The Data Divide in a South African Rural Community: A Survey of Mobile Phone Use in Keiskammahoek

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Abstract

Recent research on cell-phone use in South Africa suggests rapid uptake of smartphones and increasing - use of mobile data for accessing the Internet. Despite the significant decrease in the cost of mobile data, it is still unaffordable for the majority of South Africa's citizens, especially those living in extreme poverty in rural communities. In a recent piece on data pricing by cellular networks, Arthur Goldstuck of WorldWide Worx , argues that the "digital divide" is being replaced by the "data divide". This points to the emergence of networked activities as a significant aspect in mobile use across all socio-economic sectors. This paper discusses a survey of mobile use conducted in late June and early-July 2014 in Keiskammahoek, a rural area in the Eastern Cape Province which is characterised by endemic poverty and lack of services. The area is the site of the Makana Apps Factory, a project sponsored by the Eastern Cape e-Skills CoLab and hosted by Rhodes University's Department of Computer Science and School of Journalism and Media Studies. The study informed software development and training to improve the socio-economic conditions of the community. Of the 200 respondents, approximately 82% are unemployed. Drawing on the survey data and in-depth interviews, we explore *inter alia* how respondents are using mobile phones and for what purposes, what phones they are using, how and why phones are shared and how much money they spend. The survey suggests a strong interest for networked activities despite the relatively low socio-economic status of the participants. This is consistent with earlier surveys in Keiskammahoek and in comparable communities.

Keywords: digital divide, mobile data, rural areas, survey methodology, mobile apps.

Introduction

Recent research on mobile phone use in South Africa suggests rapid uptake of smartphones and increasing - use of mobile data for accessing the Internet. A number of studies focus on mobile users (particularly the youth) in urban and peri-urban areas (Bosch, 2008; Butgereit, 2007; Francke & Weideman, 2007; Kreutzer, 2009). Although a vast portion of the South African population lives in rural areas, research on mobile access and use by members of marginalised rural communities is lacking.

This paper accepted by executive review

In this paper we review past research conducted using survey methods in two comparable rural areas in the Eastern Cape Province of South Africa. We then present and discuss the findings of a recent survey in one of these areas. The novelty of our approach is threefold.

We focus primarily on uses requiring relatively advanced features. In a recent piece on data pricing by cellular networks, Arthur Goldstuck of WorldWide Worx, argues that the "digital divide" is being replaced by the "data divide". The same author notes that cost of data is becoming a significant problem in South Africa as more and more people become active participants online. While considering all aspects of mobile use, we feel that a focus on advanced features reflects a forward looking attitude, capturing current developments rather than reinforcing a view of rural dwellers as continuously excluded and backward.

We focus on two well researched case studies rather than aiming for a large and representative sample. Asking comparable questions over time gives us an insight into the dynamic dimension of the mobile phenomenon. The presence of research across disciplines and on various topics enables comparisons and a holistic understanding.

Our experience shows that employing established survey techniques in a rural area present specific challenges. After experimenting with various techniques, we propose a two steps approach involving the training of local fieldworkers to administer a questionnaire orally. While this strategy is not new, critical reflections on the application of such technique complement the findings of this study.

Multiple Digital Divides in South Africa

As access and use of technology becomes an important aspect of the daily lives of South Africans across the socio-economic spectrum, active participation in the information society required familiarity with the Internet. Within the current scenario, the most relevant aspect of the mobile phenomenon is the level of participation online, captured by the concept of the "data divide". In this section we position the discussion on the data divide within a multiplicity of other divides, i.e. computers/mobiles, individual/shared, physical/epistemological and urban/rural. In all instances, we pay particular attention to the implications for access to and use of the Internet via mobile phones. Quantitative research documents the rapid uptake of ICT - and particularly mobile phones – on the African continent (Feldmann, 2003; ITU, 2013; Kruetzer, 2009; Rao, 2011). Numerous scholars (Dourando et al. 2007; Feldmann 2003; Ivatury & Pickens, 2006; Jidenma, 2013; Karanja, 2014; Skuse & Cousins, 2007) note the increasingly important role of mobile phones across domains and socio-economic sectors. The vast majority (up to 80%) of the phones in South Africa are expected to be smartphones by the end of 2014 (Jones, 2010).

