

Please call ME.N.U.4EVER: Callback & Social Media Sharing in Rural Africa

N.J. Bidwell, M. Lamas, G. Marsden, B. Dlutu, M. Jones, W.D Tucker, E. Vartiainen, I. Klampanos, and S. Robinson,

Abstract. In this paper we report findings generated during the early phase of a research project that aims to design and develop social media sharing systems to benefit marginalized communities. Studies of cell-phone network users in the developing world have shown that the relatively high tariffs for network access have resulted in new and innovate uses of technology to circumvent these costs. In this paper we describe a completely new form of service appropriation and how it is being used to overcome tariff costs in a remote rural area of South Africa. In this country, cell-phone providers offer a highly constrained form of free messaging to their subscribers called “callback”. These requests contain the caller’s cell-phone number and the recipient’s very short personalized message. Up to five free callback requests can be sent per day to any South African cell-phone network. This service is provided for emergencies when as pay-as-you-go customers do not have any airtime left. However, callback is used in rural areas in ways that go far beyond emergencies. As with SMS, the constraints on the callback have been appropriated by people to shape both a new language and cultural interactions. This paper reports the context of our study in communication practices in a remote rural area of South Africa, our methodology which we position within Ethnographic Action Research, and our findings and their implications for the design, development and deployment of social media sharing systems for this area.

Keywords: ICT in Social Development, Local and Cultural Interaction, Call Back Interaction Patterns.

1 Introduction

Much hype and excitement surrounds the diffusion of mobile handsets in developing regions: there are more active SIM cards in South Africa, for instance, than there are people [ITU10]. Buoyed by increased access to mobile technology, much research has been conducted on developing and creating new technologies for developing contexts; however, there remains much to learn about what people actually do with these handsets. Whilst some work considers local communication patterns in emerging markets [Bid09, LD09], it is unclear how different literacies, social practices and even network tariff structures shape, and are shaped by, the ways communities appropriate mobile technology

In this paper we report findings generated during the early phase of a research project that aims to design and develop social media sharing systems to benefit marginalized communities. The project focuses on a highly populated, but geographically remote, area of South Africa’s Eastern Cape and involves design-ethnographers, designers, technologists and community members. Our findings

2 N.J. Bidwell, M. Lamas, G. Marsden, B. Dlutu, M. Jones, W.D Tucker, E. Vartiainen, I. Klampanos, and S. Robinson,

inform the iterative design and deployment of prototypes to facilitate information sharing in the targeted community and contribute to creating a baseline against which to assess changes in local communication practices with technology interventions in the community. We gathered data using various qualitative methods, which we interpret by drawing upon ethnography locally (e.g. [Bid09]). In describing our studies we emphasize the ways our methods involve community participation and how this contributed to designing and undertaking interviews with local residents.

The results of our interviews show the, as-yet, unreported appropriation of an USSD “callback” service by community members, which provides free text messaging. They also show that younger community members have developed coding strategies in using callback and creating messages that address severe constraints on message length. These findings not only have consequences for the emergence of a new language and interaction forms but also provides avenues for designing and introducing media sharing systems suited to, and involving, the local community.

We start by presenting the context of, and motivation for, our research. Then we explain the data we sought to collect about the community and the methods we used to gather it. Next, we discuss insights from that data and describe the “new” behaviors using callback. Finally, we present design insights into creating technologies that mesh with existing practice within the community.

2 Background

2.1 Study Context

We are in the early stages of an 18-month research project that seeks to contribute significant insights into how to design and deploy social media sharing systems that will benefit marginalized communities. The Eastern Cape is one of South Africa’s impoverished regions. Our endeavor focuses on the poorest district within the Eastern Cape, Nyandeni municipality, where over 50% of households have no income, other than remittances from family members living elsewhere, pensions and child benefit; and, where 80% of families survive on less than 10% of South Africa’s national, median income for a working white man.

Local communication patterns in Nyandeni are affected by factors in addition to poverty. Firstly, due to topology, local resistance to colonists, famine and invasion and subsequent neglect by successive regimes, villages have preserved traditions in habitation and communal land-use [Bid09]. Secondly, written literacy locally is lower than elsewhere in South Africa, especially for older people. Information sharing is also affected by temporary migration for employment and a HIV prevalence of 29% of the population. In Eastern Cape people of parental age are relatively few and, compared with other parts of South Africa, the local population declines very steeply between the ages 20 and 44 ([SSA10]). People of parental age are those most likely to have either died from HIV related illness or leave Eastern Cape for work, frequently leaving children in the care of grandparents. This particular population distribution has consequences for communication patterns including remote communication between urban parents and their children and parents living rurally and a missing generation in the everyday practices of local information sharing.

The project involves Transcape, a Non-Profit Organisation (NPO)¹, which was registered in 2004 in direct response to social, educational, economic and health disadvantages in Nyandeni. Transcape is a collaboration between Mdumbi Backpackers', medical staff at the nearest rural hospital and community members of the Mankosi district of Nyandeni. Transcape helps Mankosi community members to implement projects that address local concerns and develop local capacity. Transcape's main role is facilitation; allowing people in the community to own the projects themselves, empowering them to face the challenges affecting them, and also helping to ensure that projects are sustainable.

This project builds on relationships established via Transcape and insights gained in our previous work in four wards in Nyandeni and villages in neighbouring districts. Since 2004 we have explored: deploying technology in Wi-Fi based endeavors for both tele-health connections between a hospital and clinic and for traditional leaders [TB08, Bid09]; local practices of communication and technology use through situated ethnography [GBD+10]; and, localizing media design [BRM+10]. Geographically, this work encompasses an area of only 25km², but the region is extremely difficult to traverse and the distribution and scale of our activities means interventions do not yet constitute a "living lab". Rather our experiences have enabled us to respond to local concerns and needs, align with Transcape philosophy, and position the current project within Ethnographic Action Research.

