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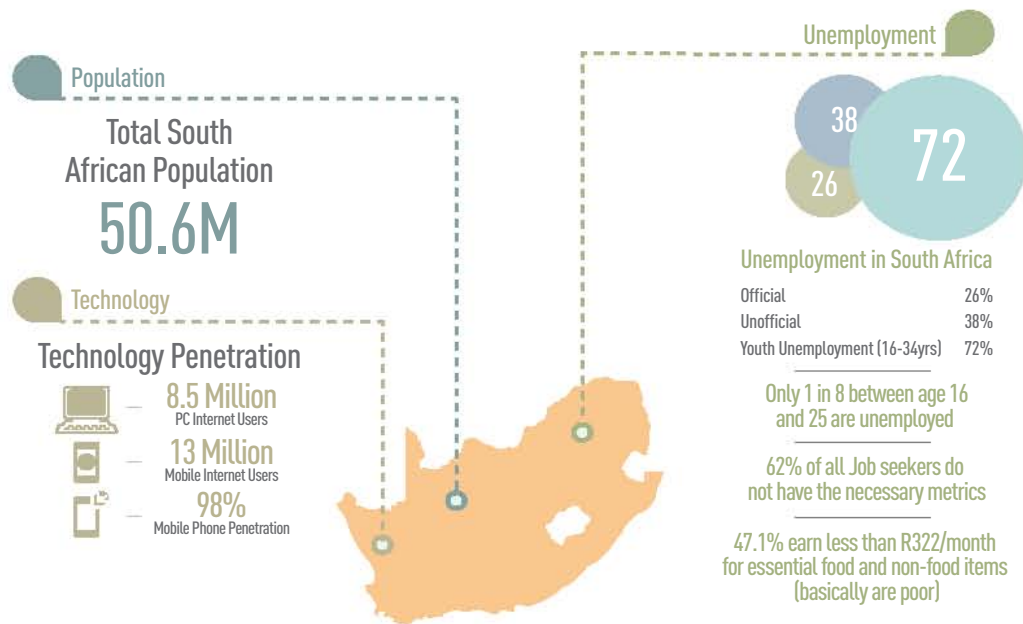
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DESIGNING UMMELI

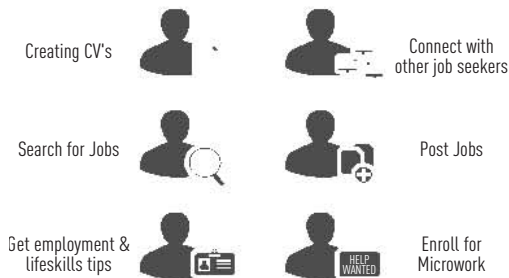
A case for Mediated Design, a participatory approach to designing interactive systems for semi-literate users

Shikoh Gitau
2012

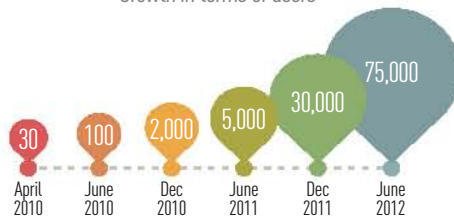


Ummeli is a Mobile and Mobile Web App

How Ummeli helps its Users



Growth in terms of users



“ I was referred to ummeli by a friend in march. At first i thought it was a youth chatroom. I looked it thoroughly and got impressed by the employment tips. I built my cv and searched in the gaming category as i am a licenced professional hunter. I sent my cv to two game lodges and one of them called me the following day,inviting me for an interview. I am now a headranger at legendlodes and the salary is generous,with benefits. I plead to users to stop using ummeli as a chatroom but as a platform where we the youth address unemployment issue and offer career advices to others.

-One of Ummeli's users

A Thesis Presented
for the

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Plagiarism Declaration

I know the meaning of plagiarism and declare that all the work in the document save for that which is properly acknowledged is my own.

Signed:

Signed by candidate

Date:

University of Cape Town

"By the grace of God I am what I am, and his grace to me was not without effect. No, I worked harder than all of them—yet not I, but the grace of God that was with me."

1 Corinthians 15:10 , The Bible, NIV

"Attempt something large enough that failure is guaranteed...unless God steps in!" –
Bruce Wilkinson, *The Prayer of Jabez*

DEDICATION



To Rainer and Dorothea Güting,

For hearing the call, taking the step, and risking to believe in me.

Thank you for being God's hands in my life.

To Mom and Dad thank you for always being there, and always believing in me.

I love you.

Acknowledgment

In Africa we have a saying – “*It takes a village to raise a child*”. The same can be said for a PhD. In the course of the last three years, this baby has had lots of support from different quarters, some who I can mention here, and the majority of whom hold a special place in my heart. To all you, I extend my heartfelt thanks.

Gary and Jonathan, you took me under your wing, mentored me, corrected and patiently moulded me to what I am today. Thank you so much and, as I have said countless times, I hope to make you proud one day. God bless you and your dear families for all that you have contributed to my life.

Dad and Mom; Jen, James and Baby Karen; Kim and Rose; and Joe: I know I have been the worst at communicating over these past few months. But you were always there, calling me, praying for me, encouraging and loving me. I am happy to be a Gitau and to be related to you lot. I love you.

To the ICT4D Lab – guys I know I mean more to you than the muffins and coffee ☺. You are an amazing lot, and your passion for changing the world is one to be emulated. I will be checking up on you to see how it is going.

To my friends, those of you who have been there as pillars of support, really I do not have enough words to say thank you. Nkatha, Beato, Nans, Wawi and Loredana, thank you for the interventions, making sure I did not grow mould reading/writing. Stebi, or should I say Dr. T. Mahamo, my writing partner, girly it is done!

Milton, **insert a double high five here** you are the best developer I would have ever asked for. Thank you for staying awake all those nights to make Ummeli a reality.

Most importantly I would like to acknowledge the Khayelitsha community for taking me in and baptizing me “Tandiwe”, meaning the “the loved one”. I really did feel the love. Thank you to Learn to Earn, the whole staff and student body, to Babs for constantly being there and to Susan for your encouragement and support. Thank you so much.

This baby would have starved to death had it not been for the financial contribution of the Hasso Plattner Institute, Microsoft Research and Google Inc.

To the Praekelt Foundation, in particular Gustav, thanks for taking up my baby, nurturing and feeding her to what she has become now – Ummeli.Mobi, 100 000 going on 1 billion users !

Well, that’s why my very deepest gratitude goes to God, the author and finisher of my faith. I would like to say thank you most for keeping the dream burning, and bringing it to reality, even through those rough patches you still made it look possible. For all this I say: TO GOD BE THE GLORY!

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ABSTRACT

This dissertation documents a journey into the design of Ummeli with a community of semi-literate job seekers in Khayelitsha, Cape Town whose primary access to the internet was through their mobile phones. Working closely with this community over many months, we developed Ummeli, a suite of tools that allow the user to build their CVs; browse and apply for employment and training opportunities; recommend and post jobs; get employment tips and connect to other job seekers.

To design Ummeli, Ethnographic Action Research (EAR) was embraced, not as a methodology, but as a research approach, a foundation from which to incorporate participatory approaches to designing Information communication technologies for development (ICT4D). User Centred Design (UCD) was incorporated as a design approach.

Ummeli was built by a combination of insights drawn from a lived-in experience, and employing UCD informed methods of participatory design (PD). Here we employed Human Access Point (HAP), a form of PD that allows for a member of the community to be a proxy for the design process. Learn to Earn, an NGO based in Khayelitsha, became the HAP, and took the critical role in that they highlighted, translated, evaluated and represented what was most crucial for the community; their input allowed Ummeli to match the community's need.

In the process, we came across concepts such as *Umqweno*, which represents yearnings and desires, replacing our own perception system's requirements; *Siyazenzela*, representing a communal participatory approach to doing life; and *Ubuntu*, which captures the spirit behind Africa's communal identity. All were adopted into the original EAR framework.

In this document we set out to demonstrate what it means to be a "reflective practitioner" as we adopted appropriated and reconfigured aspects of participatory UCD methods to fit culturally relevant contexts. The process allowed for constant reflection, leading to "aha" moments. In the end, and as a contribution to the field, we had: created Ummeli, with over 80,000 users; developed Mediated Design, a culturally indoctrinated participatory approach to designing interactive system with

and for semi-literate people; and applied Appreciative Inquiry as a means to support Usability Evaluation and Participatory Design.

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1. Introduction

“Unjani, sisi?” the lady behind the sewing machine called out. I replied, *“Philile, enkos’. Kunjani wena?”* Laughter filled the room as she replied, *“Philile nam, enkos’.”* After 10 months of coming to Khayelitsha, this was a routine I’d become used to. As I settled in for the day, Nontembeko (Nonty) came rushing up to me, crying, *“Sisi! They replied! They replied, sisi!”* She repeated it over and over as she frantically fumbled through her phone’s menu. She arrived at the Gmail application, tapped into the Games section and shoved the phone into my hands. Nonty was referring to an email response to an application she had sent through her email the previous day. If I had to pinpoint when Ummeli was conceived, it would be Nonty’s application and eventual admission to a home-care training centre.

South Africa is said to have achieved liberation with the end of apartheid in 1994. Since then, the country has made great strides in abolishing discriminatory policies that rendered the majority of the population uneducated, unemployed and poor. Strategic and focused attention towards improving the lives of millions of South Africans has seen an increase in the number of school enrolments, widespread infrastructural improvements and more investment, resulting in South Africa becoming a more equitable nation. However, even with all these efforts, South Africa still faces her biggest challenge: nearly 40% of households, in a country of 50 million people, live on less than ZAR388 (USD \$50) per month[1], [2]. Additionally, the nation’s cumulative unemployment rate also stands at 40%, with an average national age of 24.9 years. The majority of the unemployed (72%) are under 35. One of the biggest and most disruptive consequences of a mostly youthful population languishing in poverty and unemployment is civil unrest. Since 2004, South Africa has experienced an annual ‘festival’ of service-delivery demonstrations, ranging from mild protest marches to violent and sometimes fatal protest action. The challenge lies

with the unemployed youth; and the problem will get worse unless a series of interventions are made to engage the youth in meaningful activities.

Unemployment is caused by an amalgamation of factors at a personal, national and even global level. There is no single solution; these factors are diverse, and may include global markets, local politics, and personal endowment. Each factor, or a combination of these and many others, may need to be tackled in order to guarantee employment. However, accurate, timely and meaningful information about employment opportunities is essential if the unemployed are to access them. It is also important to note that this information is not limited to available opportunities; rather, it is the result of increasing a person's capabilities, as a step out of poverty. Information about processes such as skills development – which make a person better placed to obtain gainful employment – is also vital.

In this dissertation we look at providing employment and skill-training information that is not only accurate, meaningful and easy to access, but also time- and cost-efficient, in the context of an unskilled and semi-literate population (based on their personal and communal dispositions). Ummeli is a mobile-based social networking application targeted at semi-literate job-seekers whose primary access to the internet is through their mobile phones. Ummeli contains a suite of tools that allow the user to build their Curricula Vitae (CVs); browse and apply for employment and training opportunities; recommend and post jobs; get employment tips; and connect with other job-seekers.

Starting in April 2010 as a mobile application written in JAVA Mobile Edition (J2ME), Ummeli has since been rewritten in PYTHON and is now available free as a mobile web application on Vodacom's (a South African cell phone service provider) mobile web landing page VodacomLive. At the time of writing (July 2012), Ummeli has a user base of 85 000, having grown from the original 100 users involved in its design and prototyping. A survey of current users shows that most are in the same skills bracket as the initial users.

This dissertation positions the design of Ummeli – an interactive system – in a community of semi-literate job-seekers in Khayelitsha, Cape Town, South Africa.

Ummeli falls into a category of applications broadly classified as Information Communication Technologies for Development (ICT4D), a term referring to a field of study

that distinctively identifies itself as an interventionist science[3], in which a technology is built or introduced into a developing community – usually in the global south – with the aim of improving the various attributes of livelihoods [4] [5].

This first chapter is an introduction to some of the discussion around designing ICT4D applications. Here I describe the research approach, the research question, and the motivation for this study, and provide an outline for the rest of the dissertation.

1.1. Theoretical Framework

It is said that necessity is the mother of invention, and certainly innovation, design and ideas often emanate from unexpected sources. From the literature, we knew that Khayelitsha in Cape Town is one of the poorest communities in South Africa, with up to 90% of the population living below the poverty line (Chapter 2 gives a detailed description). In reality, the sheer scale of the deprivation was intimidating. There were so many problems to address; it was difficult to pin down a single thing essential to community upliftment. Therefore, we opted to become immersed in the community, listening and observing in a very systematic manner. Hence, the design of Ummeli is rooted in situated systematic listening, observation and interaction with the potential beneficiaries, with the aim of creating a technological artefact that will have a positive impact on their lives. This leads to the theoretical and philosophical positioning of this work.

This study lies broadly across two areas of study: one deals with studying and understanding people, with the aim of leaving an impact; the other deals with creating technologies for development. In this section we examine both areas, as a way of giving the rest of this document a firm foundation.

1.1.1. ICT4D: ORIGINS, METHODS AND PRACTICES

This work falls into the area of Information Communication Technologies for Development (ICT4D), generally described as the study of how technology (or components of technology) may be used for social economic development.

While this dissertation is within the context of computer science, and great emphasis was placed on the 'ICT' part of ICT4D – primarily the design of the technology – it is important to take a step back and gain an understanding of ICT4D as a whole. Here we begin by first delving into the 'D', or Development. In the context of this study, we point back to poverty and then describe some of the ways proposed to achieve development. Later we look at the 'T', or digital Technology; its entry to and growth in Africa, and its role in the Development discourse. We touch on the area of digital exclusion, and show the potential of mobile phones in development.

This is not by any means intended to undermine the importance of the information and communication aspects of ICT4D; rather, Development and Technology have been highlighted, as they form the focus of this dissertation.

1.1.2. CONTEXTUALISING THE 'D' IN ICT4D

There is no sufficiently definitive way of emphasising the importance of first understanding Development in ICT4D; this is because it provides a holistic view of why this kind of work is undertaken. The challenge for many scholars is to pin down its definition and detail what Development actually entails. To be able to do this, we started by looking at what Development is not. In this regard, poverty is viewed as the polar opposite of Development.

1.1.2.1. POVERTY AND DEVELOPMENT

The World Bank and the United Nations define poverty as a situation characterised by ill-health, illiteracy, inadequate schooling, social exclusion, powerlessness and gender discrimination [6], [7]. Sachs [7] refers to poor households as those that are “chronically hungry, unable to access health care, lack the amenities of safe drinking water and sanitation, cannot afford education for some or all of their children ... lack rudimentary shelter and basic items of clothing”. The World Bank views poverty in relation to a household's Gross National Product (GNP) and their daily expenses for comfortable sustenance. This puts a household's purchasing power against its income and examines its ability to meet daily needs. In this context, a household and its members are termed 'poor' when their total daily income is less than their daily household expenses, which results in a lowered standard of living [8–12]

Development, therefore, is seen primarily as the absence of poverty. However, there are divergent views as to what development entails. One side sees development as an outcome;

it is portrayed as a complete change to the status quo. For instance, increases in development could be measured in accordance with household income, number of children going to school, or healthcare facilities within a given locality [10]. The other side sees development as a process, a sequence of state changes, whose aggregated outcomes lead to an increase in the welfare of the individual, household, or society as a whole [13]. This view seems to embrace development as a progressive state, as opposed to a change in condition. This is notable in the discussion on democracy, where it is seen as an accumulation of initiatives and constitutional law, such as regular, free and fair elections; freedom of speech; the free flow of information; and gender equality, to name but a few.

Among many development practitioners – particularly economists – poverty is measured in terms of income and expenditure. This approach looks at the issue in terms of a household's purchasing power in relation to the cost of survival, which can be linked to the cost of acquiring a number of food calories or a basket of goods and services [10]. However, for a long period looking at development in terms of income and expenditure was viewed as simplistic, as it resulted in a range of failed development initiatives. The need for an holistic view of poverty, and consequently an holistic approach to development [14], was recognised. This change in approach saw a shift in and expansion of poverty as a 'multidimensional' phenomenon [12], [15].

Leading this school of thought was Amartya Sen [4], [15]. Sen views poverty as a condition in which people are very deprived, and argues that although income has a role to play in predisposing one to being poor, poverty is much more – it is a deprivation of basic human capabilities (ibid). This deprivation is reflected in many societal failures, including (but not limited to) premature mortality, significant undernourishment and widespread illiteracy (ibid). Hence, in this context, development may be described as the process of enlarging a person's 'functioning and capabilities'. This implies that development is about expanding the range of things a person can do by removing obstacles that they believe will hinder their well-being; this may be through obtaining an education, accessing health care, lobbying for better governance, or increasing income [15], [16].

Sen's work on the multi-dimensionality of poverty has influenced United Nations (UN) initiatives in tackling poverty. Through its development programme (UNDP), the UN views poverty as primarily a deprivation of choices and opportunities for living a life which one

has reason to value [12]. Through the Human Poverty Index and the recently updated Multi-Dimensional Poverty Index [8], [12], the UN focuses on four basic dimensions of human life – longevity; knowledge; economic provisioning; and social inclusion.

Another index of the UNDP is the Human Development Index (HDI) [8]. In addition to income, the HDI includes literacy and life expectancy as means of measuring development or lack thereof. The HDI is constructed as an aggregate index of a long and healthy life, indicated by life expectancy at birth (usually a minimum of 40 years in developing and 60 years in developed countries); literacy, in terms of levels of education (hence the emphasis on basic education); and income, indicated by a decent standard of living [14], [8].

Given that there are diverse views on poverty and development, various development practitioners and institutions have put forward various ways in which to tackle poverty and achieve development. One way which seems to have gained a reputation for success is ‘Participatory Development’.

1.1.2.2. PARTICIPATORY DEVELOPMENT APPROACH

Participation, as applied to taking part in collective forms of action and decision-making, at some level and between some individuals, is inherent to all social life. It was adopted as a development approach as a means of reversing the negative effects of ‘normal’ development practices, which were considered prescriptive and irrelevant. Development was equated to modernity, as achieved in the west [17–20]. Hence the development undertaken was a replication of steps and processes previously undertaken in western countries, under the stewardship of development experts who were also from the west, resulting in a development process that was Eurocentric, top-down, and which disregarded local realities [19].

The Participatory Development Approach (PDA) was put forward in recognition not only of local realities, but also of local capacity to interpret these realities. It’s an approach to development based on the point of view of those directly affected by the developmental interventions. It uses local decision-making, culture and practices in the planning, design and implementation of development initiatives that affect them [17], [18], [20].

In response to PDA's emphasis on bottom-up development, the focus in implementing development has been on the grassroots level of the community. This focus has seen the emergence of an active civil society who lobby and facilitate this form of development. 'Civil society' has various connotations, including the politico-philosophical. However, it's largely accepted that it refers to a formal or informal grouping of individuals with similar agendas. In this context they are actors in socioeconomic change in their immediate society [20–22]. Formally, these groupings, with formal structures, are community-based organisations (CBOs) and Non-Governmental Organisations (NGOs). Given that they are grassroots-led, NGOs are a “fountain of local knowledge”, providing local community expertise, an entry point to the community, and a source of background information on the community and its needs [23].

Despite existing criticism to PDA [17], [20], [22], [24], participation in development has a lot more advantages than underlying disadvantages. They include ensuring self-determinism through empowerment and capacity development, and providing for effective and efficient development interventions. By using local knowledge, skills and material, PDA cuts down on the cost of an intervention. Additionally, local negotiations on the nature of an intervention result in an accurate representation of the majority of the local population's view on the intervention. And most importantly, PDA has been seen to ensure sustainability. Jennings [17] notes that surveys of participatory-driven development initiatives have shown unprecedented levels of success in fostering sustainability of development initiatives. These are advantages that could be transferred when planning for IC4D initiatives.

1.1.2.3. SUSTAINABLE LIVELIHOODS APPROACH (SLA)

Another highly-acclaimed approach to development is the sustainable livelihoods approach (SLA). SLA was conceptualised in the mid-80s by Robert Chambers and Gordon Conway from the Institute of Development Studies (IDS) and the International Institute for Sustainable Development (IISD), as a tool to increase the efficiency of development

organisations in environmental conservation [25], [26], [27]. Since then the SLA has evolved and been mainstreamed into the activities of international development organisations.

SLA breaks poverty down to its basic elements and tackles each element in terms of its most basic issues, using whatever resources are at the individual's or community's disposal. Resources may not necessarily be monetary; they can also be abilities, skills and natural resources. The SL framework provides a useful checklist for the design of monitoring development projects. Implicit in SLA are the principles put forward by DFID, as illustrated below in Box 1 [27].

Box 1 DFID core SL principles

Poverty-focused development activity should be:

- **People-centred:** sustainable poverty elimination will be achieved only if external support focuses on what matters to people, understands the differences between groups of people and works with them in a way that is congruent with their current livelihood strategies, social environment and ability to adapt.
- **Responsive and participatory:** poor people themselves must be key actors in identifying and addressing livelihood priorities. Outsiders need processes that enable them to listen and respond to the poor.
- **Multi-level:** poverty elimination is an enormous challenge that will only be overcome by working at multiple levels, ensuring that micro-level activity informs the development of policy and an effective enabling environment, and that macro-level structures and processes support people to build upon their own strengths.
- **Conducted in partnership:** with both the public and the private sector.
- **Sustainable:** there are four key dimensions to sustainability – economic, institutional, social and environmental sustainability. All are important – a balance must be found between them.
- **Dynamic:** external support must recognise the dynamic nature of livelihood strategies, respond flexibly to changes in people's situation, and develop longer-term commitments.

SL approaches must be underpinned by a **commitment to poverty eradication**. Although they can, in theory, be applied to work with any stakeholder group, an implicit principle for DFID is that activities should be designed to maximise livelihood benefits for the poor.

In conclusion, having gone through some of the prominent approaches concerning development and poverty, note that this dissertation is in the tradition of the Participatory Development Approach. We chose to consider our work in this way as it concerns and explored the ability of ICTs to support individual citizens who wish to make a change in their circumstances.

In this approach, ICTs are to be used for Development in the context of underlying realities, harnessing locally-available resources and methods towards supporting people by increasing their ability to be and do what they value.

In the next section, I look at the ‘T’ in ICT4D, and how it is being used to support people’s capabilities.

1.1.3. CONCEPTUALISING THE ‘T’ IN ICT4D

Information and the channels with which to communicate it are both dependent on development and intrinsic to human rights. Information is essential for an individual’s well-being. Well-being (or Development) is characterised by the expansion of individual, household and societal capacity for and capability to enjoy freedom. Freedom involves the process of, as well as opportunities that allow people to, expand their ‘capabilities’ so that they can lead a meaningful life, given their personal and societal disposition [5]. Accurate, objective, and timely information enables individuals to take action on available opportunities that may lead to Development [4] [28].

As a human right, access to information is characterised by the ability to seek, receive and impart information. Freedom to access information is found in Article 19 of the International Covenant on Civil and Political Rights which, in part, states:

“...Everyone shall have the right to freedom of expression; this right shall include freedom to seek, receive and impart information and ideas of all kinds, regardless of frontiers, either orally, in writing or in print, in the form of art, or through any other media of his choice.....” [29]

This implies that in addition to information being a means through which to attain other freedoms, lacking access to it is a form of deprivation, as it stands in the way of an individual’s capacity to make decisions and take action [28].

In the last half a century there has been a lot of interest in the use of technology in Development. It is seen as a tool for expanding the capacity and extent of information access; thus, it's a catalyst to Development. Digital technology is no longer just an agent to Development, but is also a measure of Development [12]. The more technologically advanced a society is, the more developed it is presumed to be.

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1.1.3.1. THE DIGITAL DIVIDE

The importance of technology in achieving Development has gained widespread acceptance among development practitioners. There have been claims that technology can 'leapfrog' under-performing economies into success. Radio, the internet and personal computers have all been the focus of attempts to deploy technology to connect the world's poor to essential information and services.

In Africa, this reflection on the possibilities of technology brought about the coining of the term 'digital divide', referring to the gap between technology haves and have-nots [30]. An exhaustively-documented phenomenon, it has had academics, industries and governments all wanting to measure and then bridge this gap. It is believed that with an increasingly digital economy, the world is shrinking to a village; those with no access to technology (particularly the internet) are missing out on critical information and opportunities to better their lives [31–34].

In the 90s and early 2000s the discussion on bridging the gap focused on telecentres. A telecentre, at the time, was a room with several computers connected to the internet. This era saw hundreds of these initiatives popping up in remote areas across Africa. Governments and multinational organisations invested a lot in making sure that villages were connected to the global economy. The successes and (mostly) failures of telecentres are well documented, and are still a source of study for many scholars [35], [34], [36], [37].

The Post-Physical Access Era

With increasing international pressure, many African governments have put policies supporting ICT in place, leading to the liberalisation of the telecommunication sector. This has seen an increase in investment in the sector by private players, which has led to competition, bringing about innovative solutions for lowering the cost of access and technology. This has meant that more and more people in Africa are able to access and even own a piece of technology [33], [36], [38–41].

1.1.3.2. MOBILE PHONES IN AFRICA AND ICTD 2.0

The new era ('ICTD 2.0', as Heeks [35] terms it) is characterised by the widespread penetration, adoption and use of mobile phones. To put it into perspective, by the end of 2010 the International Telecommunications Union (ITU) estimated that about 90% of the world's population had mobile network coverage; this is set to reach 100% by the end of 2015 [42]. At the time there were an estimated 5.3 billion mobile-phone subscriptions on the globe (including 41% of Africa's 1 billion population [43]), compared to 12 million fixed telephone lines and 100 million internet users. At around the year 2002, when the number of mobile phones overtook that of fixed lines around the globe, the ITU [44] produced the report *Mobile Overtakes Fixed: Implications for policy and regulations*, which captured the relevance of the connection between mobile phones and Development.

The greatest impact of mobile communications on access to communication services – in other words, increasing the number of people within reach of a telephone connection of any kind – can be seen in developing countries. Furthermore, in countries where mobile communications constitute the primary form of access, increased exchange of information on trade or health services is contributing to development goals; in countries where people commonly use both fixed-line and mobile communications, the personalising traits of the mobile phone are changing social interaction. [44], cited in [45].

