills.

"After a while the Internet and PC get boring, there is nothing good there. We rather read and flip newspaper than getting lost (read: browsing aimlessly)". **A teenage youth in a library telling us about being bored without local Bengali content**

Interestingly, despite these considerable challenges, we found that individuals started to work around their constraints. A new way of using and doing things emerged that enabled people to use communication access technology in ways appropriate to their local needs and environment.

Modification of Components

From our findings, the modification of components focuses not only on technology, but also on perspectives of behavior and usage. An example of a widespread local ingenuity is the practice of "missed calls". In short, a missed telephone call is used as a signal in lieu of a short call. When one makes a missed call, it may signal to the other party some urgency such as a need for money or getting to a meeting place early. Missed calls can be used in different contexts such as signaling.

"I usually use missed calls with my father. If I give him a missed call, then he will know that my overall balance has run out. So immediately he sends me money" or in the form of coding, *"Otherwise, I might use missed calls when I arrive at a place early to let my friends know that I have reached the place. This makes them hurry up and come faster"*. **A teenage girl relating her experience with missed call and how she uses it as a means to save money and message coding**

Mixed Consumption

A third finding is the notion of mixed consumption. In many situations, we observed the low income segment utilizing different devices and services to address financial constraints. For instance, even if they co-owned a mobile phone, some of them will still use the Public Call Office (a public phone facility manned by an operator) to get an instant reduced call rate due through the on-network call service. The respondent's quote succinctly defines the real value of a PCO:

"I don't like to upload my call credit, I rather just pay 10 Takas and make a short 2 minutes call." **A working adult telling his reason for alternating between uploading and not uploading call credits**

Intransitive Choice

The notion of intransitive choice⁴ is the phenomenon of modifying a new technology based on how people evaluate different choices of consumption. In some instances, in order to save money, an individual may resolve to do SIM switching⁵ either due to lack of network calling clarity or to try to save on few Takas of calling time:

"I will use whichever number gives me the lowest call rate. If Grameen offers it, I will use Grameen, if Banglalink offers it, I will use Banglalink." **A working woman recounting her decisions on which service to choose**

LILC FEEDBACK LOOP: A WAY TO BREAK THE MINDSET

It is through the use of a fusion of ethnographic and participatory design methods that we are able to stimulate and generate insights into human communication and interaction behavior. For example, rather than being stuck with introducing more products or service features (designing a solution around a problem), the LILC feedback loop process examines the use of a product or service from the viewpoint of an individual and his/her local community to get to the core of his/her needs and desires (finding the root cause to a problem).

Local Ingenuity Feedback

The LILC feedback loop process begins by understanding the local ingenuity feedback (See Figure 1). It facilitates understanding the interplay between different constraints and how they in turn, affect those dimensions being modified. At this juncture, we may introduce a service currently being developed or a current service for the users to try out. Then, we observe and note the user experience and in what dimensions users modify their usage behavior. For example, if the user repeatedly skips a step to access a service and uses another feature more often to access the service, we should note what is being done and know why the user is doing so. This could be a source of inspiration for local ingenuity.

⁴ It refers to a person's inconsistent choices for different consumption purposes. For example, a person might rank A higher than B and B higher than C, and unexpectedly, rank C higher than A.

⁵ SIM-switching refers to the practice of a mobile service subscriber possessing more than one SIM card and alternating the main SIM card with one or more SIM cards.

Domestication and Diffusion Process

Our assumption is if the local ingenuity proves to be appealing to more people, the process of domestication⁶ and diffusion will begin and will affect more lives within the local community. This will set the stage for the second phase of the process, which is to observe behavior within the broader community by further exploring design modifications. In other words, how and in what ways does the community experience and influence consumption? A brief phenomenological mapping of consumption experiences and constraints enables us to draw out meaningful structures of the consciousness of human experience (Polkinghorne 1989). At the same time, from a sociological perspective, we attempt to understand how individuals consciously develop meaning from their social interactions, and examine whether these will sustain local ingenuity in the longer term (Swingewood 1991; Moustakas 1994). If so, as a service provider, we can innovate from this point through further modification. The interplay of the local ingenuity and community feedback loop gives us a clearer picture of the domestication and diffusion process between individuals and local community.