Mobile telecommunicators provide services to low-income communities as part of their licencing requirements. In Sub-Saharan Africa, access is often limited by poor network coverage (Buys, Dasgupta, Thomas & Wheeler, 2009). The cost of data in South Africa has often been criticised as being too high (Abrahams & Goldstuck, 2012). A recent ruling by the Independent Communication Authority of South Africa (ICASA) – see aims at promoting competition and lowering prices by introducing asymmetric Mobile Termination Rates (MTRs – the extra charges to call users across different networks) in favour of smaller players. In order to save on Mobile Termination Rates (MTR) and cope with poor network coverage in certain areas, many people use more than one SIM card (see Chepken, Blake, & Marsden, 2013).

The most appropriate technology to support Africa's leapfrog into the information age is the object of current debate (Bramforth, 2011; infoDev, 2012). South Africa's ICT infrastructure is relatively advanced compared to the rest of Africa (Bovee, Voogt, & Meelissen, (2007). Through its Universal Service Agency, the South African Government is committed to providing universal access to ICT (Oyedemi, 2009). As in other African countries (see Mmusi, 2005), much effort has

gone towards community access via telecentres and schools. Goldstuck (2013) blames this approach for South Africa's drop in World ranking on Internet access and advocates in favour of household and individual access.

Donner and Gitau (2009), note that for a growing number of South Africans mobile phones are the first, if not the only, means to access the Internet. The fact that the mobile Internet is often prepaid, slow and expensive has implications on how these users experience being connected (Donner ,2008). A key difference compared to fixed-line uncapped broadband access is the issue of cost. All over Africa, as in other parts of the developing World, commercial as well as non-commercial phone sharing is practices mainly as a strategy to cope with the cost of communication (Aker & Mbiti, 2010; James, 2011). Donner (2008) notes how sharing of ICT among family and friends contributes to reducing the digital divide in South Africa. In his study on mobile phone access and use by peri-urban youth in Cape Town, Kreutzer (2009) notes that phone owners and those who access shared phones display similarly high levels of use (up to 68% daily). He also notes the popularity of online news, instant messaging and the creative use of phones to take pictures and videos.

Due partly to past discriminatory policies and partly to current socio-economic inequalities and geographical configuration, access is profoundly unequal. Castells (2000; see also Donner, 2008) uses the term "fourth world" to refer to people across the gender, age, language, location literacy and other divides who, willingly or unwillingly, are at the periphery of the global network of networks. With specific reference to universal access, Goldstuck (2010) notes a lag between the achievement of physical access and active participation online. He terms this the Digital Participation Curve and quantifies it in roughly five years. That means that, even if everybody has access to the Internet by 2015, it will take until 2020 before everyone has the actual opportunity to meaningfully participate online. Besides issues of language, literacy and skills, attitudes also play a major role. The DPC concept links the dynamic dimension of physical access, exemplified by the rapid diffusion of mobile phones on the African continent with the realm of epistemological access. The distinction between physical and epistemological access is exemplified by the finding by Goldstuck (2010) that up to 60% of owners of Internet-enabled phones in a South African urban area are either unaware of or have never used this feature.

As noted by Odendaal, Duminy, and Saunders (2008) the urban/rural divide is a prominent characteristic of the debate around universal access in South Africa. Roodt, Paterson and Weir-Smith (2006) highlight the differences between different regions in South Africa and note that, while the relatively high Internet penetration is due mainly to concentration in metropolitan areas, the situation in rural areas is similar to the African average. Powell (2012) notes how the process of urbanisation brings more and more people within reach of large metropolitan networks. Rural areas can be considered not only representative of a vast and under-researched portion for the South African population, but as representative of many other realities on the continent.