At the time, this was merely a prediction on the potential of mobiles; but with the influx of mobile phones into the continent, there has been an increase in innovation around how to adapt mobile phones to (for example) deliver information and services to previously marginalised and under-serviced communities. These mobile services (often referred to as 'm-services' are created to be used in the most rudimentary of states, with the most basic mobile phones. Donner [45] [76] does an extensive literature review of the research as well as of the mobile-phone-based services that have surfaced over the past decade. He concludes that the services can be grouped into two categories: those that support existing markets and communication structures, and those that are transforming communication and structure. Other sources that document the growing number of mobile services across

the globe include Mobile Active [48] and GSMA-mWomen [49], which specifically document mobile services and research that affects women in developing countries.

1.1.3.3. MOBILE INTERNET IN AFRICA

Over and above the all-inclusive initiatives running on the rudimentary features of SMS and USSD, there is an increasing uptake of internet use via mobile phones, also referred to as the mobile internet. In 2009, the number of mobile internet users in Africa, and specifically in South Africa, was more than the number of those who accessed the internet through a computer terminal. The increasing availability of the mobile internet to resource-constrained individuals particularly interests the community of researchers and practitioners concerned with ICT4D. Mobiles offer a confluence of portability, personal control and flexibility that makes them appealing, disruptive, and ubiquitous in development [50–53]. Many hope that the mobile internet, if widely used in the Global South, will combine the ubiquity of the handset with data access, and will increase the productivity and agency of individuals and organisations.

With the ubiquity of mobile phones and now the mobile internet, focus has shifted from the physical divide (what Nielsen [54] refers to as the ‘economic’ divide), to the skills and usage or usability and empowerment divide [31], [55].

1.1.4. HUMAN-COMPUTER INTERACTION AND DESIGNING FOR DEVELOPMENT

Human-Computer Interaction (HCI) arose in recognition of the change in and widening of computer user profiles. Today, interaction with computers doesn’t happen in a clean and structured lab environment, but in a chaotic and messy world where interruptions are inevitable, and where the use of computing systems may be changed to fit a user’s schedule, skills and work requirements. Field methods were introduced into HCI to meet this need, and design teams now include anthropologists and sociologists. Design and experimentation are carried out as users go on with their normal duties. Instead of the user adjusting to the computer, the computer adjusts to the user ([56–58]).

The term ‘Human-Computer Interaction’ was adopted in acknowledgment that system design is broader than just creating correct computer structure and operation; it also includes all the other aspects that relate to using computer systems. HCI is described as the

set of processes, dialogues and actions through which users employ and interact with a computer [56].

1.1.4.1. USER-CENTRED DESIGN

User-Centred Design (UCD) describes a design process in which the user is at the centre of the process. While HCI looks broadly at the design of systems artefacts, UCD focuses on the user as a co-creator. Also known as 'Human-Centred Design', UCD has been formally defined as 'a multi-disciplinary approach to interactive system development that focuses specifically on making systems usable based on user characteristics, their environment and the task at hand' [56], [58–60]. The key goal of UCD is to produce systems with a high degree of usability. ISO 9241-11 (1998, cited in [61]) defines usability as 'the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use' [58], [62], [63]). Gould & Lewis [63] put forward three principles for ensuring usability in a system:

- 1. Early focus on users and tasks:** This is an information-gathering tactic, requiring direct contact with users so as to understand the cognitive and physical characteristics of the user in his or her environment.
- 2. Empirical measurement:** This requires that potential users get involved in simulating activities and processes that will be performed on the actual system. It involves testing the system to make sure that their cognitive characteristics are matched in the system.
- 3. Iterative design:** System functions are changed continuously, depending on the results of continuous testing. There must be a cycle of user study, testing and re-design until users are satisfied.

Breaking down the design process into various interwoven stages provides a structure and path to be followed when considering the design of interactive systems. As HCI and UCD grow to accommodate a wide range of users, usage, devices and interaction techniques [64], there has been a paradigm shift in methodological approach [65]; no longer the technical, structured and systematic approach to realising systems [62], [66], a more liberal approach has developed that looks beyond the realisation of a useable technological

artefact to include user enjoyment [67], [68]; personal values [69], [70]; and value added to the world [71]. It is in this shift that HCI and UCD methodologies targeting developing communities (HCI4D and UCD4D) have arisen.

Interaction design, described by Preece et al [72], provides structural and practical methodologies for applying the principles. It is described as ‘Designing interactive products to support people in their everyday life and working life’. Interaction design is driven by two goals. Usability: this ensures that the outcome of a design process is easy to learn, effective to use and enjoyable from the user’s perspective. (Gould & Lewis [63] state that designing for usability ensures that a system is useable, useful, appropriate, adoptable, and based on the context of the use and user.) The other goal of interaction design is to give the user a pleasurable and pleasing experience while interacting with the system [64], [72]. Preece et al suggest four phases of interaction, summarised in Figure 1 [64]:

1. **Study:** Identifying needs and establishing requirements for the user experience;
2. **Design:** Developing alternative designs that meet those requirements;
3. **Build:** Building interactive versions of the designs;
4. **Evaluate:** Test what is being built throughout the process, and the user experience it offers.

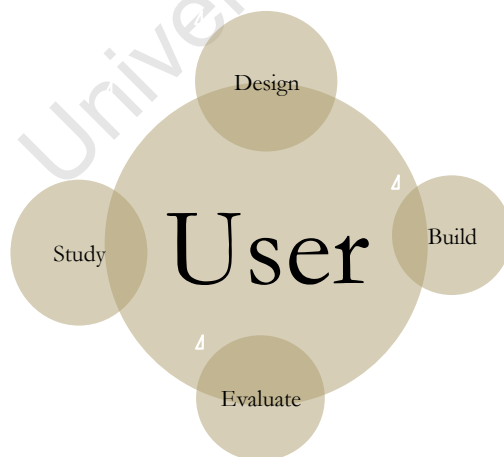


Figure 1: Stages of an Interaction Design process with user as the focus

To ensure that usability is achieved, interaction design requires several methods and techniques that ensure user involvement in various degrees throughout the design process. The process is an iterative lifecycle, as illustrated in Figure 2:

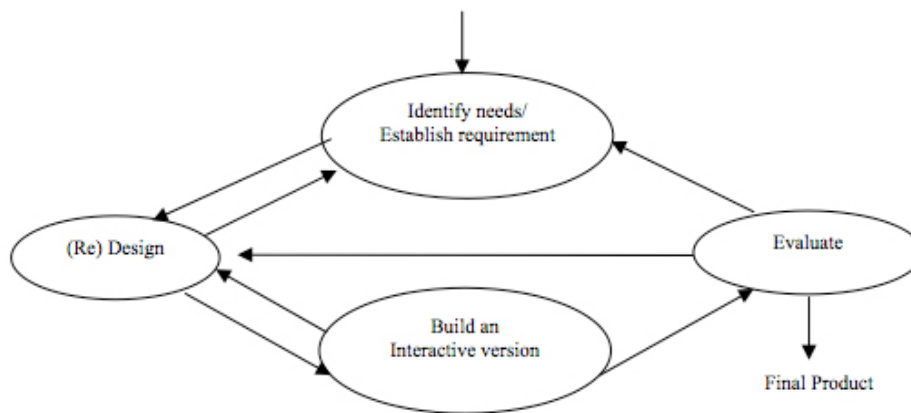


Figure 2: Interaction Design Model as adopted from [72]

In the next section, I discuss the process and goals of each of the phases (as described in [72]), including similar concepts from various other sources.

Study: Identifying needs and establishing requirements

This is the proposed first stage for the design process of an interactive system. In some quarters, systems design and requirements engineering is referred to as the requirements specification stage [73–75]; its main goal is to identify the targeted users and their needs and requirements, and to understand the context in which they live. This means looking at the activities that the users carry out and identifying where a technology could provide support. Requirements are ‘statements of intent’ about what a system should do and how it should do it. They may be grouped into the functional and the non-functional: functional requirements specify what a system should do, and non-functional requirements describe the constraints and challenges that shape the system and its development. These ‘traditional’ groups can be broken down further, into:

Data Requirements: the type, volatility, size, amount, accuracy and value of the required data. For instance, a study on the use of mobile phones in a developing community might consider looking at capturing and disseminating health

information through audio and visual data requiring a greater amount of storage than textual data. Furthermore, the usability of such data is determined by its accuracy.

Environmental Requirements: this refers to the context of use; that is, where the system is expected to be used. Here, several characteristics of the physical environment come into play; for instance, lighting, dust and noise. In the developing world, additional factors include the availability of supporting infrastructure, such as power and mobile phone signal. Social aspects also come into play; for instance, system collaboration, and coordination or even sharing of the system. All these are examined in the context of the user's environment [76], [77].

User Requirements: the characteristics of the intended users; they should take user ability and skill into account, as well as the level of user engagement with a given technology or technologies in general. It should be established whether the users are novice, casual, expert or non-users of technologies. User exposure to a technology often determines their perception of how the system should look, and also the amount of effort needed to support a certain task.

Usability Requirements: these tie the requirement elicitation cycle back to the need for a usability benchmark that captures the goals of a design process, including defining the various usability goals in context. This includes understanding how a system in a given environment will be seen: as usable, efficient, effective, memorable, safe or even learnable [78], [79]. Each of these goals conveys a different meaning, depending on context. For instance, a web-based information portal about Africa might be an efficient and effective tool in delivering information about Africa, and might even contain information relevant to Africa, but might not be useful for people *in* Africa because it is not usable, due to lack of underlying infrastructure, literacy, or even the skills needed to access it. As illustrated in the above example, usability requirements are closely linked to the other forms of requirements.

Design and Build: Developing alternative designs that meet those requirements

Once a basic set of requirements has been determined, the next step is to translate them into a design. As mentioned previously, design is made up of the externalisation of a

cognitive process and the internalisation of physical artefacts [62], [80]. Hence, the design process can be divided into conceptual design and physical design. In this section I deal primarily with conceptual design, while in the 'Build' section I'll deal with the physical design.

Conceptual design is the cornerstone of interactive system design. It aims to develop a conceptual model to capture the system's information flow and behaviour, as prescribed by the users' cognition [81]. Cognition refers to the belief system that an individual uses to perceive, construct, and make sense of his or her world, and thereafter to make decisions about what actions to take. The accurate representation of this belief system greatly influences a system's usability [80–82]. Siau & Tan [83] note that conceptual modelling is aimed at *requirements representation* and *requirements validation* in the requirement engineering process [74]. In requirements representation, conceptual models are created to map real-world needs, while requirements validation verifies that their needs have been correctly specified, by looking at the generated conceptual models.

Conceptual modelling is a collaborative and democratic process carried out by the users and the designer together, and involves negotiations and presentations of the various needs and requirements. It takes various formats, and is done over various iterations so that it captures the totality of features, characteristics and concepts that bear the ability to be understandable by the users and satisfy their user requirements in their environment in the manner intended [72], [74], [84], [85].

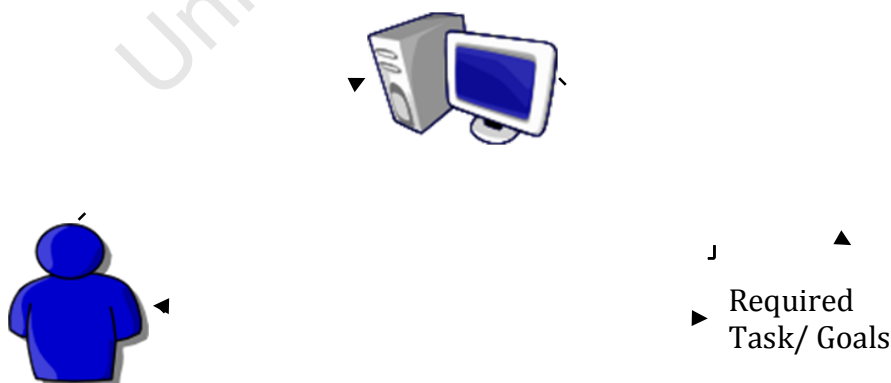


Figure 3: Conceptual Process Mediating Between User and Tasks

Therefore, to design the system, the process must have the correct understanding of the task, the user and their interaction (see Figure 3). In other words, the system should be able to mimic the processes that take place for users to achieve a certain goal or tasks [62], [72], [86], [87].

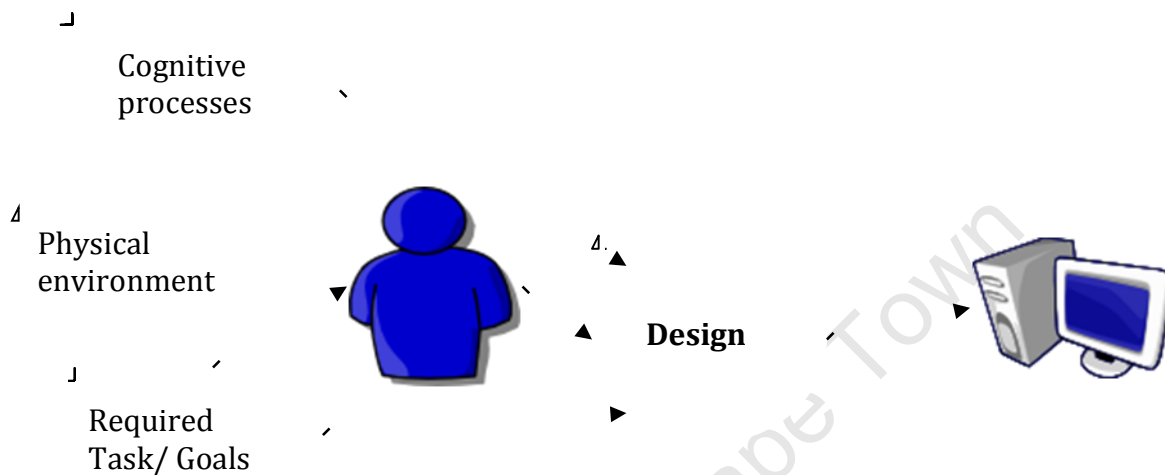


Figure 4: The Design process sums up cognitive processes, the physical world and the required tasks

Hence, design consists of studying the user and his or her environment, understanding the task or the goals that need to be achieved, translating these goals into an artefact based on the users and their environment, and testing the artefact to see that it both matches user needs and performs the task it was built for (Figure 4). To enable an understanding of the design process, Norman [62] devised cognitive engineering. The aims of cognitive engineering are 'to understand the fundamental principles behind human action and performance that are relevant for the development of engineering principles of design', and 'to devise systems that are pleasant to use'.

Cognitive engineering involves determining user tasks or goals, analysing the user actions and user conceptual models that it takes to achieve those goals, and translating all this into a system. This, argues Norman, makes the design a process of first bridging the gulf of execution and then the gulf of evaluation [62], [80] (see Figure 5).

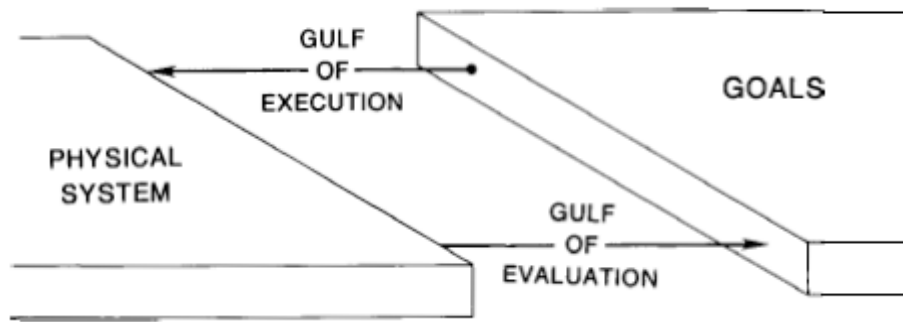


Figure 5: The Gulf of Evaluation, adopted from [62]

The Gulf of Execution represents the gap between perceived goals or functionalities of the design and the actualised physical system. In other words it portrays the difficulty of acting upon a given task – the reason behind an artefact – and how well the artefact supports those actions. It is bridged from the system side of the artefact, where a designer has captured the user’s psychological process (the conceptual model), determined an action sequence for performing a given task, and translated this into a physical artefact.

The Gulf of Evaluation, on the other hand, represents the gap between the actual artefact and the user’s perception and interpretation of the system, based on the task at hand. The design process outcome is an artefact that should be a physical representation of the user’s conceptual model. Evaluation is then a comparison between that artefact – the outcome of the design process – and the user’s conceptual model and actions.

To bridge the two gulfs, Norman suggests four steps:

1. Intention formation;
2. Specifying the requirements;
3. Interpreting the intention and requirements (actions and conceptual model); and
4. Comparing the interpretation of system state with the original goals and intentions.

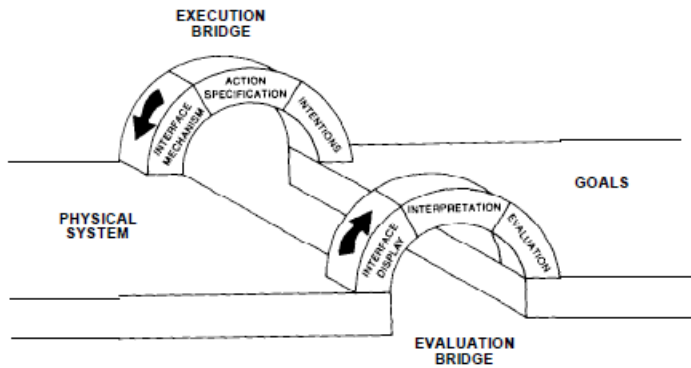


Figure 6: The Evaluation and Execution Bridge

In his later work, Norman [88] notes that in order to bridge both gulfs there must be an appropriate design for the artefact, and training to enhance mental effort such that, with increasing skill, the user becomes able to mentally bridge the gulfs (see Figure 6). An appropriate interactive system can thus be described as one for which activity flow is uninterrupted, in that its outcome fulfils the given goals; with given, set actions, for a given context. Bodker [89], [90] describes 'Activity Flow' as the activity cycle in accomplishing a task, where a consistent, cohesive activity flow is supported by the task, artefact, and context.

Interruptions and unexpected results break the activity flow, forcing conscious attention to be paid to the task. For many activities, this 'bringing to consciousness' is disruptive of efficient performance [80], [88], [91].

Evaluate: Test throughout the process

Evaluation is an iterative process that tests the outcome of the design process until a final system is realised. Traditionally, it was limited to testing the final product; but studies have shown that a systems failure is usually caused by requirement errors, where the requirement specification does not meet the actual user requirements. The requirements mismatch results in a system that does not match the user's needs. Furthermore, even in cases in which the requirements were well captured, the representation of the requirements solution and the user's perception – how they expect it to look – may differ [65].

Therefore evaluation is essentially not a summative process; rather, it is a formative process, made up of iterative critical reflection of the design processes and their outcomes. We could therefore break 'evaluation' down, into requirement analysis and evaluation; conceptual model quality evaluation; and usability evaluation [72], [92–95].

Requirement analysis and evaluation ensures primarily that nothing is left out. It requires a critical reflection of the user in his or her environment to ensure that all user needs are captured and prioritised. Various analyses elicit various levels of in-depth understanding of users and needs. For every iteration, requirements change to capture the user's changing needs; some have higher priority than before, others lower.

Conceptual model quality evaluation: as noted before, the status of the conceptual model is the factor most likely to affect the final product. Hence, the quality of the conceptual model may affect the efficiency, effectiveness, and usefulness of the system. Evaluation here ensures that the transformation from cognitive processes to physical artefact has captured the totality of internal activities and external interactions.

Usability evaluation looks at the final design product; the supporting interactions, and the user's experience of using the product. While both requirement analysis and conceptual model quality evaluation are concerned with the formative stages of the design process, usability evaluation takes place after the product is built and implemented; and relies considerably on how well the other evaluation processes were done. The relationship between these processes is depicted in Figure 7.

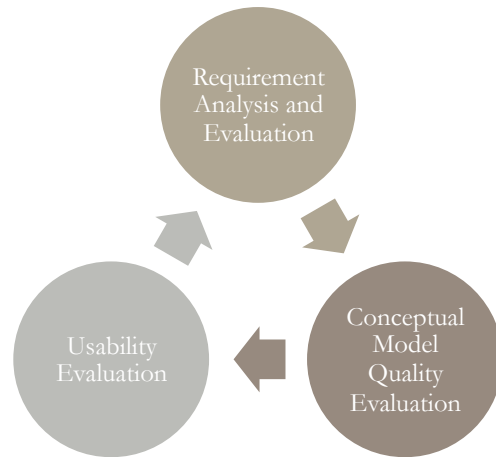


Figure 7: Relationship between the different types of analysis

1.1.5. FIELD METHODS

As we have emphasised in the previous section, it is imperative not only to accommodate user needs in the design process, but also to have users as *part* of the design process. The social sciences provide a variety of methods for studying and understanding communities that allow for continuous reflection and examination of findings with the participant group, in a similar fashion to UCD.

1.1.5.1. ACTION RESEARCH

As the name suggests, Action Research (AR) is a participatory approach that combines action and research in a manner that will provoke change [96–98]. It is used in research situations that demand responsiveness and flexibility in the course of a research project.

Bradbury & Reason, in two of their works [96], [98], provide a comprehensive definition of action research, seeing it as:

“A participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, it seeks to bring together action and reflection, theory and practice, in perception with others, in the pursuit of practical solutions of pressing concern to people, and more generally the flourishing of individual persons and their communities[96].”

AR challenges the claims of the positivistic view of knowledge, which holds that in order to be credible, research must remain objective and value-free. Instead, it embraces the notion of knowledge as socially constructed, and recognises that all research is embedded within a

system of values and promotes some model of human interaction. AR refers to theories, strategies and methods that govern people's action in social practices [99]. Goldkuhl [ibid] explicates further, noting that action knowledge is grounded in three sources: empirical; external theoretical; and internal grounding. *Empirical* grounding has to do with observed effectiveness in the application of knowledge. *External theoretical* grounding refers to how action knowledge relates to other knowledge that is explanatory or theoretical in nature. *Internal* grounding relates action knowledge to its own background knowledge. This means that action knowledge justifies its own existence. This kind of knowledge could be tacit or explicit, meaning that action knowledge is influenced by the values and concepts of the knowledge held by the actor.

The other characteristic of action knowledge that is important in AR development is that it exists at different levels. Goldkuhl [ibid] gives five levels of action knowledge: a **subjective knowledge level** – a person's knowledge about something. Where tactical knowledge comes into play, there is a need for reconstruction and articulation to others in order to create an **inter-subjective knowledge level**. Where knowledge is shared with a given society, this knowledge is expressed in various forms of communication, including formal ones, such as writing; and informal ones, such as social interaction. The expression of the knowledge occurs at a **linguistic level**. When people act upon the expressed knowledge this is referred to as the **action level**; and finally, with each action there is an expected consequence, leading to the **consequential level** [ibid].

Owen [100] points out that knowledge is generated from action; that is, knowledge is used to create works whose evaluation builds on that knowledge (see Figure 8 below). Both knowledge use and knowledge building are controlled by channels, and are used to undertake and judge the work. These channels are the conventions and rules (values, beliefs and understanding) through which society operates.

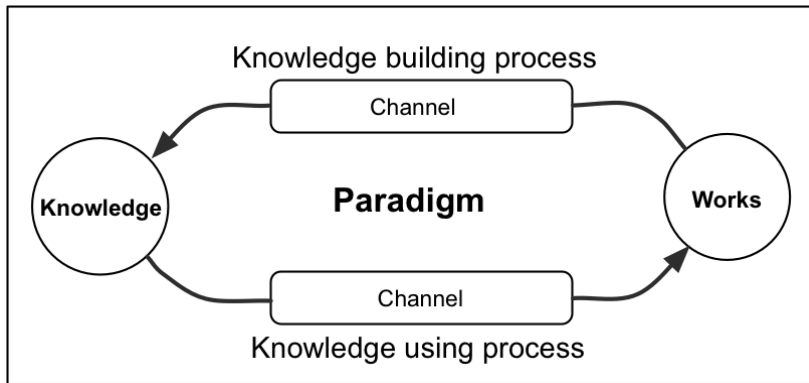


Figure 8: Knowledge Building and Knowledge Use adopted from [101]

This knowledge is what is referred to as the Research in Action Research. Hence, interpreting Owens' diagram in AR terms, we could say that research is generated from action; that is, research is used to create actions whose evaluation builds on that research. This seemingly repetitive process is what gives AR rigour. AR is often presented as a cyclical or spiral process with repeated cycles of planning, action, evaluation and reflection [96–98], [101]. The turn of each spiral or cycle builds on the understanding held at the previous turn. (See Figure 9, adapted from [102].)

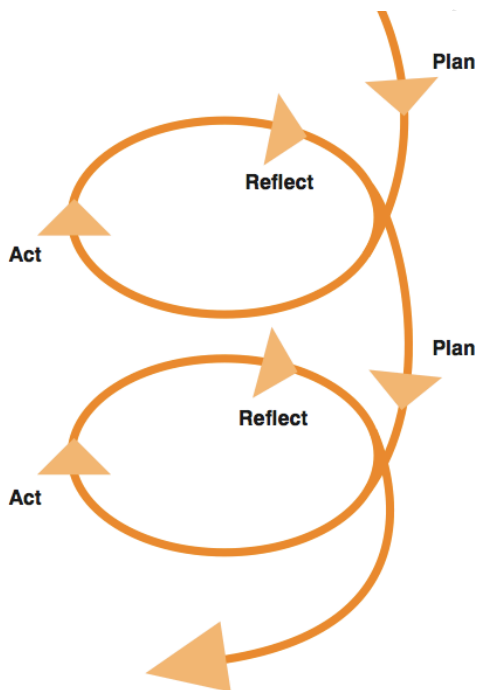


Figure 9: Action Research Spiral, adopted from [103]

It is these acts – the responsiveness to the situation, and the striving after real understanding – that define AR as a viable research strategy [103].

This means that an action research project can begin with quite imprecise research questions and focus; which in turn provide imprecise answers. Those very answers can help to refine questions and methods. Each cycle can be a step in the direction of better planning, better action, and better evaluation, and therefore more concrete questions [103].