2.2 Appropriation of Mobile Services and Call Back

In building a system for the Eastern Cape we need to respond to localized appropriations of technology and local socio-technical practices. Studies of cellular network users in "developing" regions show that people have innovated new uses of technology to circumvent the costs of relatively high network tariffs. Indeed, network users use technology in ways that network providers did not anticipate, from using a cheaper internet-based service, rather than SMS [Wal10], to the cost-reducing practice of intentional missed calls, or 'beeping' [Don08].

Introducing technical solutions matched to local practices involves uncovering the local factors that shape appropriation. For instance, the MXit system has become very popular in South Africa, where local SMS costs are high and data costs are low; as it enables users to exchange messages that are four orders of magnitude cheaper than SMS. However, MXit has made little impact in developing regions, such as India where local data costs are high. Indeed service providers often respond to local appropriations. For instance, consider the difference between the 'Callback' services offered by MTN in Nigeria and South Africa. Possibly to curb excessive "beeping" [Kre09] service provider MTN enables their subscribers in both countries to send a message through USSD services, for free. An MTN subscriber in South Africa dials *121*(cell-phone number)# and, when he or she presses call, this automatically sends a request to the recipient to "Please call" the caller. The request contains the caller's cell-phone number and a ten-character text, which is intended for the sender to add his or her name. Users personalize the call-back text by using the command *???*<TENCHARACTERS>* and can send up to five free callback requests per day to any South African cell-phone network. In Nigeria the same service has less

¹ <http://www.transcape.org>

4 N.J. Bidwell, M. Lamas, G. Marsden, B. Dlutu, M. Jones, W.D Tucker, E. Vartiainen, I. Klampanos, and S. Robinson,

constraints on message length or the number of callback requests; possibly because fewer service providers offer this service in Nigeria whereas all mobile network providers offer it in South Africa. In South Africa cell-phone providers promote the service for use in emergency; for example, when pay-as-you-go customers do not have any airtime left. However, it offers further opportunities for local appropriation, as we report in this paper.

3 Ethnographic Action Research

We now turn to describe the methods used during the studies. We begin by outlining the basis of our approach and then we consider the detailed methods deployed.

Our projects in Eastern Cape, in affiliation with Transcape, constitute an emerging Ethnographic Action Research (EAR) approach. Our approach in the Eastern Cape over the past six years has learnt from the outcomes of Critical Action and Participatory Action (AR) Research methods [CTB04,TB08,Tuc09] and now, with a researcher (Author-1) living in situ for extensive periods, incorporates ethnographic strategies.

EAR involves all parties in planning, doing, observing, reflecting and adapting, including academics, developers, local organizations and participants. It recognizes that research involves many different roles and kinds of conversations. Thus, our first step in the current project was recruiting local people as researchers who could also translate between English and isiXhosa in our interactions with the wider Mankosi community. Thembeke², who had been involved in AR in rural tele-health before [TB08], recommended four young men based on their: spoken English, print literacy, availability, enthusiasm and that they lived in four of the twelve Mankosi villages; including that of the Headman who is the traditional leader of Mankosi.

We undertook workshops with the Local Researchers (LR) for ten days at the start of the project and after a month introduced a mentoring system. The initial workshops discussed potential technology deployments; research practices, ethics and methods; and, power structures, demographics and cell-phone use in Mankosi. We recorded all sessions on video and paid LRs nearly twice the minimum wage to attend. A week later, we allocated jobs to the LRs based on their personal disposition, apparent interest and confidence in English and translation. Local Researchers LR1 and LR2 translated in meetings with the community and recorded. and translated video of local people telling stories and discussing their concerns. Local Researchers LR3 and LR4 were interviewers on a pilot survey of cell-phone use. We also recruited a fifth LR, an undergraduate student (Author-4) with experience in translation as a further researcher to mentor and guide the LRs. During the university vacations, LR5 lives in Lwandile, a village bordering Mankosi, and we became acquainted with her during a period of sustained ethnography three years ago.

4 Detailed method

As well as gathering data on cell-phone use during workshops with LRs, meetings with the community and day-to-day ethnography, we conducted two sets of

² Pseudonym

interviews. First, we designed interviews to explore cell-phone use in general and, then, based on the extent to which this revealed the importance of local people use of callback we recorded short interviews on the use of callback.

4.1 Cell-phone Use Interviews and Analysis

An early goal in EAR, as described above, was to explore cell-phone use in villages that might be the initial sites in which we will deploy prototypes. The team's interaction designers and developers sought data on phone ownership, models, use and usage including cost and charging patterns, and media sharing practices. Our workshops with the LRs, in which we discussed the project, provided a forum for listening carefully to local experience. Informed by their insights about technology used locally, we created a set of mostly structured questions for LR3 and LR4 to interview people in the community and planned when and where to interview people. The outcomes of this workshop also stimulated LR1 and LR2 to include interviewing in some of the video they recorded.

In designing and practicing a protocol for interviewing participants we emphasized a respectful, supportive and ethical manner to use text-based recording in English with non-textually literate, non-English speakers. The local researchers were diligent in ensuring that participants were aware of the purpose of the survey, confidentiality and anonymity. All participants were rewarded with 5R (0.72\$US) airtime, transferred after the interview to a number they had delegated.

Overall we conducted interviews in 11 of Mankosi's 12 villages, with a particular focus on villages that had been proposed as sites for our media sharing prototypes by LRs and in community meetings. Thus, of those people we surveyed 34% live in six of Mankosi's villages and 66% live in one of the five villages the community suggested could be sites for our prototypes. We interviewed between Saturday morning and Tuesday evening in an attempt to include people who work outside their village during the weekdays. We interviewed by visiting people in their homes, in Shebeens (informal drinking establishment) or along roads and paths in their villages and also at the football matches that occur throughout Saturday and Sunday. We interviewed a total of 52 females and 64 males were interviewed, with mean age 31.9 (stdev=13.6) and 29.7 (stdev=15.4).