Research Context

Our work builds on research in two comparable rural communities in the Eastern Cape Province of South Africa. The first one is located near the Dwesa nature reserve on the Wild Coast of the Transkei. Since 2006 the area is the site of the Siyakhula Living Lab, an ICT-for-development project initiated by the Telkom Centres of Excellence of Rhodes University and the University of Fort Hare. This case study is extensively documented in multi-disciplinary research (Cristoferi & Dalvit, 2013; Pade-Khene, Palmer, & Kavhai, 2010). For the purpose of the present paper, we refer particularly to two surveys of mobile phone and computer use among school children.

The first one (Gunzo & Dalvit, 2012) compares access and use in the rural area with a nearby small town township. The overall finding was that mobile phone use was twice as common as

computer use, while frequency was four to five times greater. Perhaps more significantly, the ur-ban//rural divide was notable with respect to computer use, but not mobile phones. However, when networked activities such as email and Web browsing were concerned, youth in peri-urban areas seemed much more confident and experienced users. These findings highlight the intersec-tion between the computer/mobile and the urban/rural divide.

The second study (Gunzo & Dalvit, 2014) represents a follow up on the rural component of the earlier study. After one year, it followed the same methodology and targeted the exact same sam-ple, i.e. 735 students of all ages in 10 rural schools in the Dwesa community. Adding a longitudi-nal dimension highlighted a correlation between mobile and computer use. The frequency and range of activities increased organically across both devices, refusing the idea that mobile access somehow cannibalises computer use or vice-versa. However, the arrival of computers in some of the schools did not translate in an immediate increase in mobile use. This is consistent with the idea of a Digital Participation Curve proposed by Goldstuck. The daily use of mobile phones in-creased from 59 to 71% and weekly use increased from 3 to 17%. The fact that 20% of the re-spondents got a new phone during the year under consideration may explain a surge of 20 – 25% in multimedia activities. The analysis of networked activities such as Internet browsing and email indicates a concern for the cost of data, as indicated by the use of instant messaging instead of SMS.

The second site under consideration is Keiskammahoek, a rural community in the Ciskei region of the Eastern Cape. Despite being relatively close to urban centres, it is comparable to Dwesa in terms of size (approximately 20 000 inhabitants distributed across several villages); type of ter-rain (a combination of flat and mountainous); and socio-economic status (endemic poverty and reliance of Government grants). This allows for meaningful critical comparison of the findings for the two sites.

Keiskammahoek is the site of the Makana Apps Factory, a project sponsored by the Ikamva Na-tional eSkills Institute through the Eastern Cape CoLab. The goal of the project is to develop software and train the local community to exploit the potential of mobile for socio-economic de-velopment.

A survey of media and mobile use (Dalvit & Strelitz, 2013) was conducted in the area. This study confirmed low household access to computers but noted a high (67%) access outside the home. A relatively high percentage reported being able to perform productivity activities such as typing and searching for information, which suggests access at school or work. Access to mobile phones is almost universal and 80% had a phone for more than two years. Approximately two-thirds of the respondents acquired their phone over the past two years. Cost was the main factor determin-ing network choice, followed by quality of signal. Each household spent an average R 160 a month on airtime. Half the sample only used phones for communication. Multimedia activities were performed by approximately 50% and networked activities by 40%. Interestingly, an addi-tional 20% lived in households where at least one member performed either type of activity. Thus, mobile phone sharing extended the reach of feature-rich phones. Younger people appeared to be twice as likely to perform multimedia activities and three times as likely to use Internet fea-tures. This broad scope exploratory study formed the basis for a more focused survey, aimed inter-alia at informing apps development and training. The results of this more recent study are reported and discussed in the Findings section below.