1.1.5.2. ETHNOGRAPHIC ACTION RESEARCH

Emerging originally from a UNESCO-funded programme to assess community multimedia centres [104], [105], Ethnographic Action Research (EAR) has been designed specifically “to focus on the actual use of, and interaction with, technologies in the wider context of people’s lives and social and cultural structures.” Its developers sought a methodological stance that, while rich and open to diverse outcomes, was nevertheless both rapid and inclusive [121-123]. This was done utilising multiple methods: patient listening, immersive observation, and the analysis of field notes. Coming together in a cycle of “plan, do, observe, and reflect”, the method “continually investigates what the ongoing impacts of a project are, in what ways it is working, and in what ways *it can be improved*.” [106]

This definition leads to the methodological positioning of this dissertation. This work took a formative research approach, relying primarily on EAR [107], [108]. Hence, we can say that EAR is seen as a refinement of AR that is informed by ethnographic methods. The word ‘ethnography’ literally means ‘portrait of the people’, therefore EAR provides a qualitative form of research that seeks to give a deep understanding of particular people – in terms of culture, behaviour and belief. It requires that researchers or ethnographers have a direct, personal experience of the people in their environment [109–112].

Hence EAR takes place where the action is – in the field of research. The knowledge creation process takes place as the researcher experiences it in the field. It is, as Schön [113] puts it, a reflection in action. In the instance of this study, it was first an open inquiry into a community – their culture, livelihoods and challenges; an inquiry as to their most pressing challenge; on what was most important to them; an inquiry into how best to solve

these challenges with what was easily available to them, in their immediate ecosystem; and an inquiry into how well the proposed solution worked.

In other words, we applied EAR in guiding the research process and eventually bringing about the desired change. In their later work, Reason and Bradbury [98] gave six characteristics of AR, which we utilised in framing this work – this project was:

- a) Grounded in lived experience;
- b) Addressing significant problems;
- c) Developed in partnership;
- d) Working with people, rather than simply studying them;
- e) Developing new ways of seeing/theorising the world; and
- f) Leaving infrastructure in its wake.

These six characteristics can be viewed as the framework on which this work was built, and can be seen as main themes throughout this dissertation; hence, they may be viewed as the yardsticks that determine the success of this work.

1.1.6. DESIGN AND EVALUATION TECHNIQUES

To complement the free-flowing, easily-adaptable nature of an EAR inquiry, there was a need for a design methodology that was equally flexible, and would embrace the six principles above. In this section we present some design and evaluation techniques that were adopted and used in the process of designing Ummeli.

1.1.6.1. PARTICIPATORY DESIGN

Participatory Design (PD) was adopted from the Scandinavian approach of workplace democracy in decision-making. In PD, the people destined to use or benefit from a system play a critical role in designing it. Its philosophy relies heavily on both Action Research and Ethnographic Research. It is a departure from the idea of design as automation of user tasks by systems through an expert designer, towards design as a transformative process that empowers users through technology, embracing the fact that users are the best placed to determine what improvements must be made in their lives [114–117]. No longer do users take a passive role in the design process; rather, they are viewed as experts. PD views the design process not in isolation, but in the context of the user's environment, their

attitudes to and perceptions of the technology, and their interaction with each other, which all influence the final design outcome.

In order to study the user, PD embraces methodologies that capture not only the user's information flow, but also their opinion on what works best for them. Many of these approaches are adopted from ethnographic research and contextual inquiry [114], [115], [118], as well as from the Scandinavian approach to industrial democracy; hence, it also embraces collaborative and cooperative decision-making by users and stakeholders to shape the technology [114], [115], [119], [120]. In other methodologies requirements can be distinctively defined; in PD, understanding of user knowledge is embedded in the immediate environment practices and interactions. It cannot be de-contextualised or broken down into discrete tasks or requirements; nor can it be fully defined or understood. There are no clear distinctions between the various processes. It is this highly iterative nature and coordinate philosophy inherent in PD that makes it sit well with the EAR approach.

Spinuzzi [120] breaks PD down into three stages: Initial Exploration, Discovery Process, and Prototyping (see Figure 10). This section presents his techniques, applied at length.

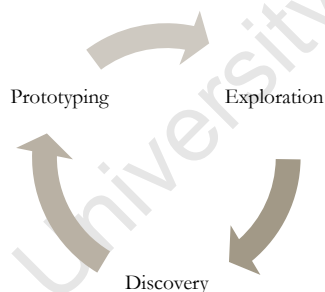


Figure 10: Participatory Design Cycles

Initial Exploration is where the designers familiarise themselves with the users, their environment, and their interaction with each other. In this stage PD primarily adopts the ethnographic research approaches of observation and interviews as scenarios. Scenarios are snippets of narrative about real events from the user's environment. Preece et al [72] note that scenarios allow exploration and discussion of context, needs and requirements in a realistic manner.

The Discovery process enables understanding and prioritisation of user needs and envisioning of the design. Here, some scenarios show current user status and others show the envisioned future. Scenarios describe how information flows; they may be verbal or visual. A sketched-out scenario can be referred to as a storyboard. Here, the user can articulate the way the system should work through an action and causal drawing, showing the steps needed to achieve certain results. The sketches usually help to refine and prioritise tasks and actions. Storyboards and scenarios are representations of the users' conceptual models. Over several iterations and reflections, a stable pattern and recognisable flow starts to take shape on the storyboard. Storyboards and scenarios are known as low-fidelity prototypes [121].

Prototyping allows the rapid expression of design ideas; with both storyboarding and scenarios, users are easily able to articulate how the system should work, both verbally and by using sketches of information and task flow. Nielsen [121] notes that these prototypes are simplified, with no functionality or features other than those envisioned by the users. These can be simulated on paper, as drawings (paper prototypes); or, materials in the users' environment can be used to create mock-ups [122], [123].

Besides information flow, low-fidelity prototypes can be used to capture specific features of systems such as buttons, text boxes, and the various transitions needed to perform a given task. Because they are cheap and 'user friendly' – they need no specialised skill to operate – low-fidelity prototypes allow increased participation, with quick and frequent feedback. They are usually horizontal; that is, they aim at having the proper look and feel of the system before it is fully implemented. High-fidelity prototypes look very much like the final product [124], [125]. Users can engage with them, as they will with the final product. They are mostly used to ensure vertical usability, i.e. that the system's features are carrying out the correct functions. Dearden et al [126] give a comprehensive introduction on how PD can be used in the design of ICT4D projects, in their work they go through various literatures and connect the important features of PD and PDA, arguing that the two approaches complement each other in both the design and the introduction of new technologies in developing communities.

1.1.6.2. HUMAN ACCESS POINTS

As noted in section 1.1, this work is primarily about designing an interactive system for development, in this case the design of Ummeli. As outlined, the key characteristics of communities in a developing context are: insufficient education, digital illiteracy, and even lack of access to technology. On the other hand the interventionist/designer is usually from a different culture, speaks a different language, and is most probably more educated. These differences and challenges create a great disconnect between ICT4D beneficiaries and the interventionist. To bridge some of the outlined gaps (power, literacy, language and culture) Marsden et al [127] proposed a transitive design approach that makes use of Human Access Points (HAP). A HAP is a person in the community who is more knowledgeable about the potential of technology and can act as a proxy for the community in the design process, as illustrated below in Figure 11.

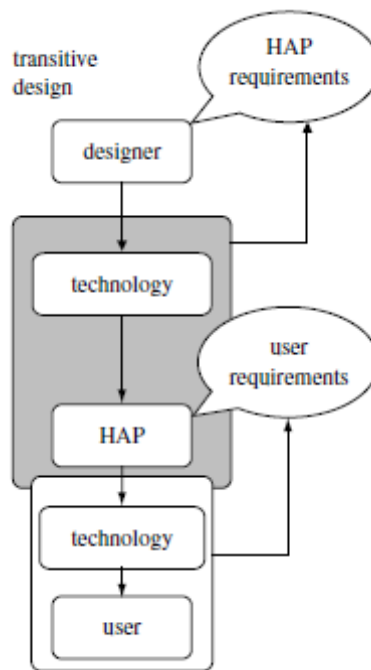


Figure 11: Human Access Points, adapted from [127]

To best understand the role of a HAP in context of a design process, we revisit Norman's cognitive design [62]. For a design process to be deemed successful, the physical artefact must match a user's conceptual model. To illustrate this Norman introduces the two gulfs – of execution and of evaluation. To bridge both, users must be involved in the design process.

In many design processes, the assumption is that the user is actually interested in the design process, has the ability to participate, has knowledge of the envisioned technology, and is actually available to participate. It is also assumed that the user can articulate the needs such that the system being built will address those needs. This does not hold true in some developing-country contexts. In such contexts, users and researchers have different interpretations; at times they rely on others to interact with the system; designers are often alien to the location of the system design and deployment, raising the issue of differences in culture, background, language and perception. This compromises the cognitive design approach and the various UCD techniques emanating from it, prompting designers to come up with a creative means to shorten the distance between the plateaus of user engagement. Figure 12 illustrates the role of HAP in the design process. The HAP approach allows for participation of the community in the design process, bridging the gulf of execution and then the gulf of evaluation by introducing a person who understands both the community needs and the design process, or at the very least the potential impact a technology could have in the given situation [62], [80].

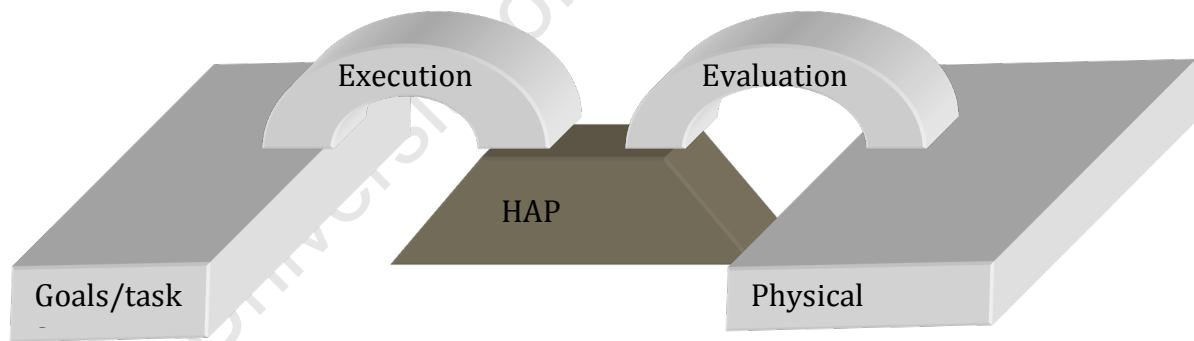


Figure 12: Use of HAP in bridging the gulfs of execution and evaluation

1.1.6.3. APPRECIATIVE INQUIRY

Taking its lead from PDA, Appreciative Inquiry (AI) assumes a positive rather than a problem-oriented lens, focusing participants' attention on what is possible rather than what is wrong. First posited as an organisational change approach by Cooperrider [128], AI seeks out the best of 'what is' to help ignite the collective imagining of 'what might be'. The aim is to generate new knowledge that expands the 'realm of the possible' and helps members of an organisation – or, in this case, a group of users – to envision a collectively

desired future. Furthermore, it helps to implement a vision in ways that successfully translate images of possibilities into reality and belief into practice [129], [130]. The AI process is the '4-D Cycle': Discovery, Dream, Design, and Destiny. This cycle (Figure 13) matches that of UCD and EAR.

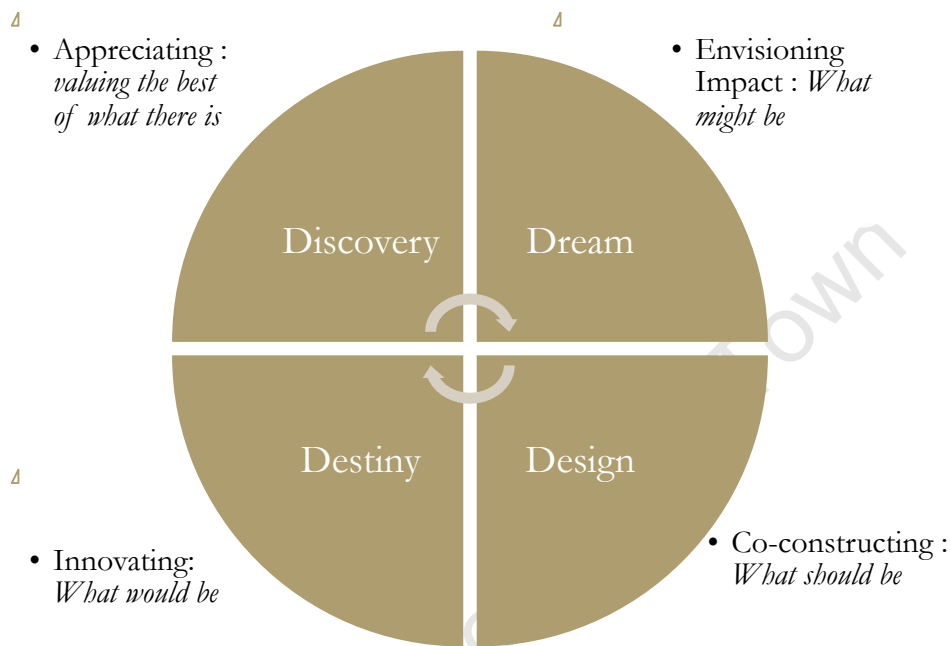


Figure 13: The Appreciative Inquiry Cycle

As an evaluation approach, AI digresses from measurements, descriptions and judgment-oriented activity to recognising that all engagements are the process of social construction. Evaluation works on the premise that language, knowledge and action are inextricably linked, and take place within a framework of values. Participants are encouraged to tell stories that help identify what is good, providing a platform from which to move towards new action [129]. The perceived outcome of an AI process is continuous positive change.

1.2. Research Question

Design, therefore, should be a collaborative and democratic process between the users and the designer, that involves negotiations and presentations of the various needs and requirements. Evaluation is a continuous consultation with the users to make sure that they are satisfied with the outcomes of each stage before proceeding. As noted previously,

HCI and UCD – even when applied in a development context – put great emphasis on understanding the user. During requirements elicitation, in-depth understanding of users and their environment is required; even more so in a development context, where the researcher or designer has to confront realities that are very different from their own.

In this work we used a combination of UCD, HAP, AI and EAR to identify problems in collaboration with the community, build interventions to address those problems, and adjust both goals and functionalities along the way in a process of co-learning. In order to summarise the content above into something measurable, the first research question we address is:

Can UCD and UCD4D methods be used within the context of Ethnographic Action Research to design and deploy a successful ICT4D intervention?

1.2.1. WHAT IS SUCCESS?

This question brings with it yet another question: how do you measure the success of this work, and in ICT4D in general? If this were a thesis concerned solely with, say, HCI, then we might measure a metric such as user error. But success in this, and most other ICT4D work, requires much broader measures. In order to determine success we therefore needed a means to evaluate whether the efficacy of our design approach, as well as the intervention itself and the impact it had on the community. Therefore we will address the research question along these three different dimensions, which will constitute the three areas of contribution of this thesis:

1. The Methods: While EAR is a relatively well established method, there are fewer research papers and case studies that look at the use of UCD4D methods (such as HAP) and how those work within an EAR framework. So while we believe that EAR and UCD4D represent the best approach to creating a technology intervention, we will reflect on these methods as the intervention proceeds. Specifically, we shall reflect on how well we can adhere to an EAR framework in the messiness of fieldwork, and on whether the relatively new UCD4D methods work within EAR and are generalisable to our context.

2. The Design: This measure is typical of UCD work, regardless of context. Essentially we are asking if our system could be used by the target user group, and if it solved a real problem for these users. To determine this, we will do the kinds of in-situ evaluation one would expect of any ICT system.

3. The Impact: while the success of the project was sufficient for testing a valuable and useful concept, AR (and by extension, EAR) aims at social impact. Whilst there are objective measures of development one might use to evaluate impact, in keeping with the participatory nature of this work, we chose to let the participants define impact criteria that were meaningful to them.

1.3. Dissertation Outline

The role of this first chapter was to give a short introduction to the rest of the document, and to the motivation behind this work. As stated in the preceding sections, this work is based on Action Research, in which the research is done in cycles, and which employs the phases termed Discover, Plan, Act and Reflect.

DISCOVER is made up of two chapters; in Chapter Two we present the initial research that led to Ummeli, introducing Khayelitsha and Learn to Earn, as well as describing the challenges that formed the scope and design of Ummeli. In Chapter Three we present work on the use of the mobile internet in Khayelitsha; here we highlight the experience of what it means to use the internet for the first time, and only on a mobile phone. In this first cycle, by interacting with people, reading the literature and studying how people use the mobile internet, the extent of the unemployment problem was discovered.

Chapter Four is the problem definition chapter, lying in between the Discover and Plan phases. This chapter contextualises unemployment within the larger South African labour market. It looks at the challenges unemployed people face, and at some of the initiatives for tackling these challenges in which the government and the private sector are involved.

Chapter Five is the **PLAN** phase; it looks at what an ICT4D intervention means, and then at what is needed to design an ICT4D intervention that will help in tackling the

unemployment crisis. This chapter outlines the four design decisions that led to Ummeli, grounded by field observations and ground realities.

Chapters Six and Seven form the **ACT** stage; here we describe the design and evaluation of Ummeli, and discuss the findings from the design process. We show the various transitions of Ummeli, from its basic format as a tool for cutting the cost of finding employment by enabling people to create CVs and access employment listings via the mobile internet, to a more robust tool allowing social networking, uploads and recommendations.

Chapters Eight and Nine are the **REFLECT** phase; where we first look at what made Ummeli what it is, including the issues of scaling and sustainability. Further, we look back at the design process, introducing the idea of Mediated Design, a culturally imbibed method.

Chapter Ten is the conclusion, which summarises the dissertation contribution and relates some practical lessons learnt, for the benefit of future scholars.

University of Cape Town

PHASE I: DISCOVER

I do not believe we can repair the basic fabric of society until people who are willing to work have work. Work organizes life. It gives structure and discipline to life.

BILL CLINTON

2. Khayelitsha – My New Home

Khayelitsha: the phrase fascinated me. Being African, having experienced and witnessed the immense poverty on the continent, I always knew I wanted to do something about it. The opportunity to do a PhD in Computer Science specialising in ICT4D provided just what I needed. From previous projects and from networking, I had identified Khayelitsha as the most suitable place for me to do my study; I studied it, read about it and talked about it. But on my first visit, the reality came to me as a rude shock. Nothing in the literature, or that anybody had said, could have prepared me for this. It was the tail-end of the Southern Hemisphere winter. It had been raining for a few days now, the shacks were flooded; and the people I met said they'd had to endure the entire winter with no heating other than the paraffin lamps they used for lighting. To mildly sum up my feelings as I drove out of the shantytown, I was devastated. I knew I would be back; my resolve to make a difference in this community was reaffirmed. I had a deep-seated need to do something that would have a meaningful and positive impact on the community of Khayelitsha. – Personal Reflection, author.

ABSTRACT

Established in the 1980s by the apartheid regime, Khayelitsha is a place where black¹ workers from the larger Cape Town region were forcefully settled. It is estimated that 90% of the households in Khayelitsha live under the poverty line, with an average annual income of less than ZAR 25 000. Over 60% are unemployed, and the area has one of the highest incidences of HIV and AIDs in the country, if not the continent, with one in every three people said to be HIV-positive. It also has one of the highest crime rates in the country; according to Violence Prevention through Urban Upgrading in Khayelitsha (VPUU) [131], 50% of the population do not feel safe walking in the area during the day – a number that rises to 98% for people who are afraid to walk about during the night. Here, through insights, statistics and anecdotes, we present findings on the day-to-day life and communication patterns of someone living in Khayelitsha.

2.1. Introduction

This study took place in Khayelitsha, about 35km from the city of Cape Town, South Africa (see Figure 14 and 15). Khayelitsha is an urban node in the Western Cape Province; the name means ‘new home’ in isiXhosa – the native language of most of its inhabitants. This chapter presents insights into Khayelitsha; though informed by the literature, the descriptions are grounded by qualitative personal experiences. Most of the empirical data used was drawn from the special report from Statistics South Africa [132], developed by the knowledge management department of the Provincial Government of the Western Cape [133]; a VPUU report on Khayelitsha; and a research report done on behalf of Learn to Earn (L2E) by the University of Stellenbosch [134]. Other insights were drawn from academic literature from Skuse et al [135–137] and Benjamin [138].

¹ ‘Black’ in the context of this dissertation refers to people of African origin living in South Africa.



Figure 14: The Map of Khayelitsha, in relation to the Western Cape, adapted from Statistics SA [1]

Figure 14: The Map of Khayelitsha, in relation to the Western Cape. Adapted from Statistics SA, 2005.

[duplicate - redundant?]

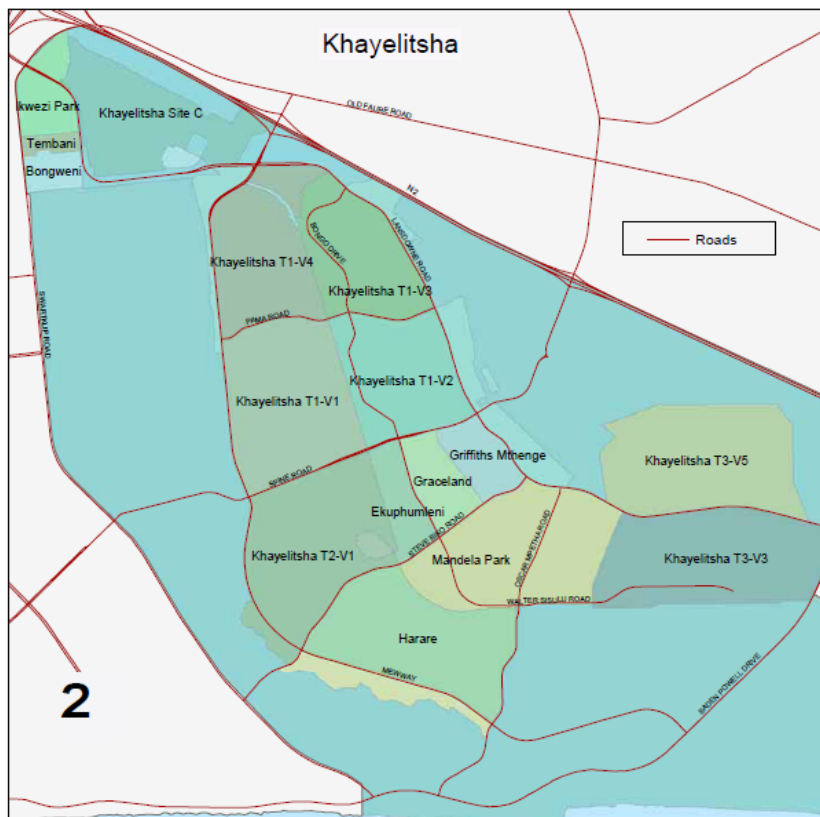


Figure 15: Detailed Map of Khayelitsha showing the different administrative boundaries

The literature provided a good overview of Khayelitsha, setting our expectations. However, as noted earlier, the reality seemed so different and more intense than what appeared on paper. Hence, there was a need to answer some preliminary questions prior to the actual research question.

Who were these people? What were their problems? What made them tick? What mattered to them? What did they need to make their lives better? Did they even want to make their lives better? Did they like technology? Did they know how it works, let alone its potential? Did they have a preference for one or another type? Did technology even matter? No amount of reading or internet research could answer these questions. These questions required an immersive experience of being the user; or, at the very least, to be there to experience their life first-hand with them.

2.2. Methodology

EAR can be viewed in two ways: firstly as broad research method that helps one understand the wider society, the cultural, social and technological structures, and the communicative ecologies in which projects work; and secondly as more targeted research method aimed at understanding one particular issue or set of issues, or one particular part of the communities served [104]. In this initial phase of the study we adopted the first version. As noted previously, EAR offers a number of techniques for data collection; in this first cycle we used several, including interviews (formal and informal) in situ, and document analysis [110]. Dick [103] notes that using multiple sources of data in AR (also referred to as triangulation, or dialectic) increases the validity of the study while also increasing rigour.

Hence, while document analysis and the literature gave a foundation, we needed to validate the data through a different avenue. Furthermore, it was important to have a personal feel for the field, so as to be empathetic to the needs of the users-to-be. Armed with the insights from secondary document analysis, we embarked on a field study using informal interviews and naturalistic observations. Naturalistic observation is a 'wide-lens capture' of the users [104]. It captures all user activity, and the relationships between the various forms of requirements. To gain the level of insight needed to understand existing

relationships, beliefs and interaction, the researcher is required to share as intimately as possible in the life and activities of the people who are being observed. This gives an insider perspective of what is happening, and in some ways allows the researcher not only to observe but also to feel what is happening. Interviews, on the other hand, can either be structured or unstructured [59], [72]; they require direct contact with users, either physically or telephonically, and explore issues that might affect the design process or the final outcome of the system. Structured interviews make use of questionnaires to capture specific information that may need clarification. Interviews can also probe to clarify some observations.

These methods would enable us to experience and observe the area personally. Furthermore, as none of the documents contained information on the use of technology, we were more interested in how it could be used, particularly the use of mobile Internet in the community.

In the periods between November 2008 and April 2009, we carried out an ethnographic study in the wider Khayelitsha area. The primary aim was to ‘experience’, listen, observe and learn to ascertain the veracity of the claims that were put forward in the secondary data analysis. The experience was documented in the form of field notes and photographs.

2.3. Findings

This section is a presentation of findings that (as previously mentioned) are informed by the literature but laced with qualitative, first-hand observations. All of the figures in this section, unless indicated otherwise, are adapted from those of Transform Africa [139], who give detailed GPS visualisations of Khayelitsha’s demographic statistics.

2.3.1. HISTORY

When originally settled, the population of Khayelitsha was fewer than 300 000, but after the democratic government was elected in 1994 and travel restrictions were lifted, the population increased, due to ‘immigration’ into Khayelitsha from other parts of the country. It is estimated that up to 80% of the population are immigrants, mainly from the rural Eastern Cape Province.

Snapshot of the Population

According to the South African census released in 2005, and analysed by various institutions including the Business Trust and Department of Local Provincial Government in Cape Town (DLPG) [140], [133], [141], as well as Stellenbosch University and Transform Africa [139], the population of Khayelitsha at the end of 2005 was estimated to be about 500 000 [133]. However, due to the influx of immigrants from the rural Eastern Cape, with an annual immigration growth rate estimated at 6%, this number could be as high as 1.2 million² people by the end of 2012. The majority of the population is black, with about 80% of them being immigrants into the area, primarily from the rural Eastern Cape. 95% of the population speaks isiXhosa as their primary language.