By the third day of interviewing we became aware that the LRs had recorded data for phone owners only, and not people who do not own a handset. Further, the accumulating data, and our discussions about the data with LRs, suggested that we needed to gather data on the frequency by which people used callbacks, a system offered by all cellphone network providers in South Africa that enables their subscribers to send a free, but highly constrained message, through USSD services. Thus, for the final day (Tuesday) we recorded data for phone users and non-users. We also asked phone users how many callback requests they made per day. The one-day sample of phone owners and non-owners included 26 females and 31 males from four villages and LR 1 and LR 2 interviewed the majority of these people in their homes.

We analysed responses to closed questions using descriptive statistics and used Grounded Theory to code themes in responses to open-ended questions.

6 N.J. Bidwell, M. Lamas, G. Marsden, B. Dlutu, M. Jones, W.D Tucker, E. Vartiainen, I. Klampanos, and S. Robinson,

4.2 Callback Interviews and Analysis

Our analysis of the survey data prompted us to explore the use of callback. Thus, LR5 conducted interviews with 16 people, selected across different age ranges and genders, in Lwandile. She asked 19 structured and open-ended questions, most of which related to the callbacks that participants had sent or received in the past two days. She recorded details about the age, gender, and relationships of senders and recipients and the frequency of personalizing, sending or receiving callbacks. She also asked participants to spell out examples of their callback messages in the past two days, explain what they meant and why were they personalised in that way. Finally, she asked participants more general questions about their perceptions of callback and callback users. We analysed responses to closed questions using descriptive statistics and used Grounded Theory to code responses to open-ended questions.

5 Cell-Phone Use Interview Results

The results of our interviews on the local use of cell-phones has had considerable implications for designing and implementing a media sharing system for this remote, rural community. In this Section we present findings, according to various dimensions of phone use, that impact directly on our first design step. We discuss their implications in Section 7.

5.1 Phone Ownership and Brands

In our one-day sample of phone owners and non-owners, 56% of females and 76% of males own a phone; of the people surveyed in the four-day sample, 5% used another person's phone and two people owned more than one phone. There are as many phone owners aged between 14 to 24 as there are aged between 25 to 54, which, in part, reflects age demographics in the area. People aged over 50 years were twice as likely not to own a phone as those younger than 50 years. There is no difference in ownership between male and females aged of 25 to 34 years; but males under 24 were nearly twice as likely to own a phone than females. Cell-phone ownership is influenced by literacy and financial ability. The LRs often noted that non-phone users said "*not educated to use the phone*" or "*I will ask to another people to make a call. I wished have my own phone but is too difficult to obtain money to buy a phone*".

We recorded 114 entries for the phone manufacturer in the four-day sample of phone owners. Of these 59% were Nokia; 22% were Samsung; 9% LG; 7% Vodafone; and, 3% Motorola. Gathering data about phone models is difficult as most devices do not display their details prominently. However, the data suggests that the majority of phones owned in the community are low-end; for instance, nearly 80% of Nokia models recorded were 1100, 1200 and 1600 models. However, the Samsung handsets in the community tend to provide more functionality than the Nokia models.

5.2 Providers of and Payments in using Cell-phones

Most participants (91%) subscribe to MTN, a network provider in South Africa, and only 7% and 2% to Vodacom and Cell-C, respectively; and, 87% of participants said that there was good signal where they lived. Everyone surveyed bought airtime on a

“pay-as-you-go” basis; none have a contract or mentioned a data plan. The majority of people buy airtime locally from the nearest shebeen, or informal drinking establishment, (33%); spaza, or small shop (32%); or cafe (11%). Only 9% buy in town, from street sellers. Thus, there is a local business in reselling; indeed, 3% of participants resold airtime. Most people spend R7 (1 US\$) per week which consists of airtime valued at R5 and the airtime resellers’ R2 mark-up. Males spend more on airtime than females, except in the age groups 14 to 24 years and over 55 years. Between the ages of 25 and 55 males spend on average 30% (4R per week) more than females. However, between the ages of 14 and 24 females spend on average 60% (6R per week) more than males and all people aged 55 and over spend a similarly small amount. Community members do not have domestic access to grid electricity. Thus, 69% pay, or sometimes pay, to charge their phone at spazas, shebeens, neighbours with a solar panel or generator, or at the NPO’s centres. They pay on average 5.5R per week (stdev 5). Thus, the interviews revealed that to use their phones people spend: 40% on airtime; 16% on the markup imposed by airtime resellers; and, 44% on charging their phones.

5.3 Use

Analysis of participants’ responses to different closed and open-ended questions in our interview revealed what they use their phones for and what they like about their phones differs (Figure 1). Of 115 owners, people tended to mention four ways they used their phone. Almost all phone owners said they used their phones for callbacks and making calls; however, these were not necessarily their favorite aspects of phone use. By corollary, participants favour receiving calls but this is not their most frequent use. More males, than females, said they used their phone for games and males were more likely than females to say the best thing about their phone was SMS, callback and receiving calls. In contrast more females said the best thing about their phone was music. Some 56 people suggested uses of their phones other than the eight uses included in closed questions. These related to receiving calls (67%); listening to ringtones (26%); changing wallpaper (4%); listening to radio (2%); audio recording (2%); and using Vodafone (2%), a service available to Vodacom subscribers of the Vodacom network. Most people (54) gave one additional use, one gave two additional uses and two said “*No else I am older*” or “*No another object*”.

Callbacks, making calls and MXit were the only uses that did not decline with age. Those under 35 years old said they use SMS more than those over 35 years and the younger age group mentioned a wider range of uses for what they like best of their phones. For a small sample of 16 people we asked how many callbacks they make a day there was a tendency for the number of callbacks to increase with age.

