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Mobile Phone Adoption and Use in Lockhart River Aboriginal Community

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Abstract—**This paper reports on an ethnographic study of mobile phone adoption and use in a remote Aboriginal community in Cape York, Australia. The researchers found that, within nine months of the introduction of the 3G network, 58% of the Indigenous people interviewed had acquired a mobile phone, a much higher rate of adoption than any other ICT. The phones were employed for communication, with multimedia uses (music, games, videos, photos) also very popular. Issues included the cost, robustness and usability of the devices, although most people managed costs well by purchasing pre-paid phones. The findings suggest a number of possible initiatives that government, service providers and business could consider to leverage mobile phone usage and develop capacity in the community.**

Keywords-mobile phone adoption; mobile phone use; 3G phones; Indigenous people

I. INTRODUCTION

There have been very few studies of mobile technology and Indigenous people. This is in part due to the lack of access to mobile networks in many remote Indigenous communities, even in First World countries [1]. In the Australian context there have only been two detailed Indigenous studies to date: one of mobile phone use by Aboriginal people in Central Australia prior to the introduction of Internet-enabled (3G, or third generation) phones [2], and a study focusing on mobile phone communication in the Torres Strait Islands [3]. The closest comparable studies to the Indigenous experience are those in economically marginalized societies in Africa [4-7] and one notable study in Jamaica [8].

This paper seeks to redress this gap by presenting the results of a study of mobile phone adoption and use in Lockhart River Aboriginal Community, Australia. This is a very remote community in Cape York which had a population of 542 in 2006 [9], most of whom live in town, where the research was undertaken. The research took place in 2008 about nine months after the introduction of the 3G network, which replaced a previous, but not widely used, CDMA (Code Division Multiple Access) network. It therefore reveals the take-up of Internet services and products and the use of the multimedia features of the phones. In this respect the research differs both from the two previous studies in Australia and from the African research, which focus on aspects of communication, cost and language use. This study is therefore important to governments, telecommunications carriers and mobile business providers who seek to supply better mobile services, coverage and products to Indigenous communities.

The research was conducted while the lead researcher was the guest of the Lockhart River Community Development Employment Project (CDEP) Office. The views reported here are those of the researchers, and do not reflect those held by the CDEP staff, Lockhart River Aboriginal Shire Council or the traditional owners.

II. RESEARCH METHODOLOGY

The researchers adopted an ethnographic approach since this methodology has proven useful in giving rich understandings of the sociology of mobile technology adoption in other contexts, e.g., [8]. Research included a combination of observations at Lockhart River township, talks with members of the community and more in-depth interviews with selected members of the Aboriginal community and non-Aboriginal workforce. In addition, the lead researcher was sometimes allowed to view users' mobile phones and their content. Investigations focused on mobile phone adoption and usage, costs, attitudes and skills associated with mobile technology and ICT (Information and Communications Technology) access and availability, with some background research into the community.

Many CDEP workers contributed to the study (CDEP work represents the most common form of employment for Aboriginal people in the community), but other members of the community were also included in order to cover a range of ages. In addition, an attempt was made to have a reasonable gender mix and some variety of occupations (office staff, manual laborers, supervisors, artists, dancers, library staff and cooks). Most of the Indigenous participants were on limited incomes, usually CDEP or welfare payments. For example, the average CDEP wage for a single person with no dependents is only $235 per week. A total of 36 Indigenous people took part, 20 females and 16 males.

Generally, talks were semi-structured, beginning with the questions: "Do you have a mobile phone?" and "What do

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you use your phone for?/Why don't you have one?" Most questions were open-ended so that the interviewees could phrase their responses as they wished, without being influenced by suggestions from the researchers [10]. This is particularly important where non-Indigenous people are trying to bridge the cross-cultural communication gap with Indigenous people [11].

III. ICT Access and Use (non Mobile)

A. Public Computer and Internet Access

Lockhart River, like other Aboriginal communities in the Cape, is unusual in having good access to modern computer technology for such a remote community [12]. Offices have the full range of computing facilities expected in a modern work environment including broadband Internet access, land-line and mobile phones.

The Library has five free public-access computers, all with Internet access and particularly popular with children, who play spider solitaire and create computer art. An elder is in the process of making a digitized dictionary of the local language available on these computers. The Library also has fee-for-service videoconferencing equipment provided by the Cape York Digital Network.