2.3.2. AGE DISTRIBUTION

Notably, Khayelitsha has a fairly young population. Over 70% of the population are under the age of 30 years, with the majority between 20 and 30 years, followed by the 15-19 group. Only 2% of the population are 60 years old or older [139], [141] (see Figure 16).

² http://www.umthawelanga.co.za/index.php?option=com_content&view=article&id=7&Itemid=5

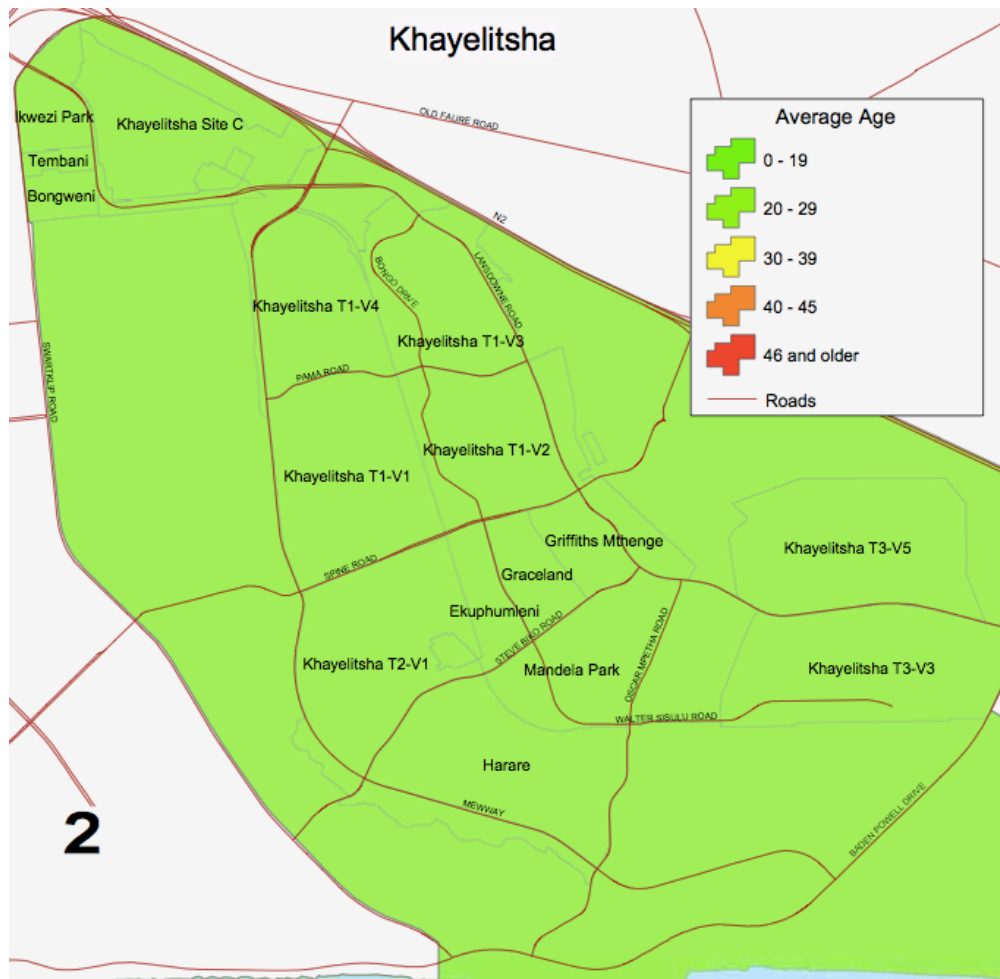


Figure 16: Population Distribution by Age in Khayelitsha

2.3.3. EDUCATION

Another obvious feature in Khayelitsha is the low number of educated adults. It is estimated that up to 75% of adults over the age of 20 years do not have Matric³ (see Figure 17).

³ Matric refers to the final high school examination, similar to University/ College entry examination.

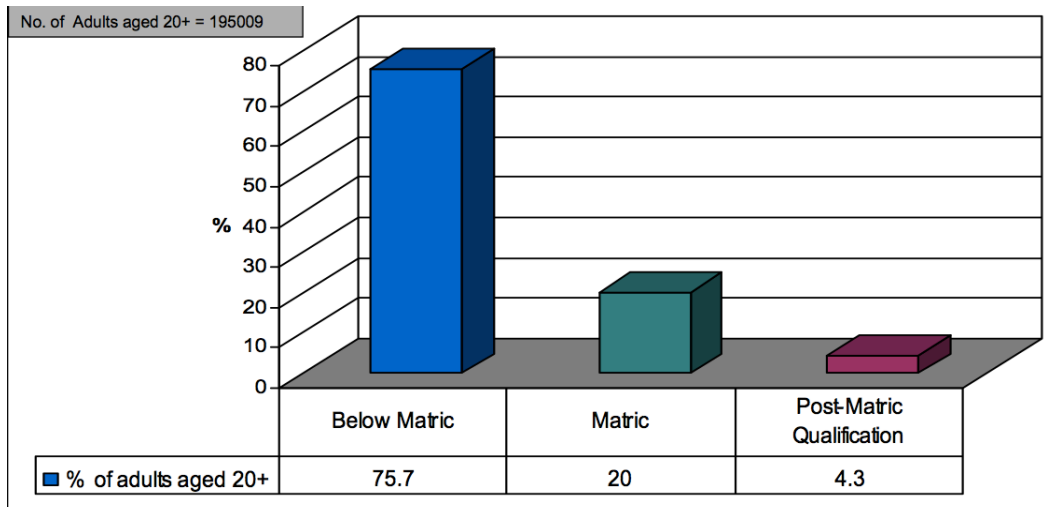


Figure 17: Population Distribution by education level, adopted from Statics SA [1]

2.3.4. POVERTY

According to the 2004 national census [140], poverty levels are estimated at about 90%, with an annual income of less than ZAR 25 000 (see Figure 18).

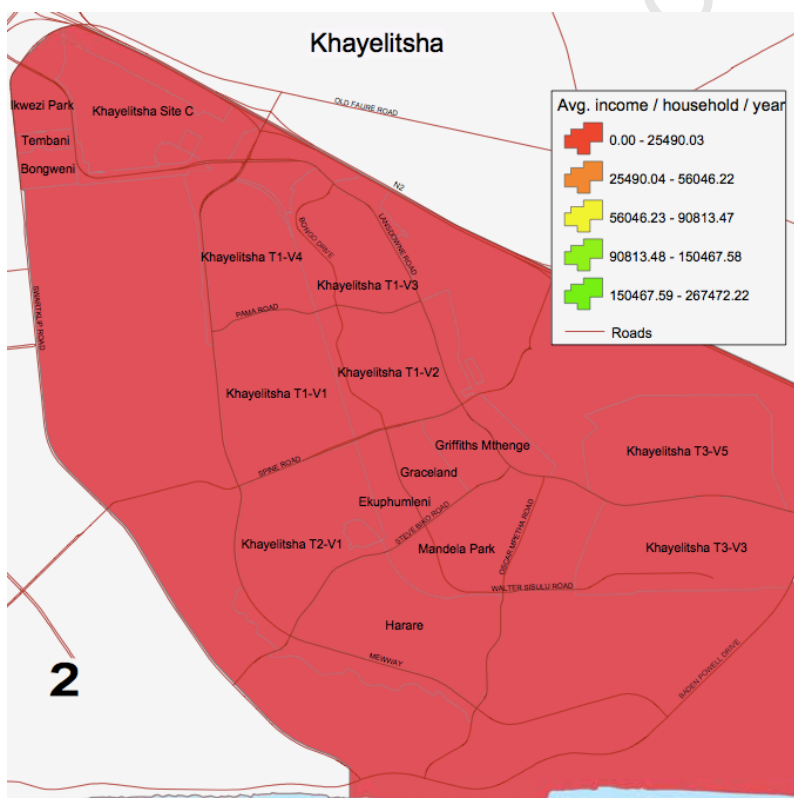


Figure 18: Poverty by Income Distribution

Khayelitsha is made up of both formal and informal settlements; only 14% of the population live in formal (brick) houses, and the rest in informal (shack) housing (known locally as *imikhukhu*), of which 54% are serviced (with electricity) (see figure), and 32% have no services [133]. As I talked and walked around Khayelitsha, I found that these unserviced shacks come 'ready-made', are sold by the roadside at a cost of ZAR2 000 (US\$300) and can be placed on empty pieces of land. Figure 19 was taken by the author.



Figure 19: Serviced

2.3.5. UNEMPLOYMENT AND UNDEREMPLOYMENT

As outlined in the previous section, one of the key characteristics of Khayelitsha is the high poverty rate, with an estimated 90% of the population regarded as poor (see Figure 20). A key contributor to this state of chronic poverty is the lack of a steady income, whether through a job or through private enterprise. With the average rate of unemployment being about 60% of the economically active population, Khayelitsha's unemployment level is higher than both the Western Cape average of 21% and the South African average of 25% [140].

Furthermore, even for those who are employed, many are working for less than one would require for daily household survival – an average of less than ZAR 1 600 (\$150) per month [139]. According to the International Labour Organisation (ILO) [142], this 'working poor' section of the community is characteristic of the developing world, with between 46 and 61% of the existing African labour force being characterised as working poor. This is in line with Stats SA's estimation that between 44 and 55% of the working population in Khayelitsha are seen as either elementary or unskilled labour [132].

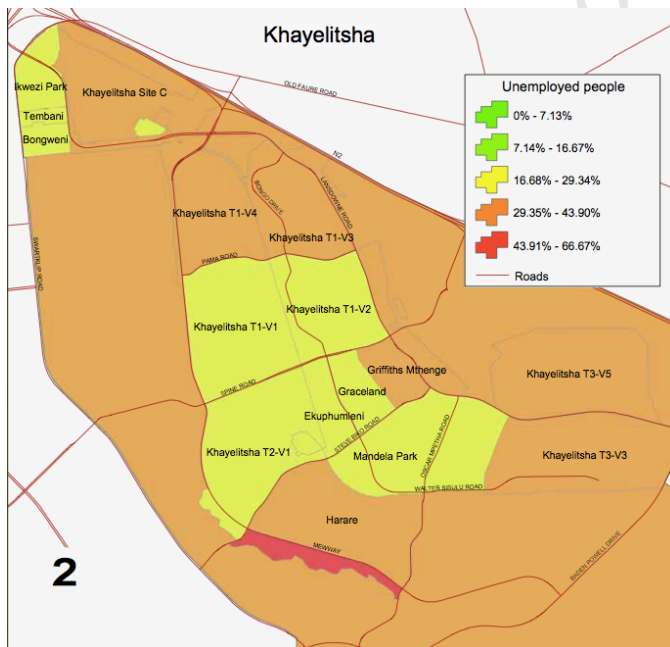


Figure 20: Unemployment in Khayelitsha

2.4. Development Organisations

One thing that is hard to miss as you walk or drive in Khayelitsha is the sheer number of organisations working for social justice in the area. These mostly Non-Governmental Organisations (NGOs) offer various services related to challenges in the community, including HIV and AIDs support, Gender-Based Violence Units, Legal Assistance, various forms of training, substance abuse treatment, job placements, and many others. There is no official documentation stating the actual number of such organisations in Khayelitsha, but during the three years spent in the community we encountered over 50 different NGOs working with the community in various sectors, including Learn to Earn.

2.4.1. LEARN TO EARN: A HAND UP NOT A HAND OUT

The role of grassroots NGOs in the development discourse has been plentifully documented. A particularly important aspect of grassroots NGOs is that they are regarded as owned and led by the community. Based on the perception that they are grassroots-led, NGOs are regarded as ‘fountains of local knowledge’; they provide local community expertise, an entry point to the community and a source of background information on the community and its needs [23].

From previous work [143], [144], we had already seen and understood some of the advantages of working with NGOs on development projects. It was during that work that we identified an NGO whose focus was on holistic community empowerment. Therefore, while the initial part of this work was made up of several months of ethnographic research in and around the area, it took its current shape upon partnering with Learn to Earn (L2E)⁴.

L2E is a faith-based not-for-profit organisation that works on a holistic human development philosophy. It was established in 1989 as the Baptist Training Centre, and renamed Learn to Earn in 1995, under the directorship of Roché van Wyk. Since its inception, over 8 800 people have been trained in various skills through their numerous programmes. Furthermore, L2E facilitates job placement for a percentage of their graduates. One of its objectives is to enhance the quality of life of people from

⁴ www.learntoearn.org.za

disadvantaged communities and facilitate the restoration of self-respect and dignity, and they aim to do this by training and equipping unemployed persons in various skills, including sewing/garment-making and carpentry, so that they may become self-supportive and independent. One of the key training areas that L2E is involved in is skills training in the use of technology, both at a basic and at an advanced level. It also offers computing services to the community, including typing, photocopying, scanning and faxing.

2.5. Use of Technology

That last point brings me to the use of technology in Khayelitsha. When we started exploring Khayelitsha one of the focuses was understanding what technology people had at their disposal, and how they used it in their day-to-day lives. Skuse et al [135–137], Benjamin [138] and Kreutzer [145] have all done extensive work on technology usage in Khayelitsha. Here we highlight insights informed by their work, but grounded in qualitative experience.

The first striking thing we noticed while walking through through the major streets and market centres are the brightly-coloured containers. The containers act as information of sorts, providing technology services including telephoning, faxing, printing and scanning. Further, there are a number of cyber-café's, and telecentres located in the two local libraries. In addition, there are a number of NGOs offering computing courses, varying from basic office support applications to more advanced graphic manipulation courses. However, most prominent was the availability of mobile phones: the local shopping mall had customer service outlets for MTN, Vodacom and Cell C, (see Figure 21) which are the major mobile service providers in South Africa.



Figure 21: Cell-phone containers and technology in Khayelisha

2.5.1. THE CYBER-CAFÉS

During our study we visited two cyber-café that are part of a chain in Khayelitsha and the greater area of the Cape Flats, with some branches in the Eastern Cape.

A key observations at the cyber-café was that 90% of the clientele required help using the computers. The owner had seven staff members whose job it was to assist customers in need of computing services. It is important to note that Silulutho, having started as a cyber-café, now offers computer training services to fill the demand for computer skills – a niche market at the time. An informal interview with the owner of the café revealed that the majority of their users were digitally illiterate and needed assistance from the computer-savvy staff to access the services they needed. These services included accessing government information, emailing, faxing and typing out documents. The staff of the cyber-café, which operated from 7.30am to 6pm, said that their biggest source of revenue was serving over 100 people daily with the creation of Curriculum Vitae. In addition to ‘normal’ computer services such as printing, scanning and faxing, the café also offered electronic payment, where the staff would assist clients to pay bills such as electricity bills and government levies through an online portal.

2.5.2. THE CONTAINERS

The container concept was the South African government’s response to the digital divide. It was rolled out as a shared-access initiative, aimed at universal access to telecommunication

services. The containers are provided by various mobile service providers. They were built to provide telecommunications services to disadvantaged communities at government-mandated prices that are well below commercial rates. They had telephone booths, and also provided other services, including computing and faxing. However, with the fall of mobile handset prices, the relevance of their primary service to the community has diminished. Many have been repurposed to meet the current demands of users.



Figure 22: Re-purposed container

The three containers that we visited no longer offered cell phone calling services; but the one that was branded sold airtime from the sponsoring service provider, and offered cell phone repairs. Another had been converted into a computer shop, where the owner provided various services including writing of CVs and document printing. The third was a phone repair shop that also sold phone 'spare parts', including keypads and screens.

The container owners were taking advantage of the gap created by high demand for computing services versus low computer literacy levels. In the container pictured above (Figure 22) we found the owner typing a handwritten letter that had been left for collection. He said that his clients required him to type out documents and print them; but on another visit he had a CV that a client had left him to type and make copies of. Along with the computing business, he was also a phone repair 'expert'. He had various

equipment, cell phone parts, and a range of old and broken cell phones. He said he sometimes scavenged useable parts from old cell phones and sold them to his clients.

2.5.3. THE TELECENTRES

There were two telecentres that we visited; one was a standalone centre and the other was integrated with the local library. They are both run by the provincial government. We only visited the standalone centre for any significant length of time; during the visit, there was only one person using any of the 15 computers in the space. The man, who looked middle-aged, was reading from his email inbox, and he had his username and password written out in a small notebook that he had tucked in his wallet. Because he was alone, we had a chance to talk to him; we found he worked for a local community-based organisation, and used the email address primarily to communicate with the financial donors to his project. The email address had been registered for him by one of the donors, and he had even received initial training from them. He came to the telecentre a few times a week, and sometimes received assistance from the attendants

In the telecentre based at the library there were about 20 computers and at the time of the visit there were a lot of young people using the facility. We were later informed that because of its under-utilisation, the library had partnered with some NGOs to offer local youths basic computer classes, which were integrated with life-skills training.

2.5.4. COMPUTER TRAINING

As noted earlier, L2E offered skills training in both basic and advanced computing. This trend was not unique to L2E; a chat with Susan Wishart, General Manager at the time, revealed that civil society organisations in the community had acknowledged the need to impart computer-related skills to the population. A number of them had in-house training centres similar to the one L2E had, while others had partnered with schools and libraries to offer courses when their machines were not in use. L2E, in particular, had a 10-week basic computing class with a six-month waiting list; other NGOs in the area confirmed the high demand for computer training. Silulutho, as mentioned previously, had established a

computer training college with courses lasting up to a year, and conducted ‘graduations’ every six months.

2.5.5. MOBILE PHONE USE

Insights into mobile phone use came from conversations with the people we had encountered in the technology outlets as well as within L2E. Due to his familiarity with people in search of airtime, phone repairs or cheap phones, the container attendant in particular gave us some initial insights into mobile phone use. Later we followed up with the customer service shop at the economic hub, and had talks with the people in the community.

Mobile phone use is highly prevalent in Khayelitsha. The container attendant was of the opinion that every second person, or at least each household in Khayelitsha, had a mobile phone number; a claim that we confirmed by randomly questioning the people we met as to whether they or any member of their household had a mobile. To our amazement, most indicated that they had at least two mobile handsets in the household, with all the adults owning a SIM⁵ card which they would swop handsets to use. The SIM card-only usage pattern was particularly interesting. As we probed further, we found that this phenomenon has arisen due to the high rate of crime in the area. Most respondents stated that they have had at least one mobile phone handset stolen in the past. SIM card replacement is free in South Africa; therefore, after losing their handsets, they would replace the SIM card, but wait until they had enough money to buy another handset.

Another interesting usage pattern was the high demand for internet-enabled mobile handsets. At the time (2008/9) the customer care outlets pointed out that the majority of their clientele were asking for handsets that could access the internet, or asking for help configuring their handsets so that they could connect to the internet. We will discuss this further in Chapter 3.

2.6. Discussion

Population Characteristics

⁵ A SIM Card, also known as a Subscriber Identity Module, is a smart card that stores data for GSM Mobile Services subscribers. It contains the subscriber’s unique ID.

In both the literature and in the qualitative insights, there were clear themes. Synthesising the above information reveals several distinct features of Khayelitsha:

1. High levels of poverty
2. High unemployment
3. A young and mostly uneducated population
4. A large number of development organisations
5. High penetration of mobile phone usage
6. High interest in internet technology

Looking at the above, one can infer a connection between themes 1 and 2. There is a causal effect that can be shown between high rates of poverty and unemployment, and between unemployment and the mostly uneducated population. The link between unemployment and poverty is well documented. Kirk [146] has argued convincingly about the link between unemployment and education. A lack of education leads to a lack of skills to be competitive enough for the job opportunities available [147]. Therefore, with only 2% of the population having received formal, professional training, there is a need to determine how the remaining portion of the population can access the type of employment that does not need specialised skills.

From the above observations, it seemed there were areas where the relationships were less obvious, in particular the use of technology and the high rate of unemployment. Of particular interest was the use of the mobile internet by semi-skilled people. In some earlier work [148] on mobile internet use in the wider Cape Town area, we had observed how users were getting online. This offered an opportunity to extend that work, but with the complication that the participants were semi-literate people with limited income. While observing the way they interacted with various technologies, it was important to investigate thoroughly why these people were interested in the internet (especially on their mobile phones), how they used it, and for what purpose they used it.

As far as unemployment was concerned, we were particularly interested in how this largely young and uneducated population could engage with the labour market. Furthermore, we were interested in finding out how this population went about seeking employment and if the internet might play a part.

2.7. Conclusion

As noted earlier, this work was positioned primarily as a reflection in action within the confines of an EAR approach. As a research – rather than a method – approach, EAR is viewed in two ways: broad research, which I have covered in this chapter; and in the next two chapters I take the more targeted approach, aimed at understanding a particular issue or set of issues in one particular part of the community served [104], [102]. In this case we were interested in understanding the use of mobile internet and the unemployment discourse in Khayelitsha. It is important to note that some of the findings occurred in parallel; they will be presented as they occurred.

In the next chapter is an encore of research work that we had published earlier, that was done specifically around the use of mobile Internet in Khayelitsha. In Chapter 4 we look at Khayelitsha's unemployment problems in the context of the South African Labour Market.

3. i-Internet, Intle!

Ushikoh, i-Internet Intle! [Shikoh, the internet is great] The exclamation brought goose bumps to my body. It had been almost 10 months since I had joined Learn to Earn, and most of the time I would just hang out, learn some Xhosa and even do some sewing with the ladies. This was just eight weeks after I ran a class on 'How to use the internet on your mobile phone'. So to hear Tandiwe exclaim *Intle* was more than satisfactory. Tandiwe was one of the eight ladies I had trained on how to use the Internet on their mobile phones. This was during their lunch break, when we had ample time to discuss their progress. – Personal Reflection, author.

ABSTRACT

South Africa is a mid-range economy and is believed to have some of the highest connectivity levels in the continent. With universal mobile network coverage, compared to the relatively low levels of PC use, South Africa thus presents an ideal place to explore the use of mobile internet, more so among people whose first, primary and most probably only access to the internet will be through their mobile phones. This chapter summarises work previously published and presented through various publications and conferences between 2009 and 2011. It presents the findings of a longitudinal study on women who were first-time users of the internet through their mobile phones. The eight-month study, which started with training of women who had never used the internet on how to use the internet on their mobile phones, resulted in some core insights that led to the building of Ummeli.

3.1. Background

With relatively low levels of PC use but near-universal mobile ownership; South Africa is a particularly good place to explore the use of mobile internet. Figure 23 below gives a comparison between the percentage penetration of various ICTs in South Africa, Africa, and

the world. It's important to note that this is an estimate drawn from various sources, a snapshot of the technological landscape as at August 2010. It gives a rather optimistic view of technology penetration in South Africa, especially in terms of mobile phones and mobile internet.

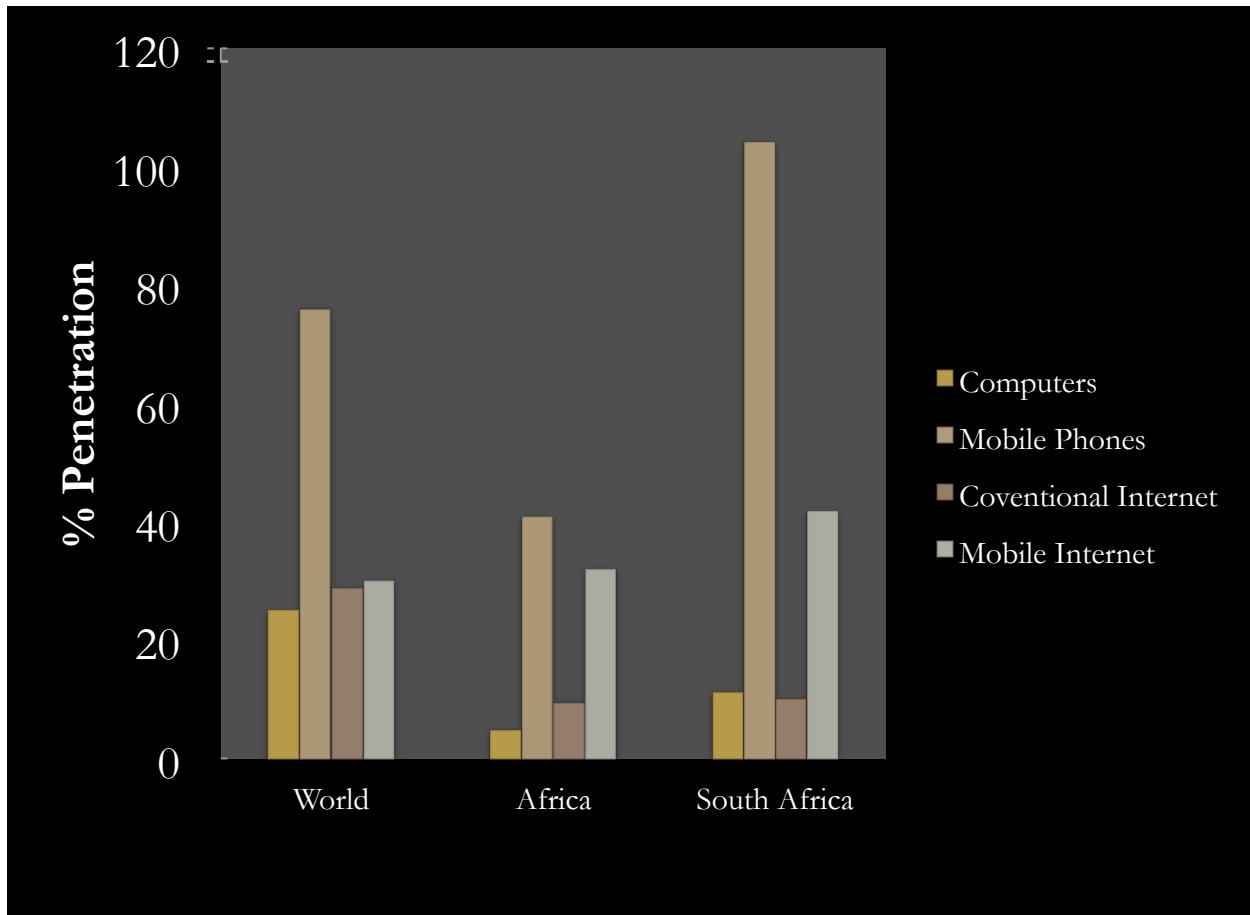


Figure 23: Percentage ICT penetration in different regions⁶

Recent studies have documented mobile internet use [51–53], as well as the specific use of a popular mobile instant-messaging application called MXit [149], [150], [53]. More specifically to this work, Kreutzer [145] finds evidence of considerable mobile internet use among low-income schoolchildren in Khayelitsha. In a survey of Grade 11 students in low-income schools in Cape Town, 77% of respondents reported owning a handset; and a remarkable 68% reported using a mobile phone on the previous day to access the internet.