5.4 Internet Use

We asked participants several questions that related to using the Internet via their cell-phones. 18 people used Internet-based functions, even if they did not realise it. Both males and females who said they used their phone for the Internet tended to be in their late twenties, at 27 years (stdev=6) and 26 years (stdev=4), respectively. Only about 10% of Nokia owners own phones with Internet capability; this number is 60% for Samsung owners. Occasionally people own Internet phones but do not use the

Internet. 18 people used MXit, the popular South African mobile IRC service, but only 3 of them said they used the Internet; further, of 15 people who use the Internet two also say they use MXit.

While, the mean age of phone owners in our sample is 28 years (stdev=11), the mean age of MXit users is 23 years (stdev=4). Male MXit users covered a wider age range than female. A similar proportion of males and females use the Internet but twice as many males as females used MXit.

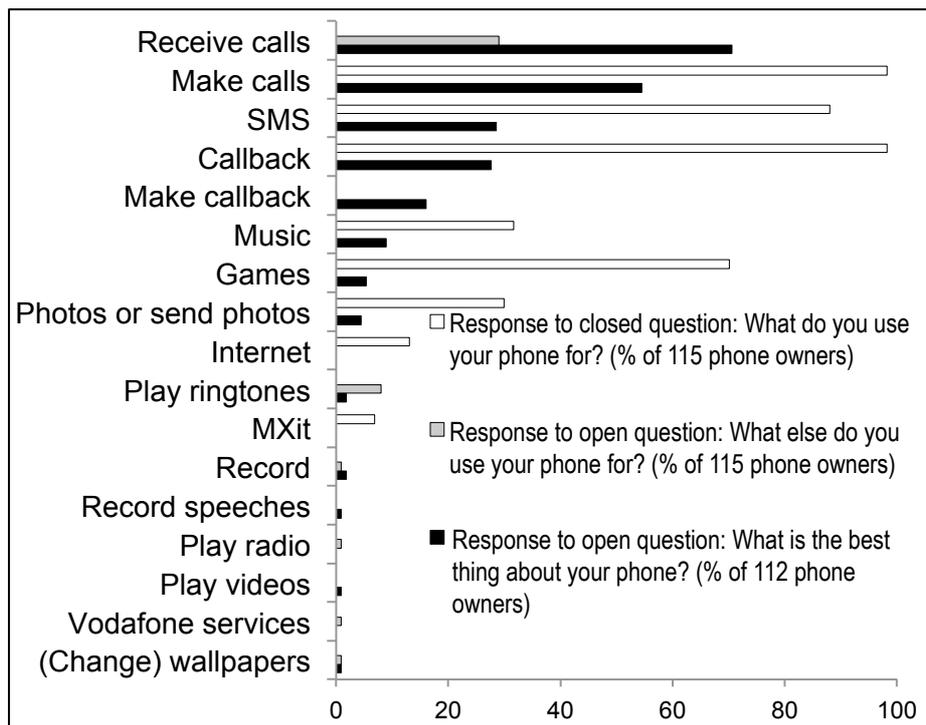


Figure 1 – Responses to closed and open questions about cell-phone use and preferred use

5.5 Sharing photos and music

Several of our questions explored how participants share photos and music using their cellphones. Some 32% of phone owners said they showed photos to other people and 29% said they sent photos to other people, and a similar percentage said they sent music to other people's phones. A slightly higher percentage said that other people send their photos or music to their phones. Similar percentages of males and females said they showed photos to others, but males were more likely to send photos to others. Females and/or people aged between 25 to 34 years were more likely to mention they shared using Bluetooth. However, it appears that up to a third of people

who share music or photos do not know how they share; 18% specifically mentioned Bluetooth but 32% said they did not know or, occasionally, did not care how they shared. No one mentioned sharing by MMS and, given how much airtime participants buy and MTN's rate of R0.90 per MMS, it is unlikely they share by MMS.

LRs often noted participants said they "*Lack of knowledge of photo and Internet*" and their comments indicated that people have differential knowledge about using their phone's functions. For instance LR2 noted that one participant said "*Lack of knowledge about send music and photos.[but] Play MXit and internet*"; LR3 noted that a Nokia 5130 user who takes photos and music but does not use the internet or share photos said "*not good for doing this object*".

5.6 Conclusions

The results of LR1 and LR2's interviews suggest that two-thirds of Mankosi residents own a cell-phone but these are either feature-less or lower end "feature" phones rather than "smart" devices. Despite the constrained nature of handsets and low use of Internet services, around a third of phone-owners share media, such as photos or music, a few use IRC (MXit). The prevalence of callback use is of special interest; thus, we now consider the data gathered in interviews that focused on callback.

6 Callback Interview Results

LR5 interviewed 16 participants: 13 on 27/12/2010 and 3 on 3/1/2011. Since many of the questions related to the two days before these dates, the data reflect Christmas and New Year. No participant mentioned specifically Christmas, New Year or holidays in either the callback use or the callback personalisations they showed us. However, we need to be cautious about generalising data related to the purposes and sites of callbacks since many people come home to their village during the festive season. LR5 interviewed participants in Lwandile, which lies just outside of Mankosi.

Of the 16 participants (N=16) interviewed fifteen live in Lwandile and one lives in Mthatha, the nearest city. Most participants remain in their village most of the time but 25% work outside of their village. Participants were 56% male and 44% female and are aged from 14 to 48 years (mean=27.1, stdev=11.3 and median =22.5). Nearly two-thirds of those interviewed were below 25 years old, which is consistent with the results of the pilot survey that there are as many phone owners aged below 25 years old as there are aged over 25. Thus, our analysis considers responses in two age groups. The younger group consists of 6 males and 4 females aged between 14 to 23 (mean=19.5, stdev=3.44 and median=20.5), and the older group consists of 3 men and 3 women aged between 28 to 48 (mean=39.83, stdev=7.6, median=41). In the younger group, 9 live in Lwandile and 1 in Mthatha, and only 1 works outside of Lwandile. All of the older group live in Lwandile but 50% work outside of Lwandile.