The CDEP Office has one free online public-access computer. Community residents use this, for example, for Internet banking, and at the time of the study there was a campaign to encourage people to adopt online banking instead of the more expensive telephone banking. In addition, there is a Training Room with computers, Internet access, free training and a Kidsclub.

Interesting uses of ICT in the public domain include health-related projects by the Health Interactive Technology Network (HITnet) based in Cairns. The waiting room of the Clinic has one of a number of touchscreen kiosks deployed by HITnet so that patients can play games or view videos focusing on positive health messages while they wait. A recent video promotes traditional Lockhart River bush tucker [13].

B. Public Telephone Access

In contrast to the good computer facilities, there is only one public telephone. Moreover, several interviewees reported this was nearly always out of order, despite regular service calls by the Telstra telephone technician. The maintenance of public phones in remote communities has been recorded as a major challenge in several government reports [14, 15]. Factors include vandalism, poverty (desire to obtain money from coin-operated machines) and maintenance difficulties because of lack of any onsite technicians [14].

C. Private Ownership of Computers and Home Phones

Public ICT facilities are so important because private ownership of fixed-line phones, home computers and Internet access is very low. Low private ownership is typical of remote Aboriginal communities across Australia [14]. For example, there is only one privately-owned computer in the Lockhart River community. In the current study one interviewee spoke of the time delays and cost of trying to get a phone installed at her home recently, and how she eventually decided not to proceed. A major problem was the requirement for her to arrange and pay for the digging of the trench for the laying of underground cables from her house to the point of presence on the street: apart from the cost of doing this, there is no trench-digging machinery in Lockhart River to facilitate the task.

Factors which contribute to the poor uptake of ICT in Aboriginal communities have been well documented. They include a range of technical and human aspects such as the excessive cost of installing fixed-line phones, the cost of satellite access to the Internet, problems of repairing computer technology when it breaks down in remote regions, lack of necessary supporting infrastructure such as stable electricity supplies, low computer literacy, and issues with paying for phone calls in extended family situations where owners of the service have obligations to allow others free use of the technology [1, 14]. One study emphasizes cultural factors which conflict with ICT design, such as the mobility of some Indigenous groups, the need to develop a "relationship" and feel comfortable with ICT, notions of community ownership and social reciprocity [16].

IV. Mobile Phone Infrastructure

Due to its remoteness, Lockhart River has only one mobile service provider, Telstra, the main Australian telecommunications carrier, which is required under government regulation to provide a certain minimum level of service to rural and remote communities [15]. Previously Telstra ran a CDMA network which was switched over to WCDMA (Wideband CDMA) about 28th January 2008, marketed as Telstra Next G [17]. Similar mobile networks were implemented in all Aboriginal centres throughout Cape York at this time. Like the other localities, only one mobile phone tower was installed at Lockhart River: this provides good signal strength to the main township but little coverage beyond this limited area. Despite Telstra's higher infrastructure and operating costs, users in this remote community pay the same rates for voice, SMS and data services as users elsewhere[18].

The change to Next G meant that Internet access could be provided to mobile phones, in contrast to the old CDMA service, which was communication only. The new network utilizes HSDPA (High-Speed Download Packet Access), a 3G technology which can operate in the 850 MHz band, providing a wider coverage area than WCDMA networks operating within other frequencies and therefore more suitable to remote regions [17].

After the switch over, the previous CDMA phones were no longer operational. Anyone wishing to have a mobile phone was required to purchase a Next G phone. In addition to being able to access the Internet, make telephone calls and send text messages, all of these new phones provide full multimedia capabilities as standard features, including camera, video, sound recording, MP3 player, games, calendar and alarm clock. Communication is no longer confined to language but can involve video calling and emailing photos.

V. MOBILE DEVICES AND COST

Mobile phones are sold locally at the Lockhart River Store. The phones are expensive compared to the average income of local residents and when compared to the price of similar devices in the city: for example, the most popular brand is sold for about $260-270. A major factor is the 600 km distance that they must be transported from the nearest city Cairns and the fact that, for security reasons (to prevent theft or loss), they have to be brought by air. Community members are aware that they are paying a lot and so sometimes buy their phones instead when making visits to the city. On the other hand, one participant had bought her phone in another remote community where she had paid even more ($300) for the same model sold in Lockhart.

The Store has an ethical policy of selling only pre-paid phones. This assists people in managing costs as they must pay for their usage upfront. The debt issue that surrounds Indigenous ownership with regard to most fixed-line home phones is thus completely avoided. Moreover, users can receive quicker feedback on how much their pattern of usage is costing them. Occasionally, people buy phones with monthly plans outside Lockhart River and the problems they incur will be discussed later.