⁶ Sources: http://www.itu.int/net/pressoffice/press_releases/2010/39.aspx , www.abiresearch.com ; www.internetworldstats.com ; www.worldwideworx.com)

MOBILE-ONLY INTERNET USERS

As noted in our previous work [151] we had initially conducted a study on the use of the mobile internet in South Africa. The study drew on 39 semi-structured interviews with mobile internet users in the larger Cape Town metropolitan area [148], [151]. We distinguished between archetypal mobile-only internet users and a more fluid category of mobile-primary internet users who also have some PC access – this categorisation is explained in Figure 24 below.

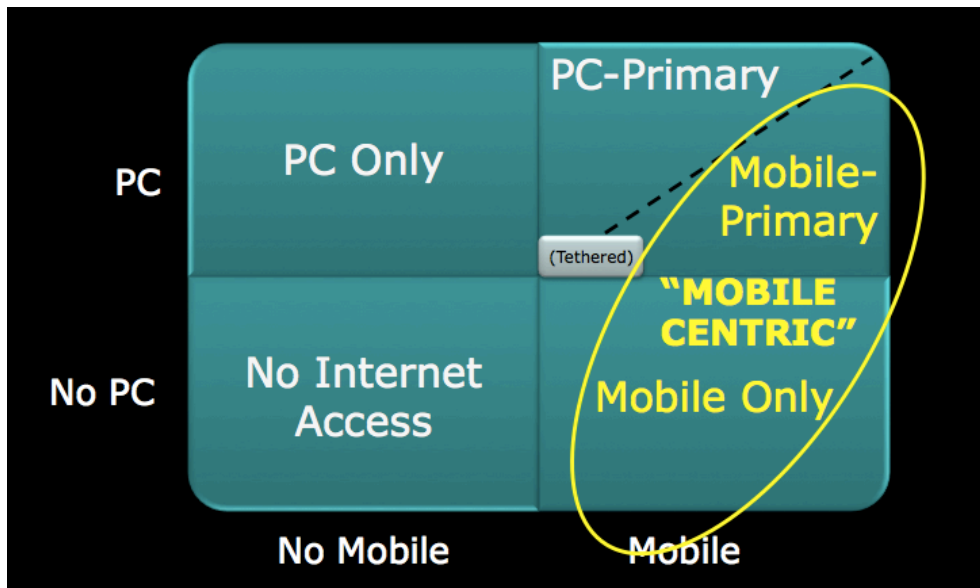


Figure 24: PC vs Mobile⁷

In this study, we pointed out the role of social influence in drawing first-time users [152], identifying the importance of the chat-program MXit as a cost-savings mechanism, and portrayed users as seeking a mix of utility (search, remittances, news, etc) and entertainment, connection, and expression, via the mobile internet. However, Phase One of the study shared the same constraint found in much of the existing work on mobile-centric internet use; it identified users only *after* they had adopted the technology. We elected to complement these interviews with observations about what happens in the earliest moments of use.

⁷ Diagram divides internet access in two dimensions with respect to their access to desktop and mobile systems. We are interested in those who access the internet only through mobile or regard mobile as their primary means of access.

During this study, we were struck by how much harder it was to find adult women using the mobile internet than it was to find adult men. This mirrors some (regrettably) common observations around differences in the patterns of ICT adoption and the barriers to effective ICT use by women [153–155]. Further probing suggested that many of the women we approached were willing to use mobile internet, but either did not know of its existence or found it too complicated. Others seemed to accept or reflect a social construction in which technology was ‘male’, and were more likely to rely on men (brothers, husbands, sons) to make use and make sense of the internet for them.

So for the present study we decided to focus on training women on the use of the mobile internet, in order to test the resilience of these ‘barriers’.

3.2. Methodology

The women were first-time users with no previous exposure to PC-based internet, and broadly speaking the project was a training exercise. Using EAR, we tried to nurture ‘successful’ mobile internet use among participants through a collaborative, exploratory, and flexible engagement process. Over thirteen weeks I⁸ was immersed in the women’s environment, through frequent half-day visits. My goals were to learn, on two levels: (a) to assess (and recommend improvements to) the ways in which the mobile internet is offered or accessed via mid-range feature phones; and (b) to gather broader insights about the technology in context, including social and cultural meanings exceeding those we had already gathered in the previous study and from in-depth immersion into Khayelitsha. Findings on the technical side – about usability – are detailed in Chapter 5. This chapter focuses on the contextual side, on issues of usefulness and utility.

The interactions with the participants were not focused exclusively on training; they went about their normal day, sewing, chatting, interacting with NGO staff, etc., with only periodic conversational swings towards the mobile internet. The analysis draws on notes taken during and after the visits, augmented with references to digital recordings (made with participants’ permission). I provided ZAR30 (US\$4) of pre-paid airtime to participants on

⁸ In many academic works of this nature there is a tension between writing in the passive voice as a default, yet reporting the active interventions of the author. In this thesis we have elected to use the passive voice where possible, but invoke the first person when reporting an intervention by the author.

two occasions; once at the beginning of the study, to cover the cost of internet access during the study, and again at the end of the follow-up interviews, as an honorarium.

I began with individual pre-training interviews, during which participants outlined their expectations about the internet. However, there was significant resistance to the planned group training; after the first 45-minute session, half the women wanted to drop out, because they felt less 'savvy' than their friends. By switching to individualised training sessions, I was able to coax most of the dropouts back.

The training introduced the mobile internet as a tool for daily life, including searching for business and job opportunities, news, and entertainment (usually music downloads). The protocol combined instructions and examples. For example, I illustrated how to access a popular search engine using WAP, then entered 'domestic care job' as a search inquiry, which resulted in several links to job databases, which I followed to display the job description. We also helped participants create email addresses, a major gateway to interaction and exchange online [156].

Given the EAR approach, the relative weighting given in training and discussion to instrumental vs. entertainment uses – between, say, getting a job and searching for gospel music – was developed collaboratively between the researchers and the participants. More details on how this weighting emerged and evolved, given the context of the training in the NGO setting, appear in the results section below.

A group dynamic evolved. The women became comfortable learning from each other. We adjusted the methods, and began teaching each participant different things, encouraging them to teach each other. This peer-to-peer learning model was advantageous in three ways. First, while most of the women spoke enough English to communicate with us, they primarily spoke isiXhosa; peer learning resulted in more animated, natural conversation. Second, there was accelerated learning in the group; and third, peer learning encouraged ongoing and viral learning, even after the initial 13-week period had ended.

After the initial group training session, most of our interactions were informal, one-on-one refresher sessions, which gave me a chance to gauge progress and adjust the training content. I concluded the training phase after 13 weeks with a group feedback session.

3.3. Initial Results

Two volunteers dropped out after the first training session. Of the eight remaining, five were in their twenties, two in their thirties, and one in her fifties. Four were married. All but one lived in a household with three or more members. Monthly household income ranged from ZAR 1 300 (US\$150) to ZAR 8 000 (US\$960). The group median of ZAR 3 000 is above the poverty line for South Africa, but nevertheless quite resource-constrained. Six of the women had moved to Khayelitsha from homes in the Eastern Cape. Only three of the women had completed their last year of high school.

Each participant owned an internet-ready phone, with GPRS capability and WAP 2.0 (a browser capable of visiting a wide range of web sites). Some had heard of the internet, but most did not know it was available on their phones. Some knew that one could access the internet by pressing a hotkey; however, none knew how to configure the data settings on their handsets. None had previously used a computer.

The participants had each already decided to join L2E and pursue training in search of better livelihoods. Susan, the manager of Learn to Earn, explained:

“Khayelitsha has close to 90% unemployment ... what we offer here is a form of income generation. We pay them depending on the work that is available, and their personal input, because for many of them this is the only way to feed their families, but we hope with the skills that they acquire here they will be able to find secure employment elsewhere.”

In this context, the search for a path out of poverty was particularly salient, and it was not surprising to us that much of the focus of the training would concern using the internet to look for a job. Indeed, even in the initial interviews some of the women drew connections between job-seeking and the iconic (though mysterious) power of the internet. Job search, at a basic level, was sufficient rationale for taking the time to sit with a stranger and learn the intricacies of the mobile internet. Tindi was confident:

“I know this life is not for me; I know I will get out, and I hear that on the internet I can get information ... all types of information. I know it will help me get out.”

Ann has two kids and is expecting a third. She is working at L2E while her partner is undertaking nursing training. She explained why she is looking for a job:

“Here they give me ZAR800 (US\$90) per fortnight, and sometimes even that I am not assured, as it depends on the orders that they get; then I have to buy food, pay 200 for crèche and give my husband some money to at least have something in his pocket. I still need money to go to the

clinic (pre-natal care) and buy things for the baby. I just want something that will pay me more than ZAR2 000 (US230) a month, that will be enough. Do you think this internet can help? They say it can help, and I am willing to try.”

JOB SEARCH

In South Africa’s highly stratified economy, some jobs are announced and filled by word of mouth and via classified advertisements in the traditional mass-media. However, others – particularly professional and service-sector jobs in the formal economy – are likely to be advertised online on one of dozens of listing services. Many formal-sector employers in urban South Africa assume that potential employees have access to the internet. Ammy’s experience:

“Here in the internet I know I will find people who want me. Look, I went to this place in the morning and they told me put my CV here in the web, but I do not know how to do that; they do not consider me, if I do not know how to use internet.”

Without the means or skills to access the internet directly, many job seekers walk door-to-door seeking employment, dropping their printed CVs or inquiring after open positions. Others rely on assistance from cybercafé attendants, who offer various services (CV writing, printing, emailing and faxing) for a fee. The benefits to be gained by self-directed internet searches are significant, whether they be saving time spent walking the streets, or halting the steady bleeding of out-of-pocket fees to cybercafé operators. Would-be job seekers with an internet connection (and the skills to use it) have the advantage in urban South Africa.

After the initial training, many participants searched for jobs and used the new email addresses they had created as part of the training to establish contact with potential employers. Linda used Google and found gumtree.co.za (a similar South African website to craigslist.com):

I put ‘job in Cape Town’, and they gave me Gumtree. I go to Gumtree and they show me many jobs here in Cape Town, but this one they don’t want many things, so I put my email address and ask them if they can employ me – and here, see, they replied in my email, and ask for my CV ... I am very excited!”

As participants progressed, they drew from multiple sources, combining old and new media. This was Tracy’s experience:

I enter 'home based care training' here and then say 'OK', then they give many things; I read them and write them here [she had bought a notebook solely for this purpose], and then I go here [Opera Mini] and write the www [URL], and I read more and then I find their email address, and write here, and then ... send them email."

The women encouraged each other to follow up on leads. Once they could recognise URLs, they found them in 'offline' media and brought them in to share. Similarly, after Tracey and Linda discovered gumtree.co.za and careerjet.co.za, they shared their phones with the other participants, demonstrating how to find the sites.

OTHER SEARCHES

In the seamstresses' area at L2E there is always a radio playing. In addition, many of the women had experience in sharing mp3 files via Bluetooth [157]. Thus, Tindi's first search was for her favourite gospel musician, Lindiwe. Phyllis did the same. Her initial searches were successful, although not without surprises:

"Eiiishh [Oh dear], I found the gospel music, but I must have ZAR16 to get it..."

Participants were less interested in political news (even during a national election) than in the weather; Khayelitsha (a former wetland) often floods during winter storms. Beatrice said:

"I live in a zinc house [a temporary structure of iron sheets], and here, if they give me weather, I can be prepared."

As noted previously, Khayelitsha has one of the highest incidence levels of HIV/AIDS in South Africa. One participant described how HIV had touched a family member. Her searches led her to the website of a local HIV-support NGO, and to information about antiretroviral drugs and mother-to-child transmission.

Participants searched for a variety of things. That said, the paths to useful content were not as clear as those to local job listings or to mp3 tracks. Unstructured searches and a jumble of sponsored and unsponsored links led them down sometimes less-than-helpful paths; and often to content from overseas, referring to circumstances quite different to what they were facing in Khayelitsha.

CHATTING AND NETWORKING

Our training did not focus on social networking, but the participants quickly found their way to such services. Linda heard about Facebook, and clicked on the preconfigured link on her handset's browser:

“Then they ask I put email address and password, and they send me code in email ... I even went there and found Neyo [a hip-hop musician] and sent him a message, and I chatted with this guy from Australia.”

3.4. Follow-up Interviews

In October 2009 efforts were made to contact all of the women who had participated in the original May 2009 training. We contacted seven of the eight women and were able to conduct semi-structured, face-to-face interviews with six; the seventh was interviewed via telephone, as the participant was no longer visiting L2E. Interviews lasted 30 to 60 minutes. All but one was recorded for later transcription (one participant refused). Based on our previous experience of the group's dynamic, we also held informal discussions with two or three of the women at a time, as in this way we were able to uncover some issues that did not come through in structured interviews.

To assess skills retention, we used a demonstration exercise that required participants to access and compose an email, and to perform a search on their preferred search engine. After six months, all seven participants tested were able to access a browser and search for a result. Six of the seven had accessed the mobile internet since the conclusion of the training (using their own money and airtime to do so). Five of the seven could access and compose an email (Beatrice could do so with assistance, and Phyllis was not able to at all). Five of the seven reported using Facebook; three reported using MXit.

The following section is an update on each of the seven women who completed follow-up interviews. In the discussion that follows, we have identified some emergent cross-cutting themes from the interviews (access and costs, confidence, and family contexts) and will weigh what transpired against the metric of a 'successful' job search.

TWO NEW MOBILE-ONLY INTERNET USERS

When we first met Ammy, 22, she was in desperate need of a job to help support a family of five adults and four children. In her words, “I want to learn this, because I know someone there will want me ... I need a job, like, yesterday.” Ammy's fortunes improved. She

reported holding three part-time jobs. Although none of her new jobs could be directly attributed to internet usage, she reported actively searching for new job opportunities via the mobile internet.

After being urged by friends, Ammy became active on Facebook; after a false start with an inactive profile, she created a profile, accumulated a number of friends, and sent regular status updates. She has also begin influencing the ICT habits of those around her, directing her sister to enrol in a caregivers' (nanny) training course that Ammy found online.

Ammy reported wanting to do more with her handset. On the jobs side, she wanted to be able to create a digital CV to email or send in some way to prospective employers. On the personal side, she has been unable to master uploading photos to her Facebook profile.

Tracy, 29, lives with her extended family. Her main objective was to find a caregiving course to help her become a nurse. Using a search engine, she located one offered in Cape Town, and got all the necessary information about the course via email. She visited the physical site of the course only to sign the necessary documents and begin her classes. The communication that would have been done either telephonically or via physical commute cost her "less than ZAR 3" (US\$0.35). By the time of the follow-up, she had completed the course and was undertaking a practicum at a local hospice. She reported looking online for jobs for herself, her sisters and her partner.

Tracy also signed up for Facebook, but is not active, as she has no friends who are users, other than the other women in the study group. She attempted to teach her partner and sibling how to use the internet, and used Opera Mini to open email accounts for them.

FOUR BETWEEN USE AND NON-USE

A mother of two, 21-year-old Linda was the 'reference point' for the other participants when they faced challenges in accessing the internet on their phones. Linda was able to search and apply for several jobs on her mobile phone; two of these applications resulted in interviews, and one led to a job offer. However, Linda could not be employed, as she did not have an original identification card, which had been stolen. Nevertheless, Linda has used her skill to search for jobs for her aunt, and for recipes for her grandmother. Together with a cousin, she started working on a business idea for buying and reselling second-hand

items in Khayelitsha, using the mobile internet to locate factory outlets and second-hand merchandisers.

In the months after the training, Linda lost three handsets in three separate street muggings. She was unable to transfer her mobile internet practices to her new phones, as she could not locate either the WAP browser or Opera Mini. Despite these challenges, Linda is still able to access the internet on familiar models, and was keen to demonstrate her skills. Linda was the first in the group to start a basic computer literacy course. She is now able to perform basic tasks on a computer; however, she preferred the convenience of mobile internet access to the option of accessing a PC via a cybercafé or at a friend's house.

Anne, 25 years old, is a mother of two and lives with her partner. Like Linda, Anne would love to be a mobile internet user. She had learned how to use the internet so she could help her partner secure employment, and had bought a second-hand data-ready mobile phone for this purpose. However, that phone was stolen. She and her partner are saving up to buy Anne a mobile similar to the one she lost. In the meantime, Anne uses her partner's phone to search the internet for jobs, and has taught him how to do the same. On seeing job-seekers' personal profiles on Gumtree, Anne and her partner approached a cousin who is a PC user and asked him to post their profile. She reported wanting to start a basic computer literacy course once she has found a regular source of income.

Initially sceptical, Nancy, 30, started the training late. Once it was under way, her main aim was to search for employment, as she is the sole breadwinner in her family. She reported using the internet to help her sister (who lives in the Eastern Cape) search for jobs, and had accessed 'The Grid' (a South African social networking service). She also discovered that '.co.za' search sites offered better access to more localised information than the same '.com' sites. Her knowledge of the mobile internet increased her confidence in the use of technology and she had enrolled in a basic computer literacy class. She likes using the internet, but time and money are challenges: "No... I do not have long time on the internet... and, you see, there are times I do not have airtime."

Phyllis, 24, lives with her husband in Khayelitsha while they support their children staying with extended family in the Eastern Cape. Phyllis became technically proficient on the handset, conducting searches and composing emails. However, shortly after the training

she had to put up her phone as a guarantee on an informal loan for travel funds, to travel 1 000km to fetch one of her children. Upon returning to Cape Town she retrieved her handset, and remains able to navigate to the WAP browser. However, she is unable to access her email account, as she has forgotten her password.

NOT A USER (FOR NOW)

Beatrice, 33, is married with three children. During the original training she demonstrated the ability to access email and a search engine to look for jobs. She had received several job listings via email from a cousin who lives in the Eastern Cape, but told us she had not followed up on the opportunities. In her words, she was “too busy to look at this, I have no time, even in the evening...” Beatrice nevertheless utilises the internet’s symbolic value. During the initial training her husband tried to prevent her from using the internet, particularly MXit; but after six months, she spoke of protecting her ‘right’ to use the internet as she wished. She expressed interest in learning about Facebook, which she had heard about from a local radio station presenter. Her curiosity points to a growing enthusiasm and a difference in attitude from her earlier acquiescence.

3.5. Discussion

Eight new users in Khayelitsha do not represent the experiences of billions of potential mobile internet users across the Global South. Nevertheless, their interrelated processes of literacy acquisition and domestication help to shed light on a critical yet under-researched phenomenon. How does one approach, understand, and use the internet via the mobile telephone, if one has never touched a PC? In Chapter 5, we discuss some of the implications of my research into interface design on the mobile internet.

Here, we focus on the intersection between mobile internet use and daily life, and stress the ways in which participants’ use is both a product of and a potential challenge in difficult socioeconomic contexts. This discussion seeks to reconcile the two disparate results from the interviews. On the one hand, the participants retained skills (and even acquired some new ones) six months after the original training. On the other hand, not one of the seven women we revisited had secured a job via the mobile internet, despite this being one of the

primary motivations for the training course, and central to the domestication process beyond the walls of the NGO.

ONLINE PRESENTATION OF SELF

Participants did not go online exclusively to look for jobs. They also used the internet to find gospel music, craft profiles, send around birthday party invitations, and even 'befriend' hip-hop stars. While in the process of registering email addresses, some participants invented names. Anne wanted to be referred to as 'Jojo'. Asked why, she replied, "Well, I like it, it sounds nice." Likewise, Tindi was excited that she had sent an email to a local radio station: "They read *my* one." The fact that her email was read on the radio boosted her self-confidence: "Now I can do more..." Email, Mxit, and Facebook demanded a conscious, selective presentation of self [158], and revealed a willingness to appropriate technologies for self-expression – also found among first-time users of the PC-based internet [159](Ratan et al., 2009).

Some participants built on their positive experience with the mobile internet and elected to pursue traditional PC training. In the words of Nancy: "I want to learn more, I do not want to sit here at Learn to Earn and do nothing ... I want to get more jobs ... Yes, I think I will get more jobs with the computer course." In all, five of seven expressed some interest in this direction.

3.6. Conclusion

This study focused on how participants made use of the mobile Internet, in the absence of PCs. Participants were all from Khayelitsha. Each had access to electricity, a mobile/GPRS signal, and enough conventional literacy to interact with textual content. Nevertheless, our interactions with them have identified behaviours in an environment in which PCs are scarce. Given South Africa's high penetration of mobile telephony and status as a regional technology leader, these results can serve as early indicators of how populations across Africa – urban and rural – may eventually approach the mobile Internet. Clearly it is a technology which will be woven into the complex fabric of everyday life, rather than be relegated to a narrow, informational role.

The tone of participants' responses during the follow-up interviews was generally upbeat. Despite the setbacks in job-seeking, they achieved a number of victories, such as faster and wider searches for jobs, interviews secured, courses enrolled for, and even business ideas hatched. They found ways to make the most of the access they had – and in the surest two signs of enthusiasm, began teaching others (4 of 7) and trying to learn more about PCs and the 'conventional' internet (5 of 7). They built on existing digital expertise acquired to operate the mobile handsets (text messaging, Bluetooth transfer, loading and monitoring airtime) to move relatively quickly to a state of reasonable competence with the mechanics of internet searching, browsing, and social networking.

Furthermore, it is worth noting how the focus on job-search was a particularly fertile and evocative choice in an urban South African context. The better, more stable jobs for the women in the study would be found in Cape Town's formal sector, at companies and organisations run with human resources systems as 'routine-ised' and reliant on technology as any in the world. But a wide range of jobs was also available online, including positions for housekeepers, cleaners, nannies, gardeners, construction workers and petrol-station attendants. That abstract information about livelihood opportunities could be gathered digitally – through searching online, or email – was a matter of course to those doing the hiring; but it was a new skill that needed to be learned by those doing the searching.

4. Mzansi - The Growing Problem of Joblessness?

'Selulutho' read the sign at the door as I entered the cyber-café in Khayelitsha Site C. I was later to find out that this is one of several similar cafés forming a chain around the Cape Flats. Inside, I could count sixteen computers arranged along the perimeter of the room. There was another one being used by the clerk behind the counter, and in a nearby corner was a printer and photocopying machine. The small shop was unusually full for the time of the day (or so I thought). There were people seated at the computers, and others standing close by in queues, peering at the flickering monitors. As I navigated through the crowd, sneaking a look at what the customers were doing on their PCs, there was one clear and rather striking observation: twelve of the sixteen computers in the shop had curriculum vitae (CVs) on their screens. Suddenly, I realised what was going on. The people peering at the screens were having their CVs typed, and the people at the computers doing the work were the cyber-café attendants; and the stack of printed and copied papers was made up of still more CVs – there were CVs everywhere. My focus shifted from computer screens to faces; the eyes were blank. I was not sure if they hid fear or disillusionment. As these people stood in line, keenly observing as the attendants worked on their CVs, I thought I sensed resolve; perhaps even hope. Still, I wondered, is this the post-apartheid South Africa Mandela hoped for? – Personal Reflection, author.

ABSTRACT

According to Statistics South Africa (StatsSA), the official unemployment rate currently (June, 2012) stands at 25.2%, which reflects the number of people aged between 15 and 65 who are not employed, but are actively seeking employment [160]. This figure rises to 38% if the expanded definition of unemployment is used – this includes the group of discouraged jobless people who are no longer actively seeking, but would accept and be

able to start employment [160], [161]. This chapter provides context for the current state of unemployment in Khayelitsha. In order to achieve that it will address the following: an overview of South Africa, the post-apartheid labour market, factors contributing to unemployment, an EAR deep-dive into Khayelitsha's unemployment ecosystem, and some of the attempts that are being made to solve the problem.

4.1. Hopes of A New South Africa

"Let there be work, bread, water and salt for all ... The sun shall never set on so glorious a human achievement!" These were the words that Nelson Mandela used to close his inaugural speech in 1994 as he became the first president of post-apartheid South Africa – or the 'New South Africa', as many referred to it. Those words characterised the great optimism and hope that filled the nation as Mandela took over the running of the country. He inherited an economy that was virtually bankrupt. This was due in part to decades of mismanagement, international sanctions and violent protests. The removal of these constraints was widely expected to transform the country's economic performance, increase jobs and reduce poverty.

The inequalities of the past decades had ensured that the majority of the population was contained in rural areas, and hence remained unemployed, usually depending on one or two household members as breadwinners. South Africa had a population of just under 40 million, and unemployment levels of close to 40% [162]. The following table (adapted from O'Malley [148]) depicts the breakdown of the Economically Active Population (EAP); the figures are taken from South Africa's National Manpower Commission 1992 annual report.

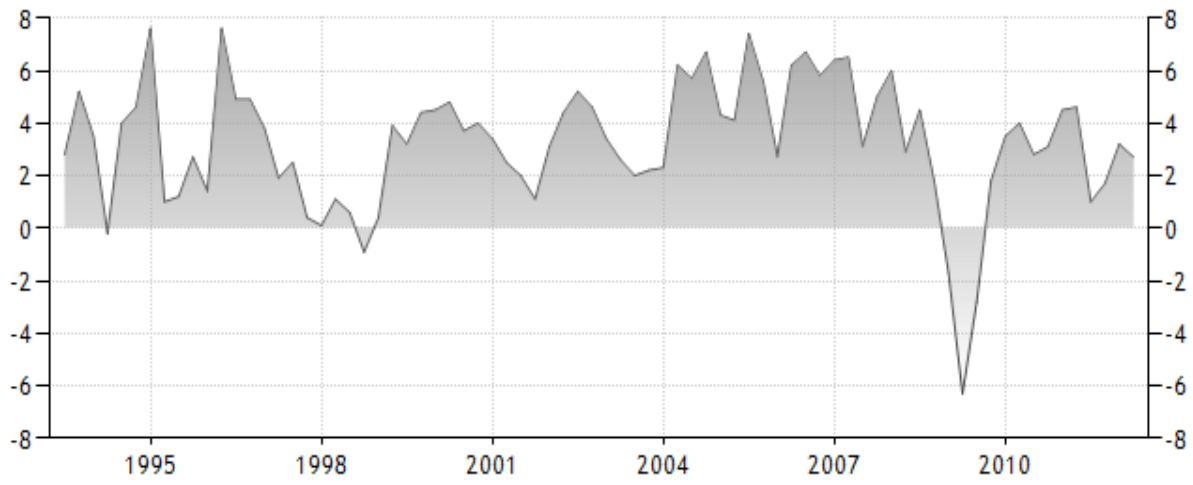
The end of Apartheid in South Africa brought about the dawn of a new era, one full of hope. After years of oppression, all the previously marginalised segments of the population could experience various freedoms – including freedom of movement; this meant people could move freely throughout the country in search of employment.