6.1 General perceptions

During the interviews, LR5 asked participants open-ended general questions regarding their use of callbacks. Some 33% and 37% of people in younger and older groups, respectively, said that their use of callbacks related to giving or receiving support to/from others. Some people mentioned other functions in addition to support;

those in the older group tended to mention practical reasons (18%), while people in the younger group tended to mention using callbacks for fun (17%). There is a tendency for those mentioning the supportive aspects to have sent or received more callbacks and those mentioning the practical aspects to have sent or received fewer callbacks in the proceeding two days before the interview.

When asked about why they liked callbacks, 69% of all participants responses included that callbacks are free and save airtime/money; are easy to use (24%); are flexible across networks and cellphones (25%); allow personalisation (25%); allow to keep close to friends (19%), for example to “*let my friend know I am thinking about them*”; provided immediacy (12.5%); and, allowed unrestrained contact and being able to “*stay in touch with 5 people a day*” (12.5%). However, some people did not like callbacks. For example, a female participant, age 48, said “*I do not like callback because I don't know how to send it and it is difficult for me to learn. I can't read properly*”. Thus, callbacks marginalise people who cannot read.

Donner [Don08] proposes that that people's use of callback services that do not permit personalisation (e.g. ‘beeping’) in East Africa are a form of phatic communication that signals or reinforces relationships between friends, family, or romantic interests. Some (25%) of all participants mentioned, explicitly, that they use callback to keep close to other people; however, not all of these people personalise their callbacks. For instance, only 50% of people in the older group said they personalised but, whether or not they personalised, all of those in the older group who said they liked callback mentioned that they liked it because they could personalise and/or it kept them ‘close’ to their friends.

6.2 Younger People Use Callback More Actively than Older People

In line with our pilot survey the older users we interviewed tended to send and receive slightly more callbacks than younger people in total but were, overall, much less than active in sending and personalising callbacks than younger people.

People in the older group sent and received slightly more callbacks (mean=4.5; stdev=1.38) than people in the younger group (mean=4.1; stdev=1.72), but sent relatively fewer. That is while older people received callbacks from between 1 and 5 persons (mean=3; stdev=0.88) they sent either no callbacks or just to one person (mean=1.67; stdev=1.03). In contrast, younger people received callbacks from between 1 and 4 persons (mean=2; stdev=0.88) but sent callbacks to between 1 and 5 persons (mean=2.2; stdev=1.55). Further, people in the older and younger age groups said 50% and 70%, respectively, of the senders of the callbacks they received in the proceeding two days were people they often sent callbacks to themselves. Further, people in both younger and older age groups received callbacks from people who are younger than those people to whom they send callbacks. That is, younger people sent callbacks to people aged 13 to 37 (mean=20; stdev=6.4), but received callbacks from people aged 13 to 26 (mean=18.7; stdev=4.5). Older people sent callbacks to people aged 18 to 40 (mean=27; stdev=7.8) but received callbacks from people aged 18 to 29 (mean=21; stdev=4.7).

Younger people personalise their callback messages twice as much as older people. In the two days preceding the interviews, people personalised once or twice if they

were in the younger group (mean=1.5; stdev=0.53; median=1.5) and 0 or 1 times if they were in the older group (mean=0.5; stdev=0.56; median=0.5).

6.3 Callback Exchanges are Balanced Between Genders but Males use Callback more Actively

In line with our pilot survey, where more males than females mentioned callback as the best thing about their phone, our interviews suggest that overall males tend to send and receive more callbacks than females. Indeed, males sent an average of 1.7 callbacks in the past two days (stdev=1.7), whereas this number is 0.63 (stdev=0.89) for females. Further, males received an average of 1.25 callbacks in the past two days (stdev=1.53). This number is 1.0 (stdev=1.41) for females.

The responses of people of all ages tend to suggest they send callbacks to people of the same or opposite gender to themselves in equal proportions but, since some participants sent more callbacks than other participants, overall 65% of callback recipients were female (mean=23; stdev=7.71).

Participants' responses suggest they receive slightly more callbacks from people of the opposite gender; since 45% and 30% of people from whom they received callbacks from of the same gender as the people in the younger and older groups, respectively. However, younger and older people receive callbacks from similar percentage of males and females. More precisely, younger people received callbacks from people who are 47% male and 53% female; older people received callbacks from people who are 50% male and 50% female.

6.4 Older People use Callback with More Local People

All participants said that all the recipients and senders of their callbacks in the two days preceding the interviews were typical, even though we interviewed them around Christmas and New Year, where many people come home for the holiday period.

Older people were much more likely than younger people to have sent and received callbacks from people who live in their village, "*close*", than people who live far, such as in a city. They were also more likely than younger people to have seen the recipient of their callbacks in the two days during which they made their callbacks. Indeed, people in the older group said that 83% of the people they had received callbacks from and 60% of those to whom they sent callbacks to lived close and that they had seen 60% of the people to whom they had sent callbacks during the past two days. In contrast, people in the older group said that 27% of the people they had received callbacks from and 50% of those to whom they sent callbacks lived close and they had seen 50% of the people to whom they had sent callbacks during the past two days. These insights suggest that sending callbacks enables younger people to connect to people living far away.

6.5 Callback is for Friends & Family

Generally people emphasise sending callbacks to friends but younger people send more callbacks to friends. People in the older group send slightly more callbacks to friends than they receive callbacks from friends; since 50% of the recipients of callbacks were a friend but 43% of the callbacks they received were from a friend. In

contrast, the people to or from whom younger senders sent and received callbacks were equally likely to be a friend; since, 56% of recipients of callbacks were a friend and 56% people from whom they received callbacks were a friend.

People in both the older and younger groups receive callbacks from relatively more people in their family than they send callbacks to people in their family. In the two days preceding the interviews, 31% and 33%, respectively, of recipients of callbacks sent by participants were a relative or in the family of younger senders and older senders. 44% and 43% of the callbacks they received were from a relative of people in the younger and older groups, respectively.