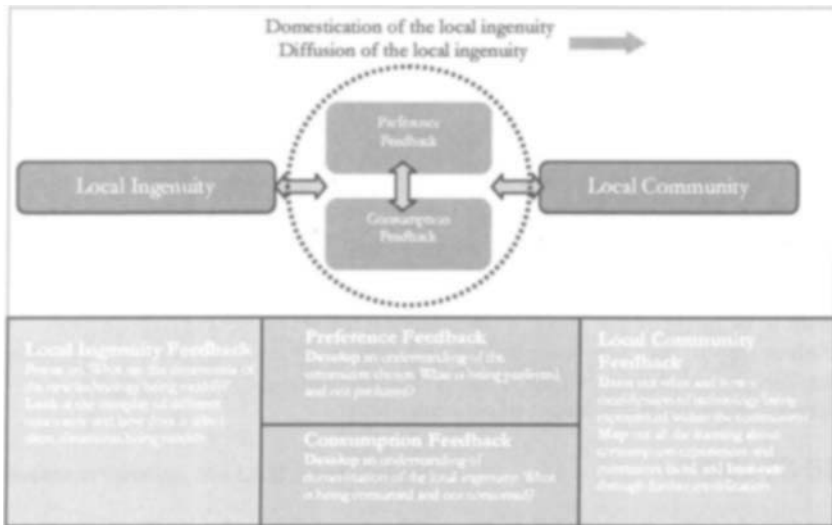


FIGURE 1 The LILC feedback loop.

Preference and Consumption Feedback

The process so far is quite straightforward. The next loop phase is more complex as we dig deeper to look into intransitive choice and domestication of local ingenuity. We start to review the local ingenuity phenomenon at the level of service constraints and modifications

⁶ Refer to the work of Silverstone and Haddon (1996) about domestication of technology.

for the individual and the community. To really come out with a good service based on the research, we need a deeper understanding of ‘What is being preferred and not preferred?’ At this stage, we initiate a second round of understanding the local ingenuity by examining the intransitive choices of the targeted segment. At the same time, we will be able to develop an understanding of domestication (what they really use) of the technology: What is being consumed and not consumed? The closer examination of the interplay of consumption and preference feedback loop gives us a clearer picture of what product/service features that really resound with the users’ needs.

Local Community Feedback

To complete the LILC feedback loop, we need to extract what and how modifications of the technology are being experienced within the community. And, at the same time, we need to map out what we learn about consumption experiences and constraints and to develop modifications and new service innovations.

As in many research projects, the schedule was tight, and yet lengthy gaps in the schedule are needed to understand users’ feedback. The deployment of the LILC model means working continuously with the users and their local surroundings with little inactive schedule in between. The model also works well in an environment where there is little knowledge about usage/user experience. There are some notable constraints when applying this model. We need to take into account the cultural differences of different communities. For example, in a local community, people may be willing to express their preferences and help to elicit their requirements clearly; this may not happen in other communities. There is also a need to be aware of two interpretation biases of this model. Firstly, there is the simplification bias due to the investigator not having the complex model of an expert. It is important to be aware of this bias and ask users or a subject matter expert to review notes/observations. Secondly, there is the translation bias due to expert users attempting to translate their knowledge so that the investigator can understand it. The more the translation, the greater is the danger of oversimplification.

CASE STUDIES

We will describe a case study⁷ to illustrate the use of this method.

Public Call Office

Our research found that a large number of people who did not own a mobile phone nonetheless knew about or had used mobile phones before, either sporadically or as

⁷ Only one case study is described here in order to adhere to page limit guidelines. There are other examples such as group sharing, learning and experimenting, multiple SIMs, video conferencing on the run, mini minutes, voice news and amplifying signal.

frequently as three to five times a day. What we found points to a popular place that can be found on almost every street corner in Bangladesh. A vast majority of the non owners of mobile phones were found to be hanging out or dropping in briefly to rent a mobile phone to make call at a public call office (PCO) The PCO is a manned version of the automated payphone located either on a busy street or lonely corner. Customers can rent mobile phones from PCOs to make calls. The PCO operator usually owns multiple SIM cards of the same or different mobile operators. The main reason for this is to match the customer's chosen mobile operator to save on on-network cost per call. Some of the more technically skilled PCO operators also obtain licenses to fix simple mobile phone malfunctions.

For now, I am communicating with my parent through a PCO (Public Calling Office). I will just go there, pay up and use the phone facility over there. A college student quoting his way of communicating without owning a mobile phone

The popularity of the PCOs is not just a phenomenon that is related to non-ownership of mobile phones. The interesting revelation was the similarity between owners and non owners of mobile phones – they all used the PCO to make calls. We observed that the PCO serves four purposes targeted at the low income segment: First, as a 'hanging around place', whereby the PCO serves as a social place that is frequented by regular customers. Second, it is a social connector, the PCO operator serves as a messenger (if someone sends an SMS or leaves a voice message), and as a creditor (if someone needs to borrow a few minutes of calling time). Third, it serves the purpose as a convenient drop in place, the PCO provides a place to make a call, get upload, fix the mobile phone and as a convenience store (some PCO operators do other business as well). Fourth, it is a window for mobile communication, the PCO operator assists in helping to dial a number (especially overseas calls), sending SMS, and as a helper in starting to learn about mobile phones.