Almost two decades later, South Africa's GDP rate (as of last quarter 2011) was 3.2% [163]. This shows improved growth rate and bounce-back after the 2008-2009 global financial crisis and South Africa's own recession. In that period the country's GDP rate dropped to

1.8% in the last quarter of 2008, then plunged to -6.4% in the first quarter of 2009, and to -3.2% in the second [164]. However, this growth in the economy has not resulted in the expected reduction in unemployment. On the contrary, unemployment is at an unprecedented high, almost matching apartheid-era levels.

Jobless Growth

Usually, GDP growth results in increased employment and decreased unemployment – there is an inverse relationship between GDP growth rate and unemployment rate ([165], cited in [166]). Paradoxically, post-apartheid South African economic growth is coupled with increased unemployment – an economic phenomenon referred to as ‘jobless growth’. Jobless growth refers to a situation in which the general economy of a country (in terms of GDP) is growing, but absolute employment levels are falling or stagnant; or, where there is growth in an economy as well as a rise in unemployment [167]. Although some economists have argued that South Africa’s growth cannot strictly be termed jobless growth (as the data used to make such claims is unreliable), they agree that at face value, these claims may be valid [161], [167], [168]. The figures below (25-27) show GDP growth and unemployment growth (both of which are on the increase) in South Africa, while the last figure shows the correlation between employment rates and GDP growth – all of which points towards jobless growth (Note: figures adapted from [167] and various data from StatsSA, as visualised by www.TradingEconomics.com)



SOURCE: WWW.TRADINGECONOMICS.COM | STATISTICS SOUTH AFRICA

Figure 25: South Africa GDP Growth rate 1995 -2010



SOURCE: WWW.TRADINGECONOMICS.COM | STATISTICS SOUTH AFRICA

Figure 26: South Africa Unemployment Rate, 2002 -2012

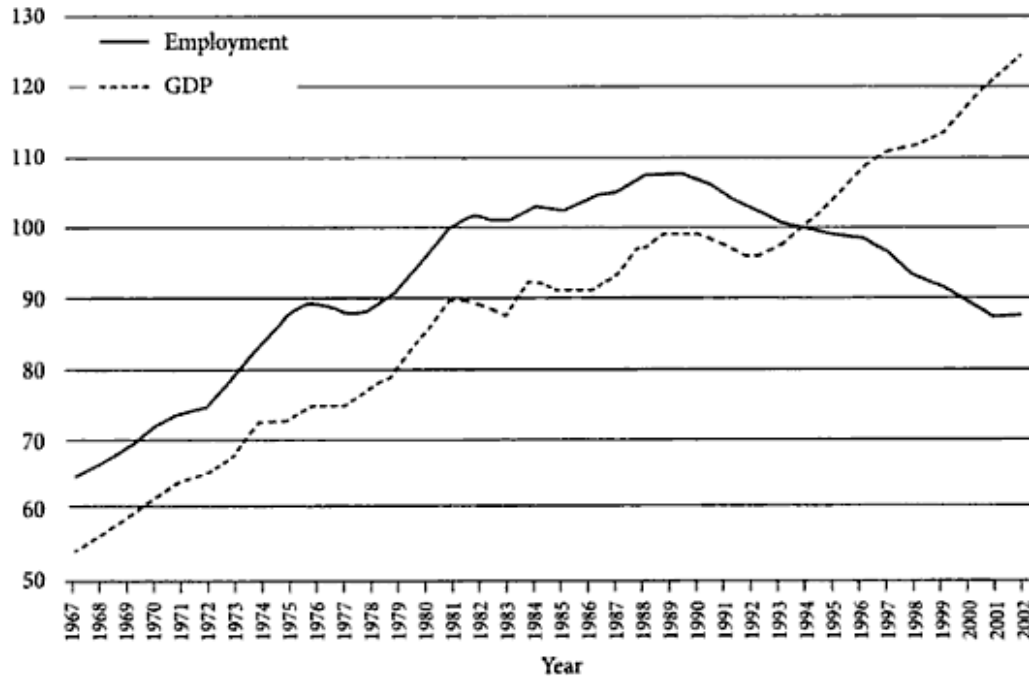


Figure 27: South Africa Unemployment Rate vs GDP growth rate 1967 -2002

These figures indicate that at the current levels of economic growth, South Africa cannot cater for increasing unemployment. The growth in the economy has been unable to keep pace with the number of new entrants into the labour market – over 6.9 million between 1995 and 2010. As a result, the unemployment rate has shot up by over 7.5% to its current rate of 25.2%. In comparison, the economic-to-population ratio and absorption rate (which measures the proportion of the working-age population that is employed) increased by only 1.2%, from 39.3% in 1995 to 40.7% in 2010. At the same time, the labour market participation rate (indicating the economically active population) went up by over 18%, from 47.7% in 1995 to 65.7% in 2011 [169], [170]. But of greatest concern in all these figures is the high number of people who are under the age of 35 and unemployed, the over 10% of the economically active population no longer seeking employment – the ‘discouraged job-seekers’.

4.2. Skills Shortage and Structural Unemployment

Thomas Carlyle, the 19th-century historian, is often quoted as saying that *a man willing to work, and unable to find work, is perhaps the saddest sight that fortune's inequality exhibits under this sun*. He could very well have been referring to the current state of the South African labour market. Currently (July 2012), the population stands at 50.2 million people, with over 33 million categorised as economically active [2]. With a crude birth rate of 21%, and a 1.5% annual population rise, these numbers are set to rise year on year [1]. In the previous section we established that although South Africa's economy is growing, it is neither fast enough nor big enough to absorb the increasing number of people joining the labour market. One economist has stated that in order to halve the current unemployed rate, the South African economy will need a miracle [171]. Hence, what South Africa is currently facing is not just unemployment, but a deeper, ingrained form of the same structural unemployment that existed before.

'Structural unemployment' refers to the inability of an economy to provide sufficient employment for its entire unemployed population – not necessarily due to the lack of jobs in itself, although this does contribute; it's more the severe shortage of job skills. The majority of the target workers do not possess the skills demanded by the economy; while the economy may be creating jobs, there are not enough skilled people to take them up [172]. This link between lack of skills and unemployment can be best demonstrated by the distribution of unemployment based on education levels in the first quarter of 2012 [2], as illustrated by Figure 28 below. It is evident that lower unemployment rates are associated with higher levels of education. Unemployment among persons without matric is greater than for those with matric or higher.

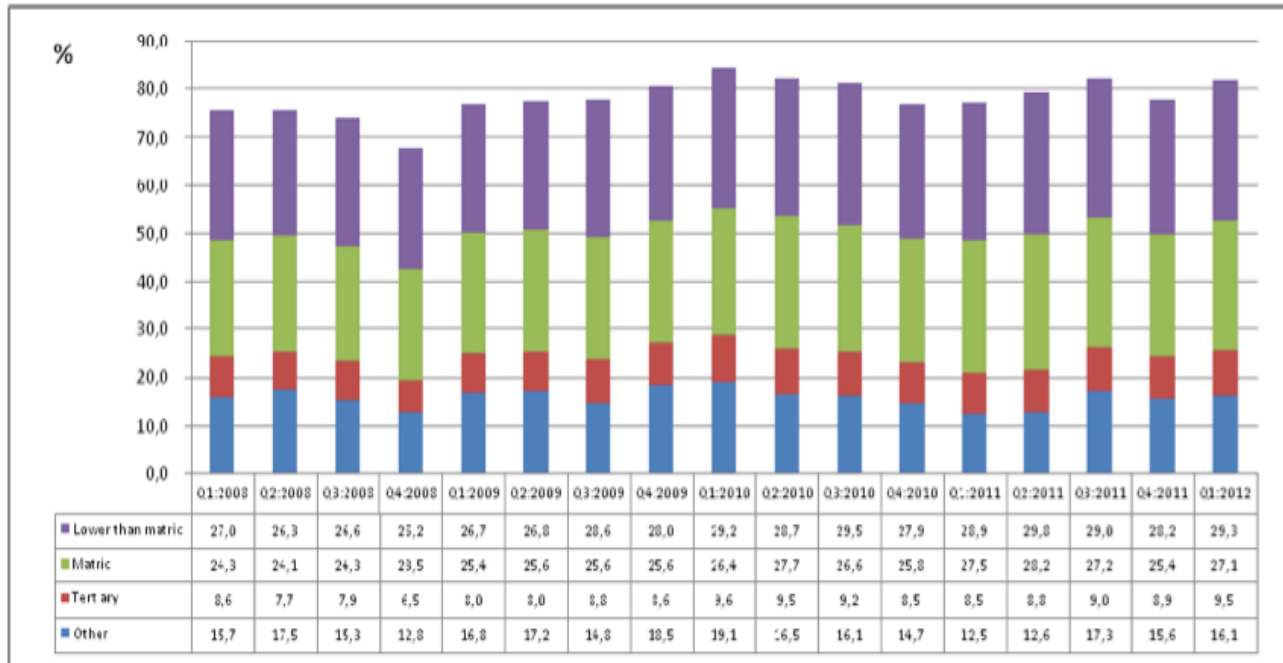


Figure 28: Relationship between unemployment and level of education

The problem of lack of skills dates back to the apartheid era, when the majority of the population was not allowed to attain education or skills for employment. The government constructed an economic system that placed the masses at a disadvantage – limiting access to education, but also to employment [173]. Inferior educational structures still affect the labour market today. While the country has made significant progress in the enrolment of students, with nearly 19% of the annual budget spent on education, the quality of the graduates has been widely questioned. [174]. The Minister of Basic Education, on the release of the 2011 annual national assessment results, expressed his concern [175]:

“This [quality of education] is worrying precisely because the critical skills of literacy and numeracy are fundamental to further education and achievement in the worlds of both education and work. Many of our learners lack proper foundations in literacy and numeracy, and so they struggle to progress in the system and into post-school education and training. This is unacceptable for a nation whose democratic promise included that of education and skills development, particularly in a global world that celebrates the knowledge society and places a premium on the ability to work skilfully with words, images and numbers.”

It is significant that the labour market and the pathway into it (through education and training) are key determinants of mobility out of poverty and exclusion from formal employment.

4.3. Youth Unemployment

In addition to the compromised quality of education, another important and worrying characteristic of South Africa's unemployment crisis is its concentration in terms of age. Overall, South Africa is a youthful nation, with up to 75% of the population under the age of 35 years. Of these, those old enough to work (between 15 and 35) are estimated to account for 72% of the country's unemployed. Unemployment in South Africa is seen not only as structural but also as catastrophically youthful [1], [2], [163], [170].

The following figure (29) (adapted from various sources, including Statistics South Africa) breaks down unemployment by age. The 15-24 age group accounts for 31% of unemployment, and the 25-34 group for 41%. In aggregate, the 15-34 age group represents a staggering 72% of South Africa's unemployed.

□

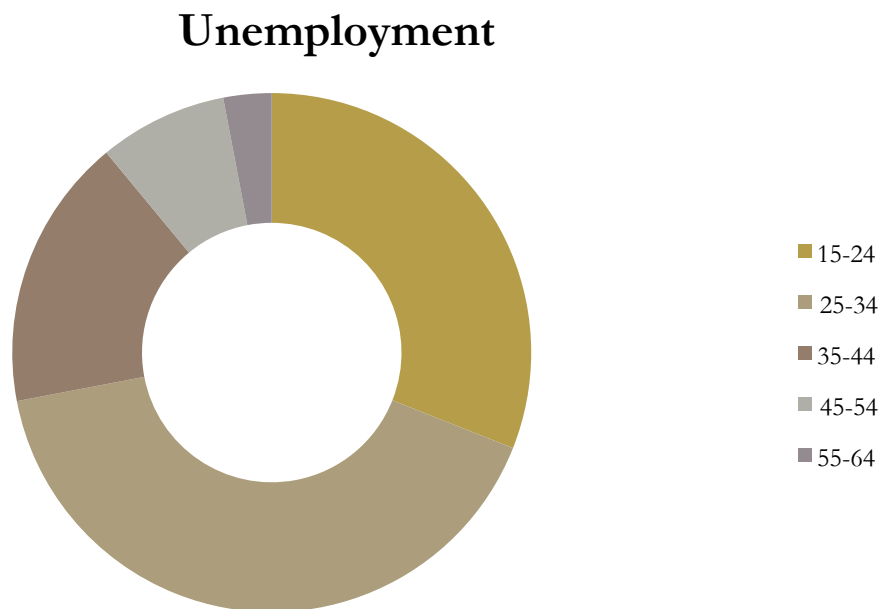


Figure 29: Unemployment in South Africa by Age

As already stated, expenditure on education has increased post-1994, meaning that more unemployed youth have higher educational qualifications than older citizens who are

employed. The fact that better-educated young people remain poor suggests that the labour market has not been successful in alleviating poverty, and that the education system is not delivering the skills needed by the labour market [146], [170], [173]. South Africa's approach to both unemployment and education must change.

4.4. Contextualising Unemployment in Khayelitsha

As seen in previous chapters, the goal was to be embedded in Khayelitsha, and to listen, observe and interact in a very structured manner to understand the community – in this case, what unemployment meant and how it was perceived. This meant seeking understanding of unemployed people's key pain points, and drawing knowledge from them towards any possible solution.

In Chapters 2 and 3 we called unemployment the biggest challenge faced by the Khayelitsha community, and in the previous chapter we attempted to position unemployment in the larger South African labour market context. Now we will give an understanding of its origins, its challenges, and how different people are trying to deal with it.

4.5. Causes of Unemployment

As mentioned, the members of the employable population in South Africa excluded from the job market because they lack the necessary skills combined with another group (close to 17% of the employable population) termed the 'discouraged job-seekers', have given up finding employment. To put all the information gathered into context, we needed to talk to the actual people dropped into the statistical job-seeker buckets labelled 'unemployed', 'illiterate', 'semi-literate', 'unskilled', 'semi-skilled' and 'discouraged'.

4.5.1. UNEMPLOYMENT STUDY

Learn to Earn deals primarily with people who are unemployed; they offered a pool of potential study participants. Adopting a snowball approach, we pursued leads from the initial group of participants to others in the Khayelitsha area, including people working in a local shopping mall, as well as cyber-café users, owners and staff.

We started off by carrying out informal interviews with a range of visitors, learners and graduates who frequented the L2E centre, to investigate some aspects of unemployment and perhaps identify a technological solution. The key questions posed were:

- Who are these unemployed people?
- Why are they unemployed?
- What are the ways to find employment?
- Do they ever use technology to find employment?
- What are the technologies used?
- How do they interact with these technologies to find jobs?

In addition, L2E's primary goal is to train people so that they can find meaningful employment. So we set out to discover how they do this: what jobs they train for, what jobs they find for their students, and what process they undertake to place the right candidate in the right job.

4.5.2. DISCUSSION OF FINDINGS

Challenges facing the unemployed

Seeking employment is a costly and physically and emotionally draining process [147]. Our investigations indicated that there are four main avenues being used: word of mouth; door-to-door search, including looking out for posters and notice boards; newspaper job listings; and internet job listings. *Word of mouth*: job-seekers depend on family or friends who have already secured employment to inform them of new openings at their place of work. *Door-to-door*: job-seekers go from one potential employer to another asking about vacancies, often relying on posters or notice boards to inform them of openings (as in Figure 30). Many job-seekers wait for the *weekly job listings* carried in local newspapers. *Internet*: job-seekers with browsing skills are able to access job listings.

1. Monetary Cost of Finding Employment

For many interviewees, the biggest problem was cost. One (typical) respondent lived in a household of seven, with three adults, only one of whom was employed. She said that although she needed a job, it was too expensive to get one.

This respondent described a process that led back to the Khayelitsha mall. As noted earlier, the cyber-café has sixteen computers, all of which are connected to the internet through an ADSL line. On every visit, we found eight to ten of the computers being used to create CVs.

Staff and owner all agreed that their biggest business is the creation, printing and emailing of CVs. One staff-member estimated that they create about 1 500 pages of CVs every week (about 75 individual CVs every day). A further investigation at the container-businesses in the vicinity of L2E confirmed that CV creation, photocopying and faxing was big business in Khayelitsha.

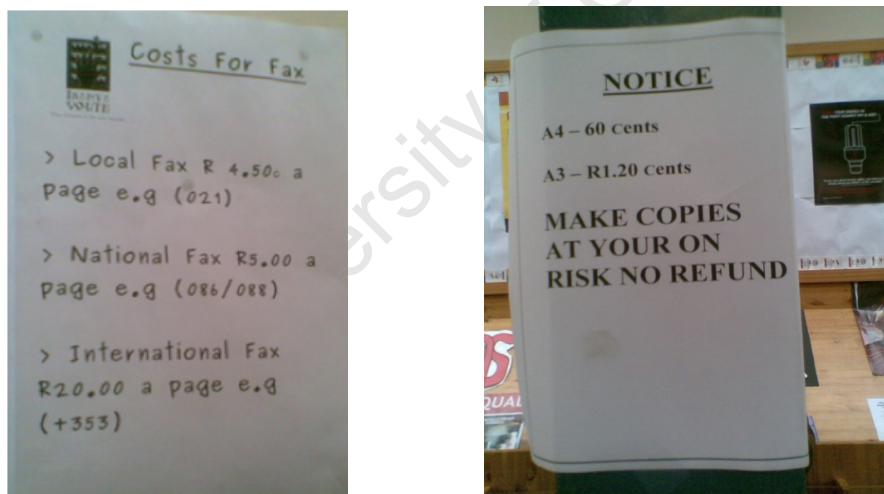


Figure 30: Posters advertising the various services

The following table gives an average estimate of some of the factors involved in searching for a job, based on a survey of one cyber-café, two containers, and L2E, who offer similar services, coupled with notes taken from the interviews. As it indicates, job search is a costly process; not only for the job-seeker, but also for any persons supporting the exercise. In a

community in which the average household income per day is less than US\$2, the situation is dire.

Table 1: Costs for a typical job-seeker

		Cost per item in SA Rands	Per Week ^c	Per Month
Transport ^a	Train	5	50	200
	Taxis	10	100	400
Newspapers	Average	5	25	100
PC Internet	Per hour	5	25	100
Curriculum Vitae ^b	Preparation	10	10	10
	Printing	0.50	3	12
	Facsimile	5		
	TOTALS ^d	30.50	213	816

- a. From Khayelitsha to Cape Town only; we did not consider other locations where employment might be found.
- b. A CV needs to be prepared once; they average 2 pages; job-seekers carry at least 3 copies.
- c. A five-day week (transport x2 x5; newspaper x 5; CV x 3)
- d. Most of this cost is usually shared within the household or among friends; for example, a group of friends may contribute towards buying a weekly train ticket which they all use to commute to look for employment.

2. Emotional Cost of Finding Employment

As indicated earlier, one of the key components of unemployment is the group of people who are deemed 'discouraged workers'. Statistics SA [2] defines this group of people as those people who have been out of employment for over three years and have given up on the process of searching for employment. What the statistics do not put in context is the very nature of 'discouragement'. Many studies such as [176] point towards the psychological effects of unemployment. This mental deterioration is a result of disappointments, lack of fulfilment, and eventually the sense of rejection that comes from loss of self-worth and perceived marginalisation by the community. The anxiety that comes with attempting to finding a job, and being unable to provide for families or self, is even more severe in lower-income communities such as Khayelitsha. During the time we spent in Khayelitsha we interacted with a number of discouraged workers who had become numb about searching for employment. One clear example was the spouse of one of the

ladies from the original study. The man, in his late 20s, had been searching for employment for over 18 months, after which he had given up. At the time of the interview he was due for a hearing in court, due to involvement in a robbery. Listening to his wife explain his predicament, we could easily sympathise with his choices, while not condoning them. The husband felt useless to the family that he needed to provide for, and had now resorted to crime as a means of providing those basic necessities .

3. Social and Economic Cost

This illustration brings us to probably one of the critical costs of unemployment. In the introduction section of this work, we mentioned that South Africa currently faces the challenge of a bulging youth population that has increasingly become violent. The violence leads to loss of life as well as economic destruction. In addition, the loss in person-hours of the productive and active population has negative impacts on the economy. During our time in Khayelitsha, we got to experience two waves of ‘service protest’, each spanning a number of weeks. Each of the waves was due to lack of a given service, and led to loss of lives and property.

4.6. In search of a solution

This study clearly shows it is very taxing for someone to find a job, in terms of time, money and even emotion.

As stated, unemployment – more particularly, youth unemployment – is a significant problem. From both the literature and my own lived-in experience, it is clear that the problem needs calculated, targeted effort to address it adequately. This necessitates a combination of initiatives requiring direct state involvement, private sector partnerships, and the mobilisation of civil society to take a proactive interest in addressing the problems presented by unemployment [177].

4.6.1. GOVERNMENT INTERVENTIONS

When freedom was attained in 1994, South Africa inherited a problem of structural unemployment, which goes back to the 1970s ... Unemployment continued to deteriorate in the 1990s and the early 2000s ... let us all join hands as we deal decisively with the triple

challenges of unemployment, poverty and inequality. Nobody will do this for us; it is in our hands." – President Jacob Zuma, 2012, State of the Nation Address

South Africa, while regarded as an 'upper middle-class' economy globally, and a super-economy in Africa, is still a very young democracy, facing a lot of social and welfare issues [166], [178]. This is something the ruling African National Congress (ANC) is well aware of, and seemingly actively working on. As stated in their 2004 Election Manifesto, dubbed 'a people's contract to create work and fight poverty' [179], which was later converted into South Africa's National Action Plan, dubbed 'Vision 2014', some of their most important targets and objectives included:

- Reduce unemployment by half through new jobs, skills development, assistance to small businesses, opportunities for self-employment and sustainable-community livelihoods.
- Reduce poverty by half through economic development, comprehensive social security, land reform and improved household and community assets.

This is echoed in the ANC's 2009 election manifesto, which was translated into the government's Medium-Term Strategic Framework (MTSF) for 2009-2014. The summary, in part, reads:

"Our Manifesto reflects on the major challenges facing our society – high unemployment, poverty, deepening inequality and rural marginalisation. As a response to these challenges our Manifesto identifies the following five priority areas for the ANC government in the next five years:

- Creation of decent work and sustainable livelihoods;
- Education;
- Health;
- Crime;
- Rural development, including land reform, and food production and security.

... In this regard, the creation and retention of decent work and sustainable livelihoods will be the primary focus of all economic policies of the ANC government."

From both manifestos and action plans, unemployment is perhaps the most prominent welfare challenge facing post-apartheid South Africa. South Africa's commitment to reducing the country's unemployment saw the government declare 2011 the Year of Job Creation. It put initiatives in place including the allocation of a ZAR9-billion Jobs Fund to encourage new initiatives both inside and outside of government. 2011 was also a year for giving effect to the ethos of 'Working Together', with a number of initiatives now committing government and various sectors to taking the country forward [180]. These include:

- Deepening social dialogue and partnership within the ambit of the National Economic Development and Labour Council (NEDLAC).
- A historic Skills Accord, committing business and the state to enrolling at least 30 000 artisan trainees in training programmes over the next 12 months.
- A Green Economy Accord between government and economic sectors, paving the way for new economic activity, and jobs linked to make South Africa more responsive to the effects of climate change.
- A Basic Education Accord in terms of which government, business and labour will work together to improve learning and teaching in the country.
- A Local Procurement Accord committing social partners to working together to increase local procurement.

The Employment Services Bill

The most crucial of these initiatives is the proposed legislation dubbed the 'Employment Services Bill' of 2010 [181]. The draft bill provides for the establishment of public employment services (PES), whose role and core functions will be governance, via an Employment Services Board, of:

- Decent work schemes to promote youth employment;
- Promotion of employment of people with disabilities;
- Employment promotion schemes responding to economic recession, company closures and pending retrenchments or lay-offs; and
- Regulation of employment of foreign workers.

The Community Work Programme

The Community Work Programme (CWP) [182] is an employment safety net, providing participants with a minimum number of days of regular work (typically two days a week or eight days a month). This provides a basic level of income security through work. It recognises that unemployment in South Africa is deeply structural, and that important as they are, policies to create decent work will take time to reach the most marginalised areas of the country. The programme is implemented at local level and designed around a site, which is between two and 10 wards of a local municipality or the metropolitan equivalent. The target is to create 'useful' work for 1 000 people per site on a part-time basis.

4.6.2. PRIVATE INTERVENTIONS

Initiatives among development practitioners in civil society (represented by NGOs and community-based organisations) are in line with what the government is doing. Other than lobbying for government to provide a longer-lasting solution to unemployment through such initiatives as the Employment Services Bill, NGOs are also assisting communities to access some of the initiatives the government has put in place (including the CWP); or creating similar opportunities, with government back-up. Furthermore, NGOs are helping communities access meaningful employment through offering employment placement services, as well as skills-development opportunities, where job-seekers are able to learn skills to complement their limited education.

4.7. Conclusion

Given the information presented in this chapter, unemployment in South Africa is a serious problem. In total, the challenge appears insurmountable, in the context of a short-lived PhD dissertation. However, we believe that in addressing unemployment – specifically youth unemployment – there is an urgent need for both short- and long-term initiatives that address the mounting demands of labour, improve education and skills, and apply labour-market interventions that improve the employability of young people. The first of these could be cutting the costs of job-seeking by increasing the visibility of potential

employment opportunities, and encouraging the youthful who have become discouraged to engage actively in seeking employment.

University of Cape Town

PHASE II: PLAN

“The bottom line is that computer technologies are not neutral – they are laden with human, cultural and social values.”

Being Human

5. STUDY: Yearnings, Desires and Decisions

“It seems to me we can never give up longing and wishing while we are thoroughly alive. There are certain things we feel to be beautiful and good, and we must hunger after them.”