For the great majority of users – those with pre-paid phones – $30 re-charges can be purchased at the Store, or $20 re-charges from an after-hours shop. These are the minimum amounts that are available from the mobile service providers. Despite this, two interviewees expressed a wish for phone cards of a lower value.

Apart from phones, the Store used to sell MP3 players and still orders them in when there is a demand. At one time they used to stock more than now.

VI. PROFILE OF MOBILE PHONE USERS

Table 1 shows the levels of ownership of mobile phones by Indigenous interviewees according to gender and age. Ages of CDEP workers were verified from records, while estimates of age were made for the remaining interviewees since asking Indigenous people personal details may be offensive [11]. "Ownership" includes both mobile phones that participants owned personally as well as those that had been supplied by their employer for their exclusive use. Some care should be taken in interpreting the figures since the number of interviewees was low (particularly in the age category of children) but they do give a reasonable idea of trends in mobile phone adoption.

The percentages show that more than half of the participants own a mobile phone (58%). This figure is similar to the Central Australian study, where 56% of people surveyed owned a mobile [2]. It is also much higher than private ownership of home phones or computers in Lockhart River, demonstrating that mobile phones are the technology of Indigenous choice when it comes to ICT. The speed with which residents have adopted 3G phones runs counter to the argument that Indigenous people need careful initiation into new technology and time to construct it in personal terms [16]. This study indicates that, if Indigenous people want a technology and it is deemed affordable, they will adopt it.

TABLE I. OWNERSHIP OF MOBILE PHONES

Age Group	Female		Male		Total for Age Group	
	No. Interviewees	Mobile Ownership	No. Interviewes	Mobile Ownership	No. Interviewes	Mobile Ownership
Children (0-15 yrs)	0	0%	2	0%	2	0%
Young Adults (16-34 yrs)	9	78%	6	83%	15	80%
Middle-Generation (35-59 yrs)	7	86%	7	43%	14	64%
Elderly (60+ yrs)	4	0%	1	0%	5	0%
Total for Gender	20	65%	16	50%		
Grand Total					36	58%

Mobile phone owners include all age groups except children and the elderly. This age profile was confirmed by our in-depth interviews, although a school teacher had noticed some young children listening to music at school through earphones which she believed were connected to mobiles.

Females appeared to have a higher ownership rate than males (65% to 50% respectively). Furthermore, two middle-aged women had CDMA phones previous to their Next G phones and so could be regarded as early adopters. These results differ somewhat from the Central Australian study where there was no real gender difference [2]. However, given our small sample size, the differences in mobile phone adoption by gender are not statistically significant.

When asked why they didn't have phones, the non-owners gave a variety of reasons although some chose not to provide a motive. Reasons include having access to a phone at work, lack of interest, not knowing what a mobile could do or not knowing how to use one. A few non-owners previously owned a mobile which was stolen or broken, had encountered cost management issues on non pre-paid devices, or didn't like people ringing them up at any time. For children, lack of money to buy one is the issue, according to adult informants.

VII. USES OF MOBILE PHONES

Table 2 summarizes the reported uses of mobile phones. Most owners gave more than one use. However, because the researchers avoided prompts, some interviewees may have omitted uses, for example, those of lesser importance, or obvious uses like keeping a contact list. Some figures are therefore probably underestimates.

A. Communication

Communication is obviously a major use. *All* owners make phone calls or text messages or both. Despite the cost advantage of sending text messages, most users still make phone calls. Some teenage girls and young women report a strong preference for text messages because of their lower cost, and one man in his early thirties only gave up using

SMS because he had texted so much that he developed a sore thumb. However, a preference for texting does not apply to *all* young people. Amongst middle-aged interviewees, there is a tendency to prefer phone calls: one woman always rings and never texts, but again this is not universal. Three supervisors telephone on their work mobiles solely because calls are free on the plan that was selected by their employer but text messages are not.

Communication partners are primarily family, friends, boyfriends and girlfriends. Mobile communication occurs both with people who live too far away to meet regularly as well as with local acquaintances. For example, one young woman rings her mother in Cairns to ask about her daughter who is being raised there, while the teenage girls text each other, "What's the plan?" to find out what they are all doing on the weekend. The importance of mobile phones as a means of communication, even amongst people who might see each other every day, indicates that communication is a fundamental human need which this technology – unlike computers – is satisfying. This confirms the findings of the two studies of Indigenous mobile technology adoption in Australia, as well as the African experience [4].