Older people sent to slightly more colleagues/co-workers than younger people. Indeed, 17% of recipients of callbacks were a co-worker or colleague of older senders but 13% of recipients of callbacks were a co-worker of or someone currently schooling with younger senders.

6.6 Personalisation

Younger people personalise their callback messages twice as much as older people. Analysis of the way younger and older people personalise suggests various issues relating to the function, langue and context of personalisation. Firstly, the content of personalisation can be grouped into serving the following five main functions.

Performing Identity: Some 28% of personalisations in the examples of callbacks that participants showed us were their names or nicknames; further, the names that younger people used in personalising provide some context to recipients. People in the older group indicated less diversity in the names that they personalising with; for instance a female, aged 46, said she personalised with her name so that the recipient “*know where the callback comes from*”: “Please call NOLUNTU ...”. However, people in Eastern Cape often have many first names including names: given by their parents, at birth, or by their husbands, upon marriage; they chose themselves for use with non-isiXhosa speakers; and, various ‘nicknames’ are chosen by others [Bid09]. Two young men, aged 17 and 20, said they personalised with their nicknames because, as one said “*Its how my friends call me*”. Another young man, aged 22, personalised with different nicknames “Please call BG.BRO at ...” and “Please call CHIZBOY at ...”

Rendezvousing or Co-ordinating: 12% of personalisations in the examples participants showed directly related to meeting. For instance, a male aged 14, said “*I wanted the person to come to my place*”, so sent a message in abbreviated isiXhosa meaning “*come here*”: “Please call Yiza at ...”. A woman, aged 35, personalised her callback because she said “*I wanted the person to know that I am on my place safe*”: “Please call @HOME at ...”,

Managing Communication Flows: 28% of personalisations in the examples participants functioned to organise phone communication. Personalising with a name can express a request for a phone response, one participant personalised with his name to elicit a reply from a friend: “*I was thinking of him and I wanted to know where is he*”. Since people, particularly younger people, use callback for more than eliciting a call sometimes, they distinguished this purpose, explicitly. Thus, a 23-year-old female sent “Please call NO.AIRTIME” and said “*I wanted to show that I don't have airtime to call*”. Other examples showed using callback to express the

availability for communication; for instance, a 23-year old female said *“I wanted to let the caller to know the person he wanted was not around”* so she personalised in abbreviated isiXhosa: *“Please call AKEKHO at ...”*. One male, aged 19, sent messages asking friends to log onto Mxit: *“Please call LOG.MXIT”*.

Interpersonal support: Many personalisations that functioned to organise communication also related to support. However some callbacks were more specific about support. For example, a male, aged 38, said *“I wanted the person to call me and letting her know I am sick”*, so sent *“Please call IM.SICK”*.

Phatic Communication: In our interviews, 22% of the personalisations related to intimacy, romance or maintaining a presence in recipients’ lives. For instance, a male aged 22, mentioned he *“personalise to express my feelings”*, and thus sent *“Please call U.R.MINE”*; a female, aged 23, wanted to say *“me for you”* by sending *“Please call ME.4U”* and another female, aged 21, said *“I wanted my contacts to have a blessed day”*, thus sent *“Please call GOD-BLESS”*. As Donner [Don08] notes people develop expectations regarding phatic communication in relation to its role in signalling or reinforcing relationships between friends, family, or romantic interests. Indeed, a male participant mentioned expectations about callback in nurturing his relationship: *“She demands my callback everyday and I demand hers”*.

Our analysis of personalisation suggests that people draw on relational cues in sending and understanding personalisations. These are affected by generational differences. Youth have appropriated callback personalisation more than elders, some of whom do not realise the existence of personalisation and/or the language used to personalise. For example, a female, aged 48, said: *“I do not know where to check, I just see there is a message from that person”*. Some older people are aware of personalisation, for instance a male, aged 44, said *“I don't personalise when I send callback my number appears to that person”*, while others perceive personalisation as related to youth. For instance, in referring to callbacks from younger people a 46-year old woman said *“I do not usually check because I have their numbers and they personalise for their friends”*. Our ethnographic observation confirms that youth will send a callback to their mothers with an intimate personalisation intended for friends or lovers, knowing that their mothers will not, or cannot, read the personalisation.

As shown in the personalisation examples described above people use both abbreviations and periods ‘.’ to circumvent the constraints of the character limit. However, the emergent language seems to support varieties of coding rules. For instance, two young men mentioned their personalisations mean *“I miss you”* but their messages differed; a 14-year-old sent *“Please call I.MCU”* and a 22-year old sent *“Please call I.MISS.U”*. It appears that the constraints on character limit in callback coupled with local perspectives on language in Eastern Cape contribute to new practices of abbreviating isiXhosa. In contrast with recent work in text-based exchanges elsewhere in South Africa, where people do not abbreviate isiXhosa [DS08], we found some participants abbreviated isiXhosa in their personalisation. For example, a female, aged 14, sent two messages asking the recipient to call her, one in English: *“Please call URGENTLY at < number>”* and another abbreviating an equivalent isiXhosa phrase: *“Please call NGOKU at < number>”*.

6.7 How People decide when to use Callback & Callback Personalisation

Overall, participants comments indicate that they distinguished between people in deciding to send callbacks; thus, 70% and 60% of people in the younger and older groups, respectively, said there are people that they would speak to or SMS but to whom they would never send a callback. Younger people were more likely to say that there were people to whom they would speak or send an SMS to but would never send a callback. Participants' responses indicate several factors in determining appropriateness in sending a callback. One factor relates to a familiarity with others' use of callback and constraints on their use of callback. Some participants, especially in the older group, indicated that some people simply do *"not respond to callback"*; other participants explained that they accounted for recipients' literacy in reading callbacks and relative financial ability in responding. People in the younger group observed, about those to whom they would not send callbacks to, *"She is old and does not understand callback"*, *"He cannot read"* and *"She cannot read and she knows nothing about callback"*.