— George Eliot

Umnqweno: *“I asked them to give me their desires and yearnings.” I asked Babalwe to explain. She hesitated. It was clear from her facial expression and body language that conveying the concept in English was going to be difficult. But she continued: “You see, this word Umnqweno captures people’s desires, it is similar to asking someone to express their yearnings, or expected future. Here [in Xhosa culture] we do not think in terms of what we do not have; it is about what we can possibly have.” She continued: “I told them to imagine that they had all the power in the world, and to discuss what ability would add value to Ummeli.” This was a ‘light bulb’ moment for me. – Personal Reflection, author.*

ABSTRACT

This chapter represents the study phase of UCD. After eight months of being in Khayelitsha, and analysing the data collected, there were four themes that arose that could inform the design of a possible interactive system. The four, which we have termed ‘design decisions’, are: Design for ‘mobile-only’ internet users; Design for mediation; Design for multiple interactions; and Design for unemployment. Here we present each of these themes as design decisions that later informed the structure, flow and interactiveness of Ummeli.

5.1. Introduction

After the eight women had been trained on how to use the internet, their most pressing need was being able to find and apply for jobs online. To ground this reflection, we conducted a further study on unemployment in the context of South Africa's labour market, as well as through immersed qualitative research. The one consistent theme throughout the research was the immense challenge that unemployment presented to the Khayelitsha community. The next obvious step was to focus on building an 'application' that would facilitate the job search and application process beyond what was then possible on a simple WAP browser and numeric/T9 keypad; this would become Ummeli.

The experiences captured so far have been both positive and negative, illustrative of (a) the design challenges facing the mobile internet as a medium for resource-constrained users; and (b) the complexity of the unemployment situation in South Africa. The question, though, was what would this design look like? To answer this, we must go back, reflect and present some of the observations, challenges and opportunities that we came across in both the Mobile Internet Study and the Labour Survey.

EAR notes the importance of, and encourages reflection on, synthesising of observation and information, both as an individual researcher as well as with the community. Regular reflection leads to the refinement of questions, and guides both the researcher and the community on the next step to take after adjusting to newly-understood realities.

In HCI (and UCD, by extension) it is standard practice to synthesise data collected from user engagement to come up with a list of attributes that a design must fulfil. It is a way of capturing user needs in a list of system requirements. But Dourish [183] is opposed to the use of field methods, specifically ethnographic research, in just the elicitation of requirements for systems development. He notes – and we agree – that this view alone may fail to capture the value that field methods bring to HCI.

In this instance we therefore distilled the data from the EAR into design principles or guidelines, which give a rationale to the design process. In this chapter, we discuss the four principles that were themes throughout the first three chapters.

The four design principles for Ummeli are:

1. Design for 'mobile-only' internet users
2. Design for mediation
3. Design for multiple interactions

4. Design for unemployment

5.2. Designing for ‘mobile-only’ internet users

The barriers faced by the women in our first intervention on ‘training on the mobile internet’ were between use and non-use, and illustrate how little ‘transformational’ power any ICT has independent of context; and yet, paradoxically, point to issues in which improvements to experience design would be most helpful. In other words, while not just granting but indeed arguing that the acquisition of mobile/digital literacy is a complex process – happening not in training sessions, but rather in communities, by people with competing demands and facing myriad challenges. We can nevertheless identify a few areas for improvement which will be critical in the success of our design. These include more standardised user experiences; more attention to ‘mobile-only’ use cases; acknowledgement of frequent handset turnover (churn) as a design problem; and reframing affordability and access as conditions which ebb and flow, rather than divides to be overcome.

5.2.1. HANDSET/MOBILE ISSUES

1. GPRS Settings

The first challenge a would-be mobile-internet user comes across is the need to match handset GPRS settings to the requirements of the mobile service provider. This can be accomplished using multi-step menu-based USSD (Unstructured Supplementary Service Data) commands. However, the menus provided by South Africa’s three main operators were unclear, and required prior knowledge of the correct steps in order to activate the devices’ internet facility. Users were required to know the handset specifications (manufacturer, model number); in several instances, the operator returned an error message saying that the handset was not supported. A second method is to call or visit a customer service centre, which can send GPRS settings to the phone via SMS. This was less error-prone, but also required prior knowledge of the phone’s specifications.

2. Security Settings

The cellular operators in our study made it impossible to navigate beyond their 'home' page without agreeing to their terms and conditions. This is a tedious exercise that distracts the user from their initial navigation goal. Although put there ostensibly for the benefit of users, it is a distraction to using the mobile internet, especially for users who are unfamiliar with concepts such as an End User Lease Agreement (EULA). Furthermore, one operator has added their own branded banners as a header and footer to all websites accessed through their network's premium services. Some participants did not realise that they needed to scroll further down the screen below the banners to find the site they were looking for – this is a common issue, even among experienced users [9]. Some users learned how to bypass the banners by launching a third-party browser; the rest viewed pages on a subsection of an already-small screen.

3. WAP / Menu Confusion

There is a great deal of inconsistency in how handsets present the mobile internet, even between handsets from the same manufacturer. The most common brand used was Samsung. On one participant's handset, the browser was located in a folder named 'Fun', which also contained games and other applications. On another, one could access the browser from the initial menu by selecting a world globe labelled 'WWW'. On others, there was a menu item called 'Internet'. Even the use of the globe icon was confusing – on some phones it represented network applications, on others it invoked the browser directly. On some Samsung handsets, the hot key for internet access was placed at the centre of the navigation pad, yet was unlabelled.

On Nokia phones, the browser could be found either in the 'Services' menu (Nokia 6600) or in its own 'WAP' menu (Nokia 6610). The menu icon associated with the browser was a globe, yet the hot key to start it had the symbol ⓘ, placed on the '0' key. This ⓘ symbol, representing 'internet' or 'information', perhaps, was little understood by participants. Regardless of the icon used, to select the hot key to open the operator's home page and then to navigate away from this page was a complex task.

5.2.2. SYSTEMIC ISSUES

Though problems with the handset and settings were resolved, other challenges emerged, most to do with the communications ecosystem.

1. Unfamiliarity with Passwords

All participants were familiar with PINs, having used them to activate their SIM cards, or at ATMs. But when prompted for a 'password', they found the new term confusing; many entered their PINs in response. Password and PIN requirements vary in terms of character string length and character type.

2. No Mobile Version of Web Site

Practitioners stress the importance of locally-relevant and/or local language content online; and these issues improve regularly as more organisations come online. But the arrival of the mobile internet seems to be lagging; all the mobile websites our participants found were in English only.

In addition, many websites do not have a WML version of their content. For this reason, Opera Mini became popular as the study progressed, doing a reasonable job of scaling full-size websites onto a handset, allowing participants to zoom in and out of the various pages and access the links. This provided a workable solution for mobile access to sites that were not available in WML.

3. Web-mail: Chicken or Egg?

As part of the training process, we wanted the participants to sign up for an email address. It is the cornerstone of an online presence; and without it, other services such as Twitter can be nearly impossible to access. An exception is Facebook, which allows users to register a profile with their mobile phone number. This option helped make it the participants' social media site of choice.

We found that most web-based email operators do not support mobile-only origination of email addresses. For example, when trying to sign up for a Gmail account, the user is instructed: "Want a Gmail account? Go to www.gmail.com on your computer." To circumvent this obstacle, we encouraged participants to use Opera Mini to access the full version of the website. Even this presented challenges; one participant's application was blocked when she could not use the image-based authentication employed by the registration system. The following message was displayed: "If your mobile does not correctly display the image below, please log in successfully on the desktop to enable your

mobile login again. Enter the correct password above and then type the characters you see in the picture below.” The handset did not display the image correctly – and the participant did not have access to a desktop device.

5.2.3. RESULTS OF THE TASK AT HAND: JOB SEARCH WITH MOBILE INTERNET

In Chapter 3, we introduced you to a group of women who went through mobile internet training. As we observed, one of the first tasks to arise when it came to applying their newfound skills was to find a job.

Only one, Beatrice, was unwilling to follow up on job leads shared via the mobile internet. The rest all tried (in one way or another) to use their mobile internet search skills to locate jobs. But after six months, none could attribute a new job to those skills – for a variety of reasons:

1. Access is sporadic.

A simple forgotten password threw Phyllis off the trail. Who would help her reset a password if the mobile was her only means of internet access? Similarly, Anne and Linda’s access was curtailed by handset theft [184]. The thieves did not target participants’ phones because they were internet-enabled; it is simply and unfortunately the case that handset theft is common in South Africa. Later Linda left one of her replacement handsets at a shop for repair; where it sat, out of reach, until she could save the ZAR200 she needed to retrieve it. These results are a reminder that people can drop in and out of technology use, and that it is an oversimplification to consider adoption to be a one-way process.

2. Affordability.

This is an ongoing concern. Nancy’s comments about the times she does not have airtime underscore that the necessary investments in time and funds are not inconsequential. Just because a handset is data-enabled does not mean individuals will spend airtime (or time) on the device, even to perform tasks that might lead to more income later. Similarly, Phyllis was willing to use her phone as collateral on a loan, to transport her children. And many participants said that they could not spend as much time as they wanted to on the internet because they had to take care of their households in addition to their work, and they could only spare time late in the evening.

3. Limited functionality

Ammy was able to contact potential employers via email, but could not get over the next hurdle – when they asked for an electronic CV, she could not create or send one via her mobile. She had similar difficulties uploading pictures to her Facebook profile – technically possible, but not as easy as using a PC. Internet-enabled handsets and services are designed to be used by technically literate users; mobile phones have been optimised to work as complements to PCs, not as standalone access devices.

4. Success is not guaranteed...

...even if everything goes right technically. Linda put her new skills to use and secured an interview for a job in the formal sector. At the decisive moment, she was unable to provide the proper identification document, and lost the job to another applicant. That this ultimately unresolvable barrier has nothing to do with our training or with the mobile internet is actually a helpful reminder of how ICTD interventions (such as our training) play out in the larger context of social structures, norms and requirements that can influence economic mobility.

That leaves Tracy, who was actively searching for jobs for herself and her siblings, and had successfully enrolled in a nursing course via email. Nothing specifically identifiable had tripped her up, but she had not been successful either. In a market with over 25% unemployment, it may be a while before she succeeds. Like radio, TV, PCs, and shared-PC internet before them, the mobile internet is not going to be a silver bullet, or immediately transform the macroeconomic conditions in which people like Tracy must find their way.

That said, the most lucrative jobs in South Africa are advertised online. While a few job sites are WAP-enabled, these are the exception rather than the rule. Better designs and more inclusive functionality for mobile-only Internet users could help transform online listings (which currently may actually reinforce stratification) into a channel for greater employment mobility.

In conclusion, while the ‘project’ of mobile Internet training did not yield successful acquisition of jobs, it was an enriching, empowering experience that gave rise to what Ummeli became.

5.3. Design for Mediation

One thing that stood out in both the mobile internet study and the labour survey was the constant reliance on others to perform given tasks, ranging from accessing the internet to applying for jobs. There are many instances through which mediation in the use of technology happens, in both the developing and developed economies. This can be explained by the 'diffusion of innovation' theory put forward by Everett Rogers [154], which notes that the adoption and use of technology happens at different rates in a community; early adopters facilitate the rate at which the technology is assimilated into the community. He notes that rate of diffusion is dictated by the innovation itself; the means by which it is communicated; and the time and social system in which it occurs. Mediation helps cut down diffusion time (by relaying the advantages of a technology through observable results) and complexity and incompatibility (through training and demonstration).

However, diffusion in the context of developing communities is affected by various challenges, including not only the cost to obtain physical access to technologies, but also factors such as literacy levels, gender, and age, which lead to techno-exclusion. The mediator not only has to transmit the characteristics of the technology, but must also bridge the other forms of exclusion in order for diffusion to take place. We will now explore some of the efforts that facilitate adoption and use of technology in the developing world, and the role mediation plays – albeit in an informal manner – in facilitating diffusion. We will argue that the mediation process takes several forms; for clarity, this section is organised into three main forms: *Institutional Mediation*, *Technological Mediation* and *Inter-Personal Mediation*.

5.3.1. INSTITUTIONAL MEDIATION

In the earliest attempts to bridge the 'digital divide', many governments in developing countries established telecentres. They were hailed as the solution to accessing various ICTs, including photocopying, facsimile transmission, telephony and the internet, and were established to allow communal access to these facilities, in acknowledgement that individuals (and even households, in the developing world) were not able afford them [34],

[185]. A comprehensive study of telecentres by the International Development Research Centre (IDRC) in 2000-2001 showed that the majority of them had failed. The failures were due to myriad factors in the community of perceived beneficiaries, including lack of necessary skills, age, literacy levels, and socio-economic status [185], [186].

In their place emerged a flourishing internet café economy. The cafés, even if located close to telecentres, drew more clientele in spite of their relatively high charges. An analysis of cyber-café and telecentres [187] notes that in addition to offering physical access to computing facilities, cyber-café were staffed with individuals who operated the computing equipment on behalf of the clients, at no extra cost; they offered services such as typing, faxing and printing at an additional cost; and even extended their services to offer training to interested clientele. The next generation of telecentres initiated staff capacity-building, to be able to assist the community in performing their tasks using the given infrastructure [188].

To complement government initiatives, Non-Governmental Organisations (NGOs) developed a hybrid system, a cross between the cyber-café and the telecentre: the community digital shop. Here they offer ICT access, service facilitation and training alongside their core work, with the aim of achieving their activism goals in empowering marginalised groups through ICTs [189]. The staff or volunteers carry out certain tasks on behalf of beneficiaries who lack skills, and give assistance to those who have some skills.

Based on the above examples we could conclude that institutional mediation is driven by a social grouping, commercial entity or governmental body with formal structures. In this case mediation is mostly facilitative; the institution provides information regarding a given area of interest to the user. Institutions can also be partisan or impartial. NGOs and governments facilitate use as part of an institutional goal, while the commercial entities facilitate use because they want to maintain their clientele. This means that when considering institutional mediation in designing the information ecology, the research goal should be aligned either to the institutional goals (when working with NGOs and Government) or to commercial benefit (when working with commercial entities).

5.3.2. INTER-PERSONAL MEDIATION

While the above discussion deals mainly with mediation as facilitated by institutions, in reality, mediation in the use of ICTs is a direct one-on-one interaction between a mediator (who is an enabler of ICT use) and the beneficiary of the mediation process. Sambasivan et al. [190] note that a mediator creates a bridge between technology and community members who lack necessary skills. They categorise the mediation process into three interrelated forms of interaction: *Proximate enabling*, which refers to mediation in which the mediator relays the user's intent to the device by the act of inputting (this could be illustrated in acts like keying in mobile phone numbers, or transferring media via a Bluetooth connection [191]). *Proximate translation* is applied when the output of an interaction is one that the user is unable to understand, due to language or literacy barriers; the mediator takes the role of translator. In the developing world, translation is not about changing text to voice, or from one language to another; it also means presenting the information in a manner that is understandable and applicable in the local context [192], [193]. *Surrogate usage* refers to those instances in which the mediation process includes both proximate enabling and translator mediation. Here the users never comes into contact with the actual technology, but trusts the mediator to perform all the tasks for them [194].

The mediation process is often used in ICT4D. For instance, the work of Medhi et al. [195] on illiterate job seekers in India – Babajob – illustrates the importance of mediation for the success of a job-search system in a developing country. In a study to develop Babajob⁹, a computerised job-search assistance program, they deployed a paper version, with the vision that they could eventually computerise the whole process. The results indicated a need for a human intermediary as a proximal enabler, to mediate between the system and an actual job-seeker.

Various other studies on mobile phone usage also indicate the vital role that mediators play in the diffusion of technology. In a previous work [148], we unearthed 'Fundu', a member of the community who was the first person to learn how to set up GPRS-enabled mobile phones and navigate the internet. In this case, he performed enabling mediation to complete the complex task of acquiring and setting up phones to the mobile service

⁹ www.Babajob.com

providers' specifications, and this knowledge made him such a community champion that all mobile internet-related queries were referred to him. He was instrumental in accessing news and other information from the internet and disseminating it to the community. Fundi also used his position as an 'expert' to train some members of the community on how to use their phones, by demonstrating the various tasks. In this study, due to his skills, he could comment on what he envisioned the mobile internet should look like, as dictated by the needs of his 'clientele'.

In the same study, children and younger members of the community assisted the older, mostly unskilled members to access various services on the internet. Using family members, friends or colleagues to help in performing computerised tasks is not a new phenomenon, as it has been observed elsewhere in the developed world [196] as well as in developing communities [197]. In a subsequent study [198], on the use of mobile internet among semi-literate women in an urban collective, it was noted that mediation occurred as a group dynamic; the various users interacting with the mobile internet used their combined skills to perform a given task – including translating for the researcher. This last aspect introduces another category of mediation, one that requires inputs from various persons in a community (including the person accessing the technology) to accomplish either enabling or translator mediation. Here, surrogate mediation rarely takes place, as none of the members of the community has the skills for the task; they depend on inputs from others. This is termed *peered mediation*.

In direct mediation, mediation is a subset of community dynamics; unlike in institutional mediation, where members of the community participate actively in the mediation process. Direct mediation allows collaborative experience-sharing, as the beneficiary in the process is usually looking over the shoulder of the mediator. This is an intermediary form of mediation, as the mediator is fully immersed in the usage process.

In conclusion, mediation plays a critical role in the adoption and use of technologies in developing countries. James [193] notes that merely making access to ICTs communal or individual is insufficient, because the targeted beneficiaries do not make use of the computers or the internet connectivity themselves, but leave this task to a third party, who is a member of their community or of an institution. These third parties are responsible for taking requests from the users, interpreting them into computer actions, extracting the

resulting information from the internet or other 'un-usable' technology, and organising and presenting it in a way that is understandable and specific in context. The mediators can be fully immersed in the mediation process as surrogate users, or partially involved in instances where the user is able to perform tasks. They facilitate adoption by relaying the advantages of technologies through training or by demonstration. Their role is to enable the user to benefit from the services offered by the technology, with minimal effort in terms of skills, literacy and resources.

5.3.3. TECHNOLOGY AND INTERFACED MEDIATION

Mobile apps offer a level of mediation we refer to as interfaced mediation. The user interface (UI), as described by Thimbleby [57], is those parts of a computing system that allow the person using the system access to the various services it offers. In essence, the UI mediates between the human user and the complex computing algorithms and scripts. The UI has made computing a function of the masses, while reducing the amount of knowledge needed to operate computers; hence, the UI provides technology mediation. Similarly, the world-wide web (WWW, or 'the web') was designed as a UI to the internet, to provide a means through which people could create, post, store and disseminate information, without necessarily having to come into contact with complex networking protocols.

In the recent past, as technological devices have reduced in size and increased in processing capability, applications (apps) rather than the web are increasingly being adopted to access internet resources. In a recent article in *Wired* magazine [199], the authors declared "*The web is dead, long live the internet*"; they present a case for supporting the use of apps instead of websites for accessing the internet. They argue that as information sources have increased, the need for a direct form of finding correct and relevant information has pushed users to want to 'get' information rather than to 'search' for it. The use of apps has been driven by the fast adoption of mobile computing, and most are designed for a single purpose – to listen to music, watch the news, talk to friends and for social networking. Apps forgo the browsing process for an optimised experience. As the need for an organised means to access the range of apps in an easy manner became apparent, super-apps have come into play. The super-app, also known as a mash-up, puts

together various other apps in a single folder that can be accessed from a single location, either on a phone or on a computer.

While the adoption of apps in the developed world is for convenience, the same cannot be said for the developing world. Apps do provide convenience; but these dedicated, semi-closed platforms also provide a walled-garden experience for people who have no way of understanding the issues that go into navigating the web, or the skills required. As noted from cycle one [148, 198], many of the respondents who had used the internet did not do so through a website, but through applications embedded in their mobile phones. While many of them could comfortably use these apps, they were not aware that they were actually using the internet. A market research study performed by the World Wide Worx notes that the use of mobile applications in South Africa is more popular than the use of the mobile web, especially among non-computer users. An example worth mentioning is the use of MXit, a mobile phone-based instant messaging application. As of June, 2010, MXit had over 20 million users [200], with varying literacy levels. MXit users do not consider themselves internet users [50], [53], [148].

In our previous studies, we had noted that the preference among low-literacy users for apps over the web can be explained by the fact that they provide a means through which to overcome the hurdles associated with using the internet on mobile phones [156], especially if the user has no other means of accessing the internet (mobile only) and has minimal or no skills for accessing it on their mobile phones [148, 198]. They are dedicated to performing specific tasks without the complexity of using and understanding web-based terminology such as 'URL', 'log-in/out', 'Sign-in/out', etc [156]. Since they are dedicated to delivering given services, they can be tailored and packaged in a way that fits skills and literacy levels, including non-textual modes [201]. In mash-ups they can be used as a one-stop shop, to deliver needed information for this resource-constrained community of users without taxing the user to learn new skills.

5.4. Design for Multiple Interactions

Distilling the usage of technology in terms of mobile phone usage, we could categorise it in terms of how users interacted with the technology to experience its benefits.

5.4.1. INTERMEDIATED INTERACTION

As noted in the previous section, due to illiteracy being rampant in Khayelitsha, we had observed (mostly semi-literate) people getting around this challenge by utilising the skills of more capable members of the community. The community utilised cyber-café's similarly, in that without having to interact directly with the computers, they still benefited by having their documents typed, printed, scanned, photocopied and faxed.

Intermediated use of the mobile phone is therefore based on the concept of 'shared skills'. Someone who owns a mobile phone or wants to use one, but is unable to, gets assistance from either a member of the community or a nearby organisation that has the needed skills (see Figure 33).

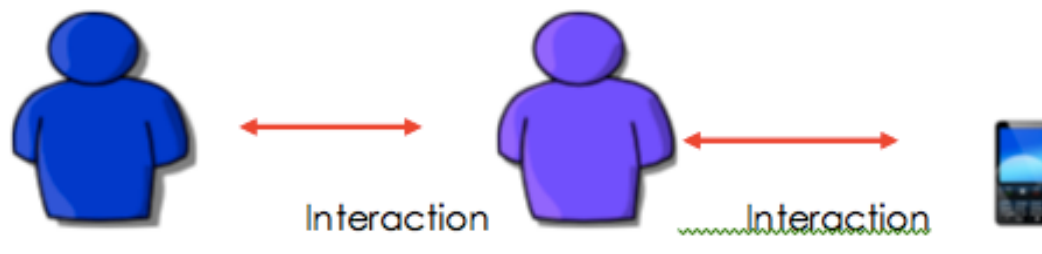


Figure 31: Mediated Interaction

These practices produce a unique ecology of user characteristics, mobile phones and skills. There are obviously more users in need of mobile handsets. Additionally, there are users:

- with only limited or occasional access to handsets;
- who are forced to share handsets;
- who use more than one type of handset; and
- who have limited skills and need help to access services on any handset.

5.4.2. NOMADIC INTERACTION

This describes users who make use of any mobile phone they happen upon to access services; they have no mobile phone handsets of their own. In most cases these users have their own SIM cards, which they will insert into borrowed handsets to make or receive calls, send an SMS or even do money transactions. The other version of this usage is where

users have no mobile phone handset or SIM card themselves but will use any phone that is available, as the need arises. These users are increasingly being eliminated as the cost of SIM cards decreases, as well as the cost of SIM card 'maintainers' – minimum amounts of airtime that can be purchased.

5.4.3. COMMUNAL INTERACTION

Ownership is considered a communal responsibility in many African communities, where the primary responsibility falls on the senior members (usually male, though sometimes female, in a household or community). This means items acquired for households are usually shared between all household members. Sharing means that use is determined by the presence of the item being shared.

In terms of technology, communal use and ownership is not a new thing. There are examples of villages and community centres across Africa where people share TV viewership, and even fixed-line telephones. This practice is what supported village and community phones at the outset of mobile telephony [202].

But with mobile handsets becoming cheaper, households can now afford to have one that is shared by all family members – usually one mobile phone with one SIM card, belonging to the parent, or the man in the family, but shared by all family members. The main user has the handset for the majority of the time, while the other users only use it when it is available.

This practice is also being affected by the availability of cheap SIM cards, which means each member of the family can own their own SIM card, but share a mobile handset, which they use when it is available.

During the design of Ummeli, we took into account the fact there were various forms of intermediation critical to its success. The major factor was the communal structure of the community, high device turnover, and low literacy levels (including technology literacy). The three most important aspects were that Ummeli was to be a mobile application, that could be used to access the employment information content from various phones, depending on their availability, as well the user getting assistance in editing or accessing content.

5.5. Design for Unemployment

5.5.1. GOVERNMENT MODEL

As noted in Section 4.7.1, the Government (through the Ministry of Labour) has established the Public Employment Service (PES). Through various means, the PES mandate includes:

- Registration of job-seekers;
- Registration of vacancies and opportunities;
- Provision of career guidance and information;
- Registration of Private Employment Agencies;
- Matching work-seekers with available opportunities;
- Placing work-seekers with employers.

One of the ways the PES has been doing this is through Job Fairs, organised around the country.

Job Fairs

Job Fairs are part of the Bill's mandate as an 'employment promotion scheme'. The initiative is to provide a platform for job-seekers to register and also meet with prospective employers. Through this initiative the government wants to register 600 000 job-seekers by 2013 [180]. Job Fairs are a free service operated through a set of buses that roam the country to register job seekers, part of a campaign to initiate and maintain an up-to-date national database of job-seekers. It also aims to empower the unemployed, offering soft skills, information, and a face-to-face search for placement opportunities, whether further learning, self-employment, co-operatives, community works or public works programmes, or formal employment. The Job Fairs initiative is not just for registering job-seekers, but will also help in planning and establishing where job-seekers are located [180], [203].