"The PCO (short for Public Call Office) is everywhere and I don't have the problem finding one, I rather walk a few miles to the PCO, if necessary to save a few Takas."
A college student quoting his way of communicating without owning a mobile phone

Assessment through the LILC Feedback Loop

Through the PCO case study, we were able to elicit several observations and reapply the information to enhance our understanding of why the PCO (as a local ingenuity) survives and is sustained by assessing it through the LILC feedback loop⁸. In particular, this supplied us with information on what dimensions are modified, what is preferred and consumed, and finally, how is it being experienced by the individual and his/her local surroundings.

Local ingenuity feedback: As a result of their financial constraints coupled with their limited capability to make calls, some individuals started to use the PCO to build their

⁸ Please refer to Figure 1 for a diagrammatic representation of the model.

confidence in using a mobile phone before purchasing one for their own use. They tried to work out their limited capabilities such as dialing a number or sending SMS by asking the PCO operator to do it for them.

"I learn to use mobile phone through the PCO. No one teach me at home, I am not allowed to use a mobile phone. Now I can." **A female student, early user of mobile phone**

Preference feedback: The PCO users like the fact that PCOs are everywhere, either along a busy street or on a lonely corner. It is also a place for socializing and meeting up with friends to catch up on the daily happenings. In essence, it is the social bonding experience that is striking here, rather than the mere calling facility.

"I like it here. Just drop by, have a cup of tea, hanging out. Here I can hear a lot of gossip about what happened here and other place. No need for radio or newspaper." **An elderly man who spends some of his time in the PCO and considers it essential for his social bonding with friends**

Consumption feedback: Most of the experiences that we elicited from the respondents indicated their sustained interest with the PCO. There were strong indications that the PCO is part of their daily life rather than just a facility; this is even more so for a person who owns a mobile phone but still goes to the PCO to make calls. The PCO is referred to as a social institution by some respondents. This is due largely to the function of the PCO as a provider of a simple, cheap and convenient service. According to the respondents, this is really what they want from a mobile service, no more than that.

"I have no worry whatsoever to call or receive call. I just go to my trusted PCO who has been serving me for a number of years." **A trader, who frequented the PCO five to six times a day**

"It is so easy here. Why should I get a mobile phone?" **A rickshaw puller commenting on why he is still a non owner of a mobile phone**

Local community feedback: Taking the preference and consumption experiences as a whole (from the local community perspective), we could deduce some form of concrete behavior modifications that had been domesticated. First and foremost, there is a tendency of the PCO to mushroom further as more people own a mobile phone. This is because the PCO attracts not only non owners, but also owners of mobile phones. Although the attraction of the PCO is very much price driven, further inquiry would show that there are more underlying reasons for their popularity within the local community. Our analysis showed that the PCO's sustainability in the local community is due largely to the formation of social circles around the PCO. Social circles are much the same as social networks, but we refer to it here more as a circle of individuals that are connected to and surrounding one individual. In this case, a person's social circle is comprised of the persons/individuals one

communicates with through the mobile phone. This explains the distinction in the degrees of relationships. The closest to one's social network (such as immediate family and closest friends) is the first degree circle, and the next to it (such as friends of friends, other relatives, colleagues) would be the second degree circle.

"PCO has a long history in our society, they serve me well when I first migrated to the city. I was alone and without any mobile phone. The PCO is like a line life for me!" A trader telling us about his long time experience with the PCO

On this basis, we are proposing to leverage on the social circle factor when we design new mobile and Internet services that are wrapped around simple, cheap, shared access and convenient factors; for example, creating a mobile service with simplified pictorial interface that shows different circles of friends to differentiate call rates and other benefits.

IMPLICATIONS AND APPLICATIONS

The findings show the importance of understanding the users' surrounding environment before attempting to focus solely on a singular entity such as a farmer or a hospital. This is important in order to unearth the enabling factors that can drive a project forward such as identifying key stakeholders and understanding some unique social practices. Another lesson is that it is important to conduct an impact assessment study before and after implementation of a service offering. Looking at the PCO case study and the model, several questions were posed:

- What's the story behind every local ingenuity case study? Is there a way to track back such local ingenuity?
- Is the usage behavior pattern coherent with other local communities?
- If more than one person studied a focus area or observed a single user, what are the similarities and differences found?

We are still at an early stage of design decisions. The findings were used as inputs into empirical and business case prioritization and filtered into several major services' distinctiveness. The work involves identifying the activities that are directly connected with owning and using a product or a service (Allmendinger and Lombrelia 2005). The question then becomes, 'Which of these activities represent opportunities?' The modification of services will be proposed for the management before the start of the pilot study.

CONCLUSION

We found the important notion of local community influences on individuals or groups in shaping social communication and interaction. Therefore, it is an important perspective to follow through in ethnographic and participatory design processes. In the end, it is for us to conduct in-depth ethnographic research to find the inner voices of the low income segment and turn their inner voices into 'technological voices', subsequently touching their lives, and in turn enabling ways in which their lives 'can be heard' by the wider world.

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