Another factor in determining appropriateness in sending a callback relates to acknowledging that callback makes phone use possible for people without any money for airtime and understanding the relative financial positions of senders and recipients. Thus, a participant, aged 14, said *"I don't have airtime. So I send all my contacts callbacks"*. A related factor shaping decisions about sending a callback relates to the costs incurred if a callback requires the recipient to send an SMS or actually call the sender. So, another male, aged 14, said he would not receive a callback from his mother because *"She is my parent and is the one who buys me airtime"*. Similarly, a male aged 44, said he would not receive a callback from someone because *"She have more money"*. Understanding his own financial ability relative to others may partly explain why one participant, age 48, said *"I do not send callbacks [at all]"*.

Our interviews provide some insight into the set of rules governing the form and flow of sequences of communication in relation to callbacks. At least partially as a consequence of their better financial ability older people were more likely to receive a call from the recipient of their callback than younger people. People in the older group noted that 75% of the people who replied to their callbacks did so by calling them. In contrast people in the younger group said only 20% of the recipients who replied to their callbacks did so by calling them and 30% of the recipients who replied to their callbacks sent a callback. People's expectations about the flow of communication take into account familiarity with recipients' behaviour with respect to callback and whether or not they knew that the recipient had received their callback and/or read their personalisation. In the younger and older groups 56% and 67% of people, respectively, said they knew people from whom they would receive a call or SMS but who would never receive a callback. One male, aged 14, said he would not receive from someone he knows because that person *"knows nothing about callbacks"*; while a 48-year old woman said she never received callbacks from her colleagues as *"they know I do not respond"*.

People in both younger and older groups said they knew that the recipient had checked the callbacks they had sent in the past two days because of the people they sent callbacks to: 31% had responded by calling them; 25% had responded with a

callback, e.g. they “*send callback also, answering my question*”; 18% responded with a SMS; 12.5% of recipients responded in some non-specified way; and finally, 6% of recipients logged on to Mxit. However, while people in the younger group said they knew that all (100%) of the recipients checked their callback message because their callback elicited some response; this number was only 80% for the older group. Further, younger people were much more likely than older people to check the personalised message in the callbacks sent to them. Indeed, 70% of people in the younger group said they checked the personalisation of the callbacks they received whereas only 50% of people in the older group did. As, one 35-year old man said “*I just read who it is from and delete*”.

A further rule relates to determining appropriateness of personalising callback messages. As earlier examples illustrate, people send a personalised callback to those they do not expect to read the personalization as well as people for whom they intend the personalisation. That is, some callbacks carry dual meanings and have dual purposes. This extends on observations that senders and receivers distinguish among the beeps using their knowledge of the situation and the people involved in the exchange [Don08], because a personalised callback is not constrained to one specific relationship. So, for instance, an older family member attends to the callback sent to them by a younger family member but understands that the personalised message is intended for the sender’s friends rather than herself. Thus, both the callback and the content of the personalisation work together as “digital homonyms” [Don08] and senders and receivers delineate differences in meanings which, simultaneously, relies on and reinforces relational and contextual cues.

7 Discussion

The results we have described are being used to shape a novel social media sharing system in the region. Here, we consider the foundations for this system based on the insights gathered.

Firstly, local use indicates a basic requirement for a system that does not rely on any form of network communication that consumes airtime. For instance, some people do not buy any airtime but use their phone exclusively as a device to receive and send communication for free using callback. Indeed, to ensure a wide uptake, we need to accommodate a large proportion of users who have low-end phones and no financial resources for sophisticated data services.

Secondly, the use of callback provides insight into the priorities that shape what usability and utility might mean to local people. The system would fail miserably on any usability metric; yet, a relatively high number of people (26%) in our interviews reported that callback was easy. Using the callback service requires recall over recognition; involves remembering arcane numerical strings to invoke functionality; lacks context information; and, lacks feedback etc. Thus, and yet again [WF07], the assumptions that underlie standard HCI measures of usability and utility are mismatched with African priorities. People assess what is easy to use in the context of their priorities in relation to a task. In Eastern Cape people do not perceive time overheads associated with communicating with others as ‘wasting time’. Our ethnography shows that in everyday life people devote considerable time to face-to-face communication and do not prioritize minimizing the time spent communicating

with others [BRM+10]. Thus, callback has high utility and the effort demanded by the task is perceived in light of the importance of communicating and that few channels for remote contact and cell-phone services are accessible. Further, since financial constraints limit their overall use of phones to communicate the value proposition offered by the callback system, in terms of the free messaging, motivates people to use it more frequently than costed messaging services. Frequent use means people adapt to using the system. Due to callback's financial accessibility and prevalence locally we have refined our design goals and plan to build our system on top of the callback system. So, a user can upload and/or create media artefacts at local servers ("stations") and notify others of its presence via the callback mechanism.

Thirdly, our insights into the way people manage and understand callback inform our decisions about introducing a system that uses callback. People manage the form and flow of sequences of communication arising around callback according to rules. Our findings show some of these rules, and that these rules take into account, for instance, people's familiarity with each other in terms of literacy, relative financial ability, intergenerational communication protocols. By applying participatory techniques we intend to use callback in our system in ways that are compatible with these, and other rules. People also make sense of callbacks despite their multiple functions and dual meanings because they are familiar with other people's social networks; such as knowing that the personalisation in a callback received from someone is intended for others. This provides us with avenues to introduce the system to different social groups in appropriate, and possibly differing, ways.

Finally, the interviews confirm our wider ethnography that people will use a system for media sharing within both face-to-face and remote communication and that users are already familiar with managing multiple communication channels depending on context. We are encouraged by the importance of media objects to phone owners; for instance, 26% of owners reported that they listened to ringtones, perhaps because they do not have other forms of music on their handsets. Further, people's desire to take and share photographs appears very high since 29% of people share images albeit by physically passing around a handset. Our wider ethnography suggests that this is not due only to a lack of knowledge about Bluetooth, and/or high network data costs but also relates to the importance of face-to-face communication [Bid09]. Together with the enthusiasm shown in our meetings with the community and workshops with LRs this suggests that our endeavours to design ways for people to create and share media locally, at low cost and without requiring sophisticated handsets, will meet a community need. Importantly, our interviews show that people can potentially manage media systems that involve entirely different interfaces and networks. This inspires us to design a system that enables uploading and downloading media over Bluetooth and storing and accessing media at a station, yet alerting and communicating with others about the media artifacts using an entirely separate network, such as callback.