Methodology

The methodology used was a survey using established data collection tools such as questionnaires and interviews. The main study was preceded by a pilot in a township chosen for convenience and accessibility. The questionnaires were originally written in English and were translated into

isiXhosa after the pilot. Previous research in the Keiskammahoek area (Dalvit & Strelitz, 2013) highlighted the importance of language issues and informed the development of the research tools used in the present study. This earlier research is also referred to for the purpose of comparison and validation.

The fieldworkers administered 180 questionnaires in six villages in the Keiskammahoek area, between 20 June and 20 July 2014. All fieldworkers were members of the local community with a sound understanding of the local context. Questionnaires were not self-administered by the respondents, but were filled in by the fieldworkers. Previous experiences conducting research in rural areas suggest that low levels of literacy and little familiarity with questionnaires warrant administration by a fieldworker rather than self-administration.

Ten fieldworkers received training on how to administer the questionnaire, working in pairs and collecting feedback to inform the final version of the data collection tool. This introduced a second step in the piloting and refinement of the questions and ensured consistency among fieldworkers. Only 12 questionnaires were excluded from data analysis as they were incomplete or because responses were internally inconsistent. Based on our experience with the application of survey methods in similar context, this is an exceptionally low figure.

The detailed summary of responses is attached as Appendix A. The relatively poor socio-economic status of most respondents is clearly captured by the data. Only 4% of respondents work full-time, 7% part-time and 82% are unemployed. The majority are young people under the age of 30.

As shown in Figure 1, approximately 34% are in between the ages of 11 and 20, 30% between 21 and 25 and 12% between 26 and 30. Only 10% are between 30 and 60 while 14% were over the age of 60. This is consistent with the demographic composition of the area, where most young people of working age migrate to the cities looking for jobs. Female respondents accounted for 56%. Gender composition reflects that of the Eastern Cape Province as Statistics SA's 2013 mid-year population estimates report that 52.9% of Eastern Cape residents are female (Stats SA, 2013).
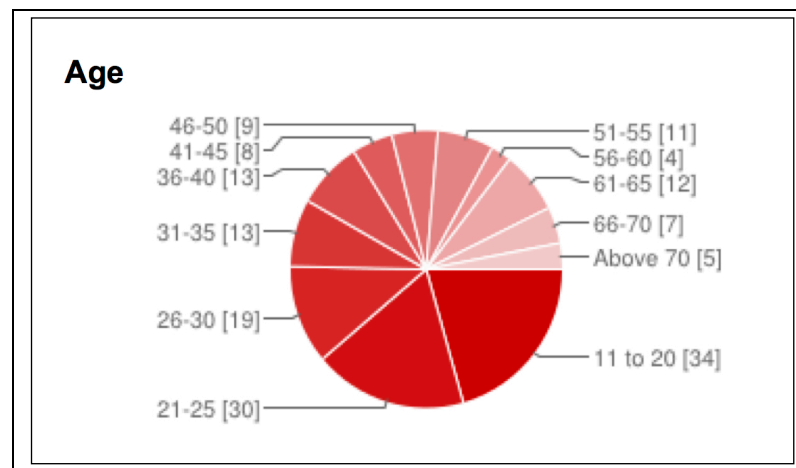

Figure 1: Age distribution of respondents [% in brackets]

Findings

As noted by Donner and Gitau (2009) the experience of most rural users in South Africa is mobile-first and mobile-centric. This is confirmed by our survey in Keiskammahoek. Only 35% of