5.5.2. LEARN TO EARN MODEL

Learn to Earn designed a form through which candidates and students were asked questions (see Figure 32). The form was administered directly to the candidates by L2E staff, or the candidates were given the forms, to answer the questions themselves or with the

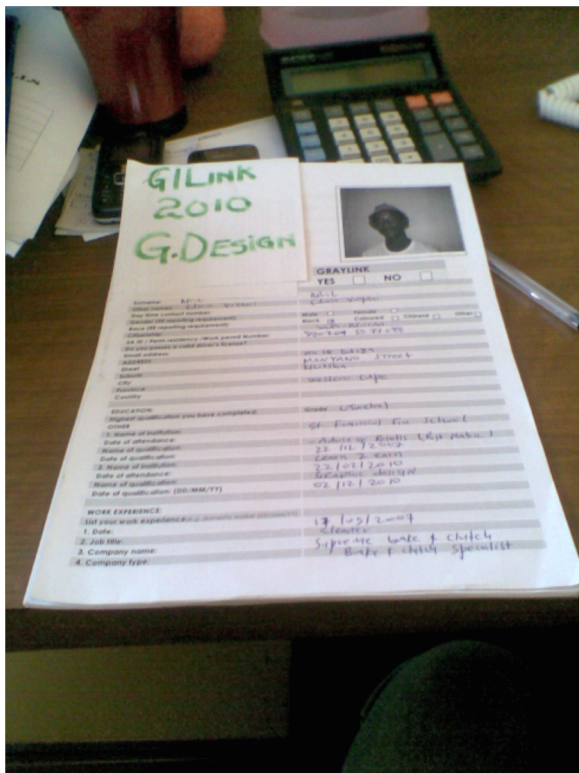


Figure 32: L2E profile capture, and people being helped fill in their profiles

When the forms were returned, a dedicated placement officer would capture the data into the system. This person was tasked with the role of quality control, which included the processes of editing the content of the forms while validating it, by going back to the candidates and asking more questions in their native language to clarify some of the information provided. The overall process is summarised in Figures 33 and 34.

A. Finding Jobs

In addition to capturing and ensuring the quality of profiles, the placement officers were also tasked with finding relevant jobs for the pool of candidates already in the system. This meant going through newspaper advertisements, classified advertisements and online job portals. Furthermore, because of its credibility and well-established reputation for empowering unemployed people, Learn to Earn had links with commercial entities that would hire some of L2E's candidates occasionally. The placement officers needed to contact and prepare the relevant candidates for the various jobs that were available.

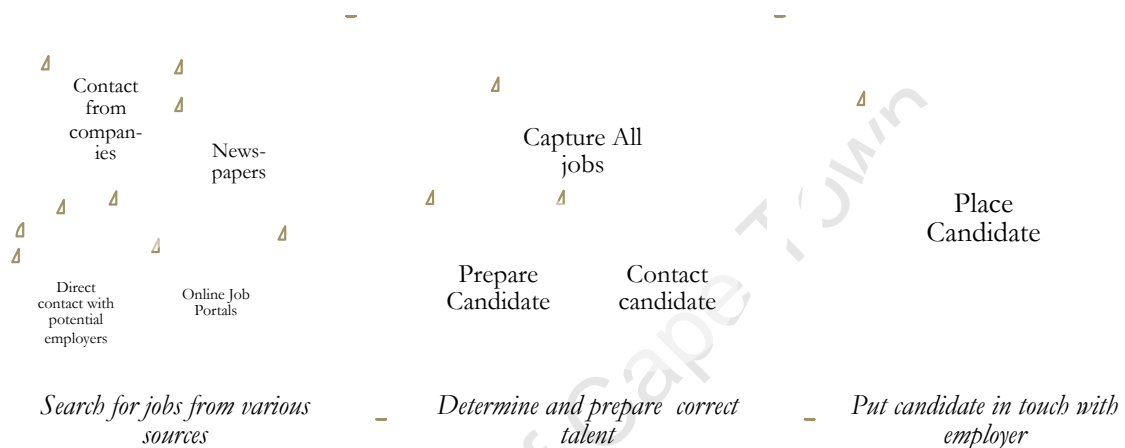


Figure 33: L2E Job Search Process

This practice and model introduced by L2E is one we could term 'mediation'; in this instance, L2E mediates between the community of semi-literate users and potential employees by interacting with the technology and representing them to the employers.



Figure 34: L2E Model

5.6. Discussion

The studies were exploratory, and limited in scope; and exposed to considerable complication concerning self-selection and uniqueness, due to the participants, researchers, and methods. By framing the work as EAR, we were able to gain insights that informed the design of a more appropriate ICT solution. For example, by being closely acquainted with the various iterations of a participant's struggle to find work on the internet, we were able to unravel the impediments that prevented them from achieving that goal. These studies provided early indications of areas and patterns that would demand attention in the design process.

From these studies, the first three design decisions for Ummeli became apparent. These are:

1. Design a technology that will overcome the challenges that users have when using the mobile internet in its native form; that is, through WAP. Create a mobile internet experience that takes their reality into account.

2. Mediation is a key element in both searching for a job and accessing the internet; create a system with an in-built mediation mechanism at both the usage/interaction and technology levels.
3. Since this will be an interactive system, it must accommodate the various forms of interaction used by the community (Communal, Nomadic and Mediated).

This last principle points to a working model for a manual system that captures most of the other design principles; not necessarily the use of the mobile internet. The next chapter describes how we captured and translated these models for use on mobile phones.

University of Cape Town

PHASE II: ACT

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6. DESIGN : Features and Flow

Go to the People. Live among them, Love them, Learn from them. Start from where they are, Work with them, Build on what they have. But with the best leaders, when the task is accomplished, the work completed, the people all remark: We have done it ourselves.

– Lao Tzu

University of Cape Town

ABSTRACT

This chapter picks up from Chapter 5; here, we discuss how Ummeli was built, from a basic paper prototype to a fully-functional first version that I named MobileCV. Building on the design principles, this part of the design process required the construction of an actual interactive system. As with the research portion of this work, even now we relied heavily on the expertise of L2E to be able to design the system. Here, a participatory approach to design was adopted; we opted to follow the Human Access Point (HAP) technique, as put forward by Marsden et al. [127], which makes use of a person in the community who is more knowledgeable about the potential of technology as a proxy for the community in the design process. MobileCV's design and flow was highly influenced by the models used by L2E and the Government discussed earlier, as well as by insights from L2E staff who became HAPs for the duration of the design process. Personal Reflection – author

6.1. Introduction

The use of NGOs to gain entrance to communities with the intention of collecting needs and designing for the community has been documented extensively in both HCI and development literature[204–206]. However, in this process, L2E was perceived not as a means by which to enter the community, but as the community representative or proxy in the design process, similar to a HAP [127]. In particular, we worked with the staff directly involved in the process of recruitment and job placement, and very closely with Babs, the programme manager in charge of placements, and our ally at the centre. We also worked with Susan, who became the expert evaluator. She was the voice of the employer, while Babs was the voice of the user. This approach was appropriate (and highly profitable) to the design of Ummeli, as I shall explain.

To capture the key features and information flow, we utilised a combination of PD techniques, including Storyboarding and Prototyping, and others that will be discussed as the need arises. After collating an initial feature set and determining the order in which information was required, we hired Milton Madanda, a software developer, to help handle

the implementation of the system, which left us free to concentrate on the research part of the product.

The first version of Ummeli was what we could term a minimum viable product (MVP). Ries [207] describes an MVP as the version of a new product which allows design teams to collect large amounts of validated learnings with the least amount of effort. The product (or in this case the intervention) should resonate with the users, as it is designed to solve their core problems.

6.2. The Design Process

First we needed to understand how L2E performed their tasks: beyond the observations reported in Chapter 5, we engaged L2E staff in several brainstorming sessions to decide on the design requirements, i.e. the features the system absolutely had to have to work successfully. After studying the L2E Job Placement model, as described previously, we settled on three fundamental building blocks:

- Register unemployed people;
- Aggregate employment opportunities;
- Allow users to access and apply for these opportunities.

We also noted that:

- The solution had to be mobile;
- The solution needed to be affordable, and flexible to local realities;
- Interaction with the internet had to be simple and straightforward;
- The solution needed to cater for a human intermediary.

Attaining An MVP

To meet these initial requirements for an MVP we needed to answer these questions, derived from our observations and literature reviews:

- How do we design a way for job-seekers to register for employment opportunities via their mobile phones?
- How do we make the process of finding employment affordable, easy, and explicitly for mobile-only internet users?

- How do we allow for a human intermediary in the system?

We had already established that we would be designing a mobile phone-based application and a web-based interface for the placement officer. The next phase was to decide on what would go into each platform, and how the platforms would interact. Therefore, we summarised the brainstorming session with L2E and the user studies carried out earlier into the following list:

Critical requirements:

- An unambiguous and uniform platform for capturing profiles on all internet-enabled mobile handsets;
- A dynamic platform, portable across handsets and mobile service providers;
- Enable creation of unique profiles, on mobile phones, that could be accessed and edited online by another person;
- Enable users to browse and view employment opportunities on their mobile phones;
- Enable users to submit their mobile phone-generated CVs to potential employers through email or fax services.

Justification for the requirements:

- The baseline study and initial study on the use of the mobile internet in Khayelitsha showed there was a range of mobile handsets that worked on different platforms; hence, we needed a cross-platform solution.
- Registration required the creation of a profile; a profile represented a CV; and each CV captured the user's qualifications and experience. However, inadequate literacy levels required someone to check and validate the content.
- Other than physically delivering CVs at the point of employment, people distributed their CVs through email and facsimile services. These would have to be critical features of my new service.

6.2.1. SUMMARY OF REQUIREMENTS

Table 2: Design decision and requirement summary

Design Principle		Type of Requirement
Design for Mobile-Only Internet Users	An unambiguous and uniform platform for capturing profiles on all internet-enabled mobile handsets	Data Requirements User Requirements Environmental Requirements Usability Requirements
Design for Mediation	Enable unique profiles to be created, on mobile phones, that can be accessed and edited online by another person	Environmental Requirements User Requirements
Design for Multiple Interaction	A dynamic platform that is portable across handsets and mobile service providers	User Requirements Data Requirements Usability Requirements
Design for Unemployment	Enable users to submit their mobile phone-generated CVs to potential employers through email or fax services Enable users to browse and view employment opportunities on their mobile phones	User Requirements Data Requirements

6.2.2. MOBILECV

The initial version was a simple tool for generating and distributing curriculum vitae (CV) documents, and was dubbed MobileCV. Together with L2E we developed a set of questions whose answers would generate a CV. MobileCV mimicked the L2E model, replacing the paper version of the questionnaire with a mobile version.

With the assistance of L2E, each of the questions was carefully worded so as to reduce ambiguity and the need for assistance in answering it. MobileCV was built specifically to support the needs of semi-literate job-seekers, through mediated interaction; the

placement officer was provided with a dynamic, PC-based web interface for editing the CVs that had been captured using mobile phones.

The Features

The requirements and questions put together in this initial stage were crafted into three tools:

Profile Creator: This was a J2ME application resident on the user's mobile phone. The user was required to register, and then create a profile by answering a series of questions, resulting in a professional-looking online CV. This would then be processed into a Portable Document Format (PDF) document and a copy stored on a web server and assigned a permanent URL. This URL could then be emailed, SMSed or faxed to prospective employers directly from a mobile application.

The Mediator: Assuming the user group to be semi-literate at best, this part of the system would allow a third party more capable than the user to suggest edits to the profile, point out skills shortages (as well as where to access the needed skills), and alert the user to any available employment opportunities. The third party would need authentication from the user in order to access their profile.

Profile Reader: This would be a representation of the profile that could be accessed through the mobile web as well as from a PC. This would be un-editable, but would allow others, including potential employers, to view the user's details.

6.3. Designing MobileCV

We started by carefully crafting the order for the questions that would lead to the design of the system. This meant writing the questions down and comparing them with the manual system already in place, to ensure that all the relevant information would be captured.

The second step was to determine the options that the user would be presented with when answering the questions. L2E advised that in order to generate quality CVs we should avoid open-ended, free-flowing questions, and rather 'lock in' some answers by providing a list of possible options. This meant, for example, that when it came to questions that require a 'date' answer, Ummeli had to provide a list of all possible days, months and years. For

gender we used a radio button option, and similarly for the question regarding level of education.

The next step was to determine how many screens we would need, how many questions should be contained in each, and which questions should be grouped together. I started the design process by creating paper-and-pen-based mock-ups, to narrow down the best position for each question. Through many iterations, and consultation with Babs and Susan, we came up with a set of 13 screens, leading to a final screen that saved the CV to the database and gave users the option to distribute it via email or fax. We transformed this final draft into digital screen captures, using Microsoft Visio as a prototyping tool. The screen shots of this initial high-fidelity prototype may be found in Appendix II.

6.3.1. SYSTEM OVERVIEW OF UMMELI VERSION 1

The features of Ummeli at this point could be summarised as:

- **The MobileCV** tool, which contained the Profile Creator and Editor, the Jobs Listing and Send Application features; screen shots of this can be found in Appendix III.
- **The Mediator** tool, containing Profile Management, Job Listing Management and Alerts; screen shots of this can be found in Appendix IV.

Figure 35 gives a systems overview of Ummeli in its initial stages.

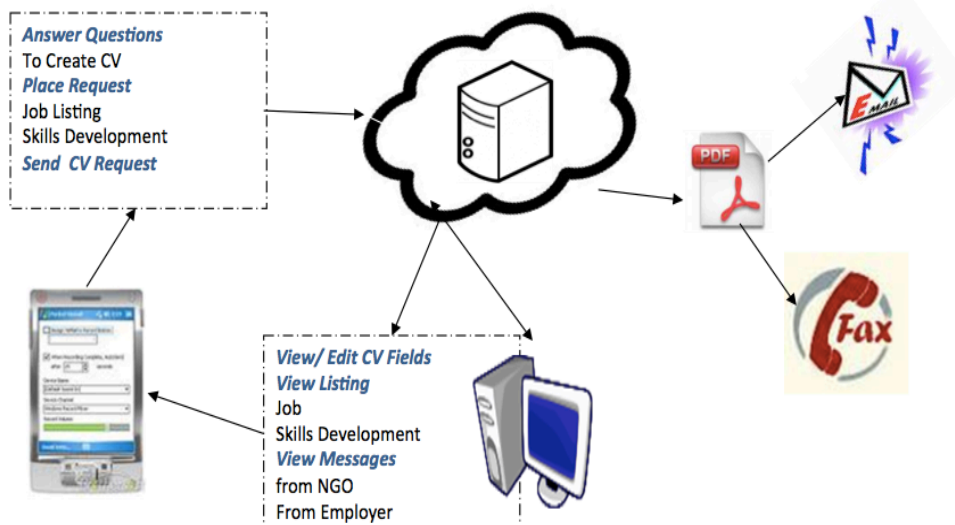


Figure 35: Diagrammatic representation of Ummeli

Each of the tools was carefully crafted, in collaboration with L2E, so as to fulfil the previous mandate, which specified registering job seekers, providing job listings, and job matching.

6.3.2. EVALUATION OF MOBILECV

Conducting usability studies [208, 209] is standard procedure in the design process, for checking:

- **Utility:** that is, whether the design provides the features needed;
- **Usability:** how easy and enjoyable these features are to use – especially important in a developing community;
- **Usefulness:** this is an aggregated evaluation encompassing usability and utility.

A number of guidelines exist for assessing usability studies. Nielsen [208] suggests the following:

- **Learnability:** How easy is it for users to accomplish basic tasks the first time they encounter the design?
- **Efficiency:** Once users have learned the design, how quickly can they perform tasks?
- **Memorability:** When users return to the design after a period of non-use, how easily are they able to re-establish proficiency?
- **Errors:** How many errors do users make; how severe are they; and how easily are they able to recover from the errors?
- **Satisfaction:** How pleasant is it to use the design?

These heuristics may be expanded even further (there exist lists of several hundred [210]); we decided to retain the abbreviated version, for the following reasons. Firstly, because many of the other guidelines may not be directly applicable to a mobile environment (particularly in a developing community), due to the unique features of mobile devices, limited bandwidth, unreliability of wireless networks, and changing environments; but most importantly, the uniqueness of the users [211]. The guidelines chosen encapsulate the factors that needed to be kept in mind for the design to be successful.

To elicit rapid feedback, prototyping was carried out alongside walkthroughs and Think Aloud [212]. A walkthrough is described as a hand-simulation of a system or parts of it to determine that it is able to carry out specified functions [213]. Traditionally, walkthroughs

were meant to be used by the design team in a lab environment [213–215], where the prototype would be peer-reviewed by other designers on given criteria. But with the increasing number of novice users, walkthroughs now involve real users, with walkthrough sessions being unstructured engagements between the user, the designer and the prototype [216], [217]. Walkthrough allows for critical reflection; as users step through the various tasks, they take stock of prior actions and visualise the next step before the actual action takes place. Variations of walkthroughs are used at different stages of the design cycle.

Requirements

As the criteria for our evaluation were mainly functional, the question here is:

Does MobileCV do what it was designed to do?

- Allow unemployed people to register and create online profile-cum-CVs;
- Empower the user to be able to apply for jobs.

Walkthrough allows users and designers to reflect critically on the requirements, allowing for refinement before they are presented in any structured manner; in this case, Babs and Susan could interact with MobileCV and establish whether this method had captured the envisioned functionality of the system.

We also wanted to see if the quality of the system's output – the CV itself – met the required standards. Susan (as an employer herself) represented the employer group, and assessed the standard of the output layout and content.

6.3.3. THE FEEDBACK

Because the design process was a collaborative effort, only small tweaks to wording and colour were necessary. A key addition to the high-fidelity prototype was log-in and sign-up functionality, which had not previously been envisioned. This was important for uniquely identifying users and safeguarding their information.

The quality of the CV – faxed, emailed, or viewed via the web interface – was acceptable to Susan, with her only suggestions being improvements to boundaries and margins.

6.4. Designing the Mediator

Having successfully created this version of MobileCV, we then embarked on the design web interface, which from this point on will be referred to as the mediator. It was to have a suite of functionality, from being able to create and edit CVs, to finding jobs and matching jobs to candidates.

6.4.1. THE PROFILE EDITOR/VIEWER

Given that there was already a mobile application for capturing CVs, we mapped the function for creating CVs on PC to what we already had for mobiles. Similarly, the edit functionality was modelled on the create-CV functionality. This decision was made so that the placement officer (in this case, Babs) could switch between the mediator and MobileCV without learning another skill-set, and hence be able to offer further assistance to the user.

6.4.2. JOB SEARCH AND MATCHING

An additional function of the mediator was finding jobs. Following L2E's current multi-source model, we needed to create a function that would aggregate, categorise and present jobs from different sources through the mediator. Additionally, we needed to allow the placement officer to manually enter any opportunities that came in through direct contacts. In order to implement the aggregation of jobs we used an open-source algorithm that would search the internet for jobs, classify them, and present them on the mediator.

The algorithm would send instances of a short web-crawl to search on predefined online job portals and classified advertisement sites. In order to determine what jobs to search for, we used L2E's current job portfolio to help determine what jobs are most in demand among their learners and visitors. From the most recent course information, eight clear job categories emerged to be search targets.

To determine the layout and content of the interface, we first studied the interface to L2E's current database¹⁰. Working with Babs, I came up with a list of features that she liked in the current system, and some additional ones she would want to have in a new system. Babs preferred having a new layout, so she could:

- View abbreviated versions of all the profiles;
- Be able to filter the profiles by age, gender, skills, education level and location;

¹⁰ Because of a proprietary agreement between the database owners and L2E, I may not disclose the name of its creators, nor publish screen shots of any detail.

- View abbreviated versions of the jobs listings;
- Be able to filter the jobs according to requirements;
- Switch easily between various profiles and jobs without leaving the current view unnecessarily.

These requirements could be met by tabbed navigation, something the current system did not have. After this revelation, we opted to design an entirely new experience for the mediator, with both horizontal and vertical tabs. This can be seen in Appendix IV.

Starting with a paper prototype, a web interface was designed in which the horizontal tabs presented the various sections appropriate to the mediator, while each vertical tab allowed deeper navigation through a given functionality. For instance, a placement officer could create, view and edit CVs in the same CV section, and toggle between the various functionalities using the vertical tabs. Additionally, the mediator needed to allow the placement officer to filter CVs by age, level of education, gender, and qualifications and skills. We added these filters as buttons that would give a list view of all CVs within a given filter, and a further view to enable access to a particular CV.

Similarly, we had a job section, into which all jobs were pulled. The section contained all the jobs within the vertical navigation, allowing for filtering the jobs based on skills needed, age, gender and location. The view was uniform for all categories. To add a job manually we decided on several defined fields that the mediator would need to enter: name of company, job opening, deadline for application, location, contact details and category.

This refined version of Ummeli was then redeployed to the users. In the next chapter, we present the process of rapid testing, evaluation and deployment for what finally became Ummeli.

7. IMPLEMENTATION :

Functionality, Features and Flow

The appreciated world came into being with the development of man's capability for self-reflection, a faculty encompassing much more than just thinking. It holds the world – the physical, social, and spiritual aspects of man's world – as we view it not just through the understanding that our mind composes of it but through all forms of experience. It embraces our appreciation of what this world can do to and for us, and what we can do to and for it... Thus, the appreciated world becomes the motor for change induced by human action.

– Erich Jantsch

ABSTRACT

In Chapter 1, we introduced Ummeli at the two-year mark; the focus in this chapter is the first eight months in which the system was introduced to the actual users in Khayelitsha. This period represents Ummeli's development as a research project, and the first time that Ummeli was developed outside the premise of the HAP technique; that is, with actual users. Here the evaluation was targeted at looking at the flow, functionality and usefulness of the features. In some cases it meant adding, removing or adjusting some of the features to fit the users' needs.

7.1. Introduction

To ensure the first version of what was to be Ummeli had indeed fulfilled its purpose, we needed to test its functionality in the real world. Up to this point, following in the footsteps of Marsden et al. [127], we had been interacting with only Babs and Susan, relying on their expertise with unemployed people in Khayelitsha. Working in the context of EAR, it was imperative to be inclusive, and to allow the system to be evaluated, through engagement with its actual or would-be users and beneficiaries. Note once more that this work was solidly rooted in AR as well as UCD; both approaches – and by extension, EAR and PD – are viewed as cyclical and recursive processes. Similarly, they both have the aspect of deliberation on their findings, in the form of reflection and evaluation respectively [218]. Given this, the evaluation of and reflection on Ummeli was continuous over the whole process; the findings presented in this section and subsequent chapters were not linear. Rather, they occurred in tandem with on-the-ground realities. In the remainder of this chapter we present the changes in Ummeli, reflected in features and usage patterns, all based on the formative evaluations and reflection processes with the actual users.

7.2. Formative Evaluation Plan

The evaluation of Ummeli was two-pronged. On one hand we wanted to evaluate the actual artefact itself in terms of heuristics, as discussed previously in Section 6.2; that is, whether the design met its requirements. We also wanted a deeper understanding of the users, and the effects and outcomes of their interaction with Ummeli; and how this could in turn inform the design, in terms of modifying the original requirements. In other words, we

wanted to judge whether Ummeli fulfilled its functional requirements, i.e. was it doing what it was meant to do? And if not, the non-functional requirements would show the constraints and challenges that would shape its development.

The objectives of the evaluation process:

- **Interaction:** Determine if the users understand the system; i.e. did the design process capture user needs correctly? And are they represented well in the system?
- **Functionality:** Test the functionality of the system. Does it work as it should?
- **Learnability:** Given that users are semi-literate, how fast could they learn to use the system on their own, i.e. is it intuitive, or is there a need for training?

7.3. Evaluation Participants

To meet our objectives, we needed to test the system with two sets of actual users:

- A group of unemployed people;
- A group of employers who would employ people with limited skill-sets and literacy.

Unemployed People

L2E learners and visitors provided a pool of potential participants. This group of users was unemployed, semi-literate, and undergoing some form of training at the organisation to increase their employability. They included the women who participated in the first cycle of the research.

For the first round of evaluation we started with the eight women from Cycle Two, as they were already familiar with the mobile internet, and had inspired the creation of the system. This later snowballed to include a class of 22 learners who were pursuing 'basic computing' training at the time, and then the whole student body, bringing the actual number of users to 200. This initial group of 200 users was representative of Khayelitsha's population demographics as they were of mixed gender; other than three users, all were under the age of 35 years; and they were mainly internet-only users.

Employers

To get the employers' point of view, we started with an internet search for entities that employed semi-skilled people. We came up with a list of employment bureaus and

outsourcing companies. We contacted six; only two responded, and we later met with them for interviews, testing and demonstrations.

The first of these, Marvellous Maids¹¹, is both an employment bureau and an outsourcing company for manual labourers and domestic workers. Positions offered include instances for nannies, cleaners, gardeners, and guards. They also have some skilled positions, such as for drivers.

The other company we contacted was Super Care¹². They offer corporate outsourcing for cleaners and gardeners. People are employed by Super Care, trained in corporate etiquette, and sent to various companies and institutions. We identified this company through referrals from some of their employees working as support staff at the University of Cape Town.

At both companies, we interviewed the people in charge of hiring, and evaluated the mobile application system to ensure that it captured the correct information for their needs. We also wanted feedback on the format of the CVs output by the system.

7.4. Formative Evaluation Methods

To fully evaluate Ummeli in Khayelitsha, we needed an AR method that would work in this particular context. One key cultural characteristic of the community we worked with was that they tended to look at situations positively, and want to build possibilities from 'Umnqweno', which translates to 'yearnings' or 'dreams'. The method of evaluation had to allow for such a cultural disposition, as well as cater for their environment.

Appreciative inquiry (AI), as introduced in Chapter 1, provides a positive rather than a problem-oriented lens, focusing participants' attention on what is possible rather than what is wrong.

In ICT4D, the more common approach to the formative evaluation of an intervention is usually diagnostic; basically, finding a problem and then a solution. We are always asking users to engage with the intervention and let us know what is not working and what needs

¹¹ www.marvellousmaids.co.za

¹² www.supercare.co.za

have not been met, so that we can fix them. AI provides us with an alternative approach to evaluation; instead of looking at the intervention as incomplete, it allows us to allow ourselves to enter the user space with a positive mentality, by first appreciating the positive effect of Ummeli in the community, then allowing the community to dream. We dreamed alongside them what the dream would be, and then brought the dream to reality – in a cyclical manner. The intervention then becomes less of an evaluation of what existed, instead using the system as a starting point for considering what might yet exist. At this stage of Ummeli’s life-cycle, that was precisely what we needed.

Using this approach we carried out the evaluation over several months, with different sets of users. For the unemployed we held a series of evaluation sessions, such as that shown in Figure 38, with each generating incremental changes to the system. It began with a short training period on how the system works, then a live demo of the system, followed by a combination of scenarios, contextual walkthroughs and think-