8 Conclusions and Future Work

By describing how methods that respond to local context produced insights about local communication relevant to designing a media sharing system we illustrate the

value of an EAR approach. Many of the authors on this paper have spent much of their careers designing and building systems for the developing world. However, before investing in a solution suited to other developing world contexts we involved the local community and defined smaller goals related to understanding phone use in the rural community. We hope other researchers will recognise the importance of ethnographic strategies to gather and help interpret data early in projects for developing regions; as every community is unique in the way it struggles and adapts to different sets of constraints.

Besides illustrating the role of ethnographic and participatory strategies our ongoing study shows how development is about so much more than disseminating educational information. Many ICT4D projects focus on health, education, wealth creation or agriculture, yet our research suggests that life in marginalised communities involves communicating information about themselves in appropriate ways, sharing their choice of media and using technology for entertainment (e.g., 56% play games on their handsets). Thus, on our project we do not enforce a strict “development” agenda, rather we seek to create a media sharing platform that the community can use to share information that is important to them; whether it is information about hygiene, community gossip or the latest rap tune.

We have started developing the first prototype of a media sharing system that acts, primarily, as a technology probe to both enable the community to develop socio-technical rules around media sharing and generate insights into the ways these rules emerge and are reinforced over time.

In parallel to developing our first prototype we continue to gather data on phone-use, callback and media sharing practices. Currently, we are analysing some 20 hours of participant-collected video to understand face-to-face communication and storytelling practices. Further, we are conducting a variant of a diary-study, adapted to the local context to examine the “rules” governing remote and face-to-face interactions related to callback. This will allow us to apply conversation analysis (e.g. turn-taking, implicit contextual cues) to more precisely understand communication practices in social groups and the ways community members manage mixtures of mediated and face-to-face communication and different cell-phone services.

Acknowledgements This research was supported by an Engineering and Physical Sciences Research Council grant (EP/H042857/1). The research reported in this paper was carried out when Mounia Lalmas was a Microsoft Research/RAEng Research Professor at the University of Glasgow. Nicola Bidwell is funded by CSIR-Meraka South Africa.

9 References

- [Bid09] Bidwell, NJ (2009) Anchoring Design to Rural Ways of Doing and Saying, INTERACT, 2005.
- [BRM+10] NJ Bidwell, T Reitmaier, G Marsden and S Hansen. Designing with mobile digital storytelling in rural Africa. *Human factors in computing systems*, pp 1593-1602, 2010.
- [CTB04] M Chetty, WD Tucker and EH Blake. Developing Locally Relevant Applications for Rural Areas: A South African Example. *Annual Research Conference of the South African Institute of Computer Scientists and Information Technologists*, pp 234-239, 2004.
- [Don08] J Donner. The Rules of Beeping: Exchanging Messages Via Intentional “Missed Calls” on Cellphones. *Journal of Computer-Mediated Communication*, 13:1–22, 2008.

18 N.J. Bidwell, M. Lamas, G. Marsden, B. Dlutu, M. Jones, W.D Tucker, E. Vartiainen, I. Klampanos, and S. Robinson,

- [DS08] A Deumert and O Sibabalwe. Mobile language choices. The use of English and isiXhosa in text messages (SMS) Evidence from a bilingual South African Sample. *English World-Wide* 29(2):117-147, 2008.
- [GDB+10] S Gitau, K Diga, NJ Bidwell, and G Marsden, G. (2010) Beyond being a Proxy User: A look at NGOs' Potential Role in ICT4D Deployment. ICTD London, 2010.
- [GMD10] S Gitau, G Marsden and J Donner. After access: challenges facing mobile-only internet users in the developing world. *Human factors in computing systems*, pp 2603-2606, 2010.
- [ITU10] International Telecommunication Union. Key Global Telecom Indicators for the World Telecommunication Service Sector, 2010.
- [Kre09] T Kreutzer. Generation Mobile: Online and Digital Media Usage on Cellphones among Low-Income Urban Youth in South Africa, 2009.
- [LD09] R Ling and J Donner. Mobile Communication. Polity Press, Cambridge, 2009.
- [MMT06] A Maunder, G Marsden and WD Tucker. Evaluating the relevance of the 'Real Access' criteria as a framework for rural HCI research. *Human Computer Interaction in Southern Africa* pp 75-78, 2006.
- [SSA] Statistics South Africa <http://www.statssa.gov.za/>
- [STL02] D Slater, J Tacchi, and P Lewis. Ethnographic monitoring and evaluation of community multimedia centres: A study of Kothmale community radio internet project, Sri Lanka, 2002.
- [TB08] WD Tucker and EH Blake. The Role of Outcome Mapping in Developing a Rural Telemedicine System. *Information Society Technologies - Africa 2008*.
- [TB10] WD Tucker and EH Blake. Abstractions for designing and evaluating communication bridges for people in developing regions. *Computing for Development (DEV)*, Royal Holloway, University of London, 2010.
- [Tuc09] WD Tucker. Softbridge: a socially aware framework for communication bridges over digital divides. PhD Thesis, University of Cape Town, 2009.
- [Wal10] M Walton. Mobile literacies and South African teens: Leisure reading, writing, and MXit chatting for teens in Langa and Guguletu. Shuttleworth Foundation, 2010.
- [WF07] H Winschiers and J Fendler. Assumptions Considered Harmful The Need to Redefine Usability. *Usability and Internationalization, Part I, HCII*, 2007.