B. *Entertainment and Multimedia*

A major new finding of our research is the keen interest in the multimedia capabilities of the phones to entertain. Almost all users listen to music and it is not unusual to see people – particularly young people – walking around the community wearing earphones with a mobile phone showing from the top of their pocket. The decline in sales of MP3 players at the Store is probably related to the growth in mobile phone ownership since the Next G network was implemented and people's realization that their new phones can play music just as well. In addition, playing games (cards or PlayStation games), and taking and sharing photographs and videos are reasonably common, again predominantly amongst youth. As young people listed their uses during the talks, often entertainment came up first: "I Bluetooth [music], games, text message, ring."

A number of interviewees in our study have novel ways for maximizing the use of the devices which do not have any parallel in the literature. For example, mobile phones provide the music for the Friday night disco which takes place at the Church Hall during school holidays: "Some of the kids plug their mobile phone into a speaker to play," reported one teenage boy. A middle-aged woman uses her earphones when in public, but at home plugs her mobile into loud speakers. Footballers sometimes listen to music from the mobiles or MP3 players in their pockets while they play their game.

Another interesting multimedia use is the videoing of customary practices. One teenager, who is known in the community as a good hunter, showed the researcher three videos of himself, taken at the end of a successful hunt posing with his prey – turtle, dugong, a cow – and sometimes surrounded by other members of the hunting party. This integration of new technology with traditional Aboriginal cultural practices is noteworthy.

TABLE II. USES OF MOBILE PHONES

Use	No of Responses
Phone Calls	15
Text Messages	14
Music	13
Games	5
Downloading Content from Internet	5
Sharing Content through Bluetooth	5
Taking Photos	4
Taking Videos	4
Wallpaper	2
Viewing Movies and Music Clips	1
Email	1
Sharing Content through Internet	1
Keeping Contact List of Friends	1

C. *Work Uses*

An example of mobile phones being used in the work situation is the co-ordination of work at the CDEP. Three of the Aboriginal supervisors are provided with mobiles which they use to ring the CDEP office to find out what jobs are scheduled and where. Consideration is currently being given to extend the issue of mobile phones to the foremen to give more accurate information about the composition of work gangs. There are probably other uses of mobile phones by the various service organizations in Lockhart River but these were not studied.

Individuals in the community also use their mobiles for business communication. One instance is an artist who spoke of receiving calls about exhibitions and workshops from the Arts Council of Queensland.

D. *Lack of Mobile Applications by Service Providers*

There seems to be a general absence of mobile applications in service organizations at Lockhart. For example, mobile learning has not been implemented at the School. The Lockhart River Clinic is yet to introduce any mobile health applications into their services, despite the successful use of SMS in diabetes management elsewhere and the development of PDA health applications [19, 20]. However there is interest at the Clinic.

VIII. PROBLEMS AND ISSUES

A. *Cost Management*

Our interviews showed that managing costs – the cost of the handset as well as usage charges – is the major issue for people with respect to their mobile phones.

People in the community have two main strategies for minimizing the purchase price of mobile phones. One is to buy their mobiles in Cairns, which can result in a saving of

about half the price compared to purchasing locally. The other is to share phones. For example, one couple had bought one between them and one grandmother reported that her grandson likes to use her mobile.

Management of usage costs is the bigger issue as these will greatly exceed the cost of the hardware over the lifetime of the phone. Bluetooth is a commonly used technology for the free sharing of songs, games and probably other multimedia content between one user and another (see Table 2). The use of text messages by many people in the community reduces communication costs. For instance, one teenager only uses SMS on his phone and relies on his mother to phone him on the land-line at home if she needs to contact him.

For some, containing usage costs is very difficult. This occurs largely when some people who buy phones outside the community unwittingly choose ones which have a monthly plan. They quickly run up large debts. One man reported that his daughter had clocked up a $700 bill on his mobile phone plan, which he is still trying to pay off some time later. He has since disposed of the phone. It is easy to see how users can accumulate huge bills so rapidly, given the attractive services available on the phones and the lack of immediate feedback regarding expenditure. One young woman, who had bought a phone with a monthly plan only a week before her interview, was already telephoning her boyfriend, text messaging friends, sending photos to people via the Internet, downloading movies and music clips as well as buying music off the Net. Some of these activities would be expensive.