respondents have access to the Internet via means other than mobile phone. 7% used a tablet to access the internet, 3% used their own and 5% used one owned by a friend or family's tablet. 14% used their own PC or laptop, 21% a friend or family member's, 1% used a PC or laptop at work, 5% at a school. (See Figure 2)
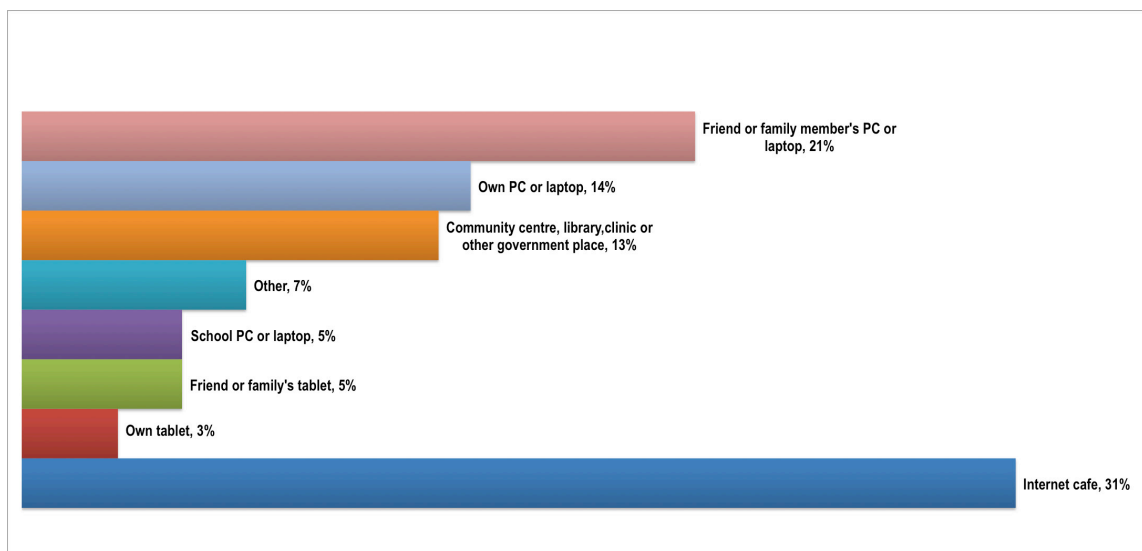

Figure 2: Access to Internet other than by mobile phone

Given the remoteness of the area, a relatively high 31% used an Internet café, 13% used a public facility such as a community centre, library, clinic or other government facility and 7% some other point of access. This is consistent with the relatively high percentage of those who claim to have access to a computer outside the home, noted by Dalvit and Strelitz (2013).

As noted by Dalvit and Strelitz (2013) people in Keiskammahoek in general are experienced users of mobile phones and have had a comparatively large number of devices. 38% of respondents have owned more than three mobile phones and 86% have owned a phone for more than three years. Only 13% use the first phone they own.

Previous research on mobile use in rural areas highlights the importance of considering different type of activities as well as their frequency. Communication activities were the most common in the hour before being interviewed. 68% had used a mobile phone to make a call and 59% had used free services such as checking their airtime balance, retrieving a voice mail or sending a "please call me". Only 34% had sent an SMS. By contrast, 43% used a phone to listen to music (27% on radio), 19% to take a picture and 16% to watch a video. Interestingly, although only 8% created a video using their mobile phone in the hour before the survey, 63% claim to have done so at some point in time.

Networked activities were frequent, considering the proportion of mobile phones which supported them. 43% used a social network and 35% instant messaging in the last hour. Although less frequent, instant messaging use was slightly more common than social networking (73 as opposed to 69% of respondents). Email was used only by 25% and just 7% in the last hour. Other networked activities such as searching for information, downloading files or browsing the Web were practiced by between 10 and 15% in the last hour, and by between 50 and 60% overall. These data confirm the progression noted by Dalvit and Strelitz (2013) from communication to multimedia to networked activities in terms of number of users as well as frequency.