B. *Mobile Phone Literacy*

Four interviewees made a point about their lack of knowledge about the capabilities of their devices and/or their inability to use certain features of their phone, or to use a mobile at all. Three of these were middle-aged or elderly people, with one man in his early thirties. Half do not own a mobile phone because of this. For example, one man said that he is in half a mind to get one but doesn't really know what it might do. Those who have phones but want to know more are hindered from a full enjoyment of the devices. One man would like to listen to music but has no room on his phone, having downloaded some animated wallpaper which takes all the memory and he does not know how to delete it. Another person would like to use the Internet and download movies but again doesn't know how. She suggests that workshops should be run to teach people more about using their phones.

None of the people in their teens or twenties reported any difficulty with using their phones. In fact, they provide "technical support" for their older family members, helping them with functions they don't know how to do. One middle-aged lady said of her grandson: "He is my technology bloke. He does everything – puts wallpapers."

C. *Loss of Devices*

A few participants in the study had had phones stolen or they had broke. One woman recalled an incident when her daughter threw her mobile and it cracked. Perhaps phones need to be designed so that they are more robust to withstand the rough and tumble of everyday use.

D. *Social Problems*

One ethical misuse of mobile phones reported in the literature [21] is also a problem at Lockhart River, at least for some girls. "Pranking" – unwanted and unpleasant phone calls – annoy one teenage girl: they "get your number from a third party. They ignore you. They copy you [repeat what you are saying] and are rude … use bad language. You hang up but they ring back! So then you have to turn it off." Apart from the annoyance of the call, there is the issue of not being able to use the phone or get calls or text messages from friends while it is turned off.

IX. CONCLUSION

Our study has confirmed earlier research [2, 3] that mobile phones are the ICT of choice for Indigenous Australians. They have had a much higher take-up than any other modern ICT, including fixed-line phones and computers. This adoption has happened over a very short time, about nine months since the implementation of the 3G network in early 2008.

Our research has demonstrated that it is no longer appropriate to view mobile phones solely as communication devices: "A mobile phone isn't a mobile phone any more" [22]. It has become a music and movie player, camera, videocam and more. Music, in particular, (listening, playing and sharing it) is almost as important as communication for the mobile phone owners who participated in our study. Music and the dancing that often accompanies it have always played a central role in the cultural life of Aboriginal Australians.

The results of this study have many implications for improvements in the delivery of the mobile phone service to remote Indigenous communities. These include:

- *Telecommunications Policy*: since mobile phones are the technology of choice for Indigenous people, then the Federal Government needs to rethink its ICT policy for this group of Australians. Certainly more emphasis needs to be placed on improving mobile phone coverage to include more Aboriginal communities, as well as extending coverage in remote communities which currently have a limited area of service. The provision of a cheaper phone model for poor communities and the marketing of phone recharges in smaller denominations would also be a great advantage, and the telecommunications carrier needs to consider these options.
- *ICT Training Provision*: currently this is completely focused on desktop computers and the Internet. If older Indigenous people are having difficulty learning how to use their phones, as this study has shown, then we need to broaden our training options to include short courses in the effective use of these devices. Training would have the added benefit of educating people about the proper choice of mobile phones (in particular the avoidance of plans which

are not prepaid) and methods of managing usage costs.

- *Development of Mobile Phone Applications and Content:* With the mobile network in place and a reasonably high level of ownership (58%), government and service providers should now be considering mobile approaches to service delivery in the areas of work programs, health, education, cultural revitalization, etc. The popularity of mobile phones for multimedia (music, games, videos, etc.) provides an excellent opportunity for the development of specific content targeted at the Indigenous community. Ideally it would include Indigenous-generated content, e.g., music clips by the local band or other Indigenous performers.

  This content could be developed by service providers (e.g., positive health videos and educational games), by the community itself or delivered on a commercial basis. However, given that Indigenous people are amongst the poorest in Australia, there would need to be a focus on free content. Methods of providing this content to reduce or eliminate download charges would also need to be considered. For example, content could be made available on community access computers and downloaded to people's mobile phones via a local WiFi network or via Bluetooth.

The ready acceptance of 3G mobile technology provides the opportunity to deliver on pressing needs and to build capacity in the Lockhart River Aboriginal Community. Indications from the two previous Australian studies [2 - 3] as well as unpublished research conducted by the authors at the Cape York community of Wujal Wujal, point to the significant potential of these findings.

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