These authors note a fourth set of activities, i.e. money-related uses. As noted below, this is one of the most common uses of apps. 36% of the respondents indicate that they do something related

to banking on their phone (e.g. check balance, pay bills etc). Airtime transfer, which as noted by Cristoferi and Dalvit (2013) can be considered a money-related use of mobile phones, was performed by 67% of the respondents and by 15% in the last hour. 29% have used mobile apps in the last hour and 55% have done so at some stage. Besides the uses discussed above checking news (40%) and, to a lesser extent, using maps (15%) were common apps. Only 2% use an antivirus and an additional 7% do activities like gaming and using a flashlight.

Despite the extremely high level of unemployment, every respondent reported that their household has at least one phone. This finding is significant since mobile phones are frequently shared between members of the same household. Households have an average of 2.9 phones. As expected smaller households (fewer than 5 people) accounted for 37% of the sample and have an average of 2.2 phones, Households with 5 to 10 people had an average of 4.1 phones. (See Figure 3)

Although phone sharing is common, only 54% said they would let someone else use their phone. 23% let other people use their phone to make calls, 14% to send SMS, 10% to make airtime transfers, 12% to take pictures, 13% to listen to music or the radio, 7% to watch videos, 5% to use social networks or send instant messages, 3% to search or use the internet and 1% to send email.

Of the reasons people gave for using other people's phones, 34% was because it had more airtime, 18% to make an airtime transfer, 13% because it has better features (camera, radio, music), 11% because it has apps such as Facebook. Only 1% said it was because they did not have their own phones.
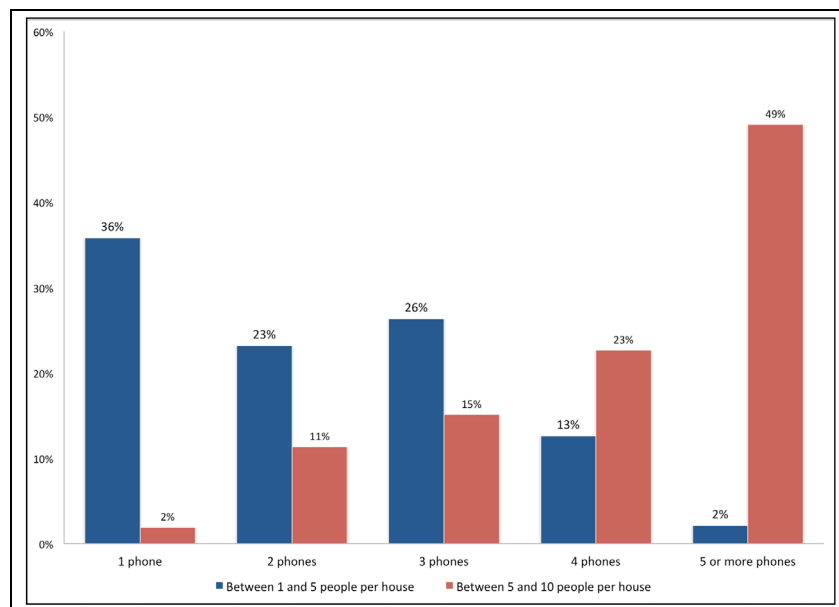

Figure 3: Phones per household

The most popular network operator is MTN (72%). Cheaper call rates were indicated as the main reason for network choice (37%) followed by signal quality (31%). In a rural area where network coverage is often patchy and not all areas are covered by all operators, this suggests a strong sensitivity to cost among the respondents.

Most respondents (55%) spend between R20 and R50 a month on airtime. Only 22% spend more than R50 a month on airtime and 23% spend less than R 20. Sim-jockeying, i.e., the practice of using more than one Sim card to take advantage of promotion on different networks and avoid MTRs (Mobile Termination Rates), is considered a strategy employed by people from a low so-

cio-economic background to save on communication costs. Approximately 42% of the respondents use more than one Sim card.

Messaging provides an indication of how data are used to save on costs. Only 37% use SMS as their main way of sending messages, while 25% use WhatsApp, 14% Mxit, 16% Facebook, 4% email (although 25% had used email on a phone in the previous month) and 1% Twitter. In this question, respondents were asked to identify only one main way of sending messages, so it is an important indicator of how many residents 63% use data-based messaging systems on smartphones or feature phones, both of which use data and are capable of accessing the Internet.

In a separate question 72% said they had used any form of instant messaging (as distinct from SMS). 35% of these had used instant messaging in the previous hour and a further 18% in the previous day, indicating that a majority of respondents use instant messaging. Commenting on a family member's mobile use, only 69% of respondents reported that the family member had never used instant messaging.

Internet Access

Of course, instant messaging is the most basic voluntary use of data (as opposed to background data: used by smartphones) (Figure 4). Social networking is a more substantial indicator of data use and use of phones to access the Internet. Some kind of social networking had been used at least by 69% of respondents and 43% had done so in the hour before the interview. 60% had used a search engine on a mobile phone, 57% surfed the internet (10% had done so in the previous hour and a further 17% in the previous day. 52% had downloaded files.
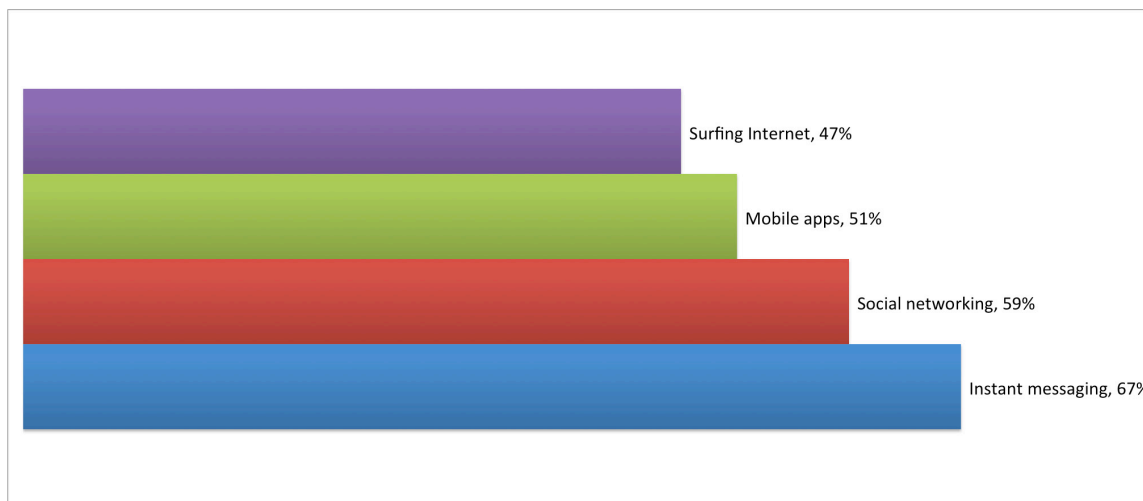

Surfing Internet, 47%

Mobile apps, 51%

Social networking, 59%

Instant messaging, 67%

Figure 4: Use of mobile Internet

Conclusions

In this paper we proposed an articulation of the digital divide -with a particular focus on the data divide - along several dimensions (mobiles/computers, individual/shared, physical/epistemological, urban/rural). We reviewed past research in two comparable rural areas of the Eastern Cape, highlighting the complementarity between phone and computer access, the near universality of the former, the progression from communication to multimedia and networked activities and the interesting phenomenon of technology sharing. We then presented the results of a survey in Keiskammahoek, confirming many of the previous findings. A longitudinal approach and a focus on data revealed that basic activities are not only more common, but also more frequent. However, networked activities are rapidly increasing. Respondents show sensitivity to

cost, but also an ability to use advanced features (e.g., instant messaging) to save on their expenses. In summary, our paper suggests a rapid uptake of networked activities in rural areas despite the relatively low socio-economic status of most respondents. Mobile applications which are data-efficient and contribute meaningfully to the life of users definitely have a future in this important section of the South African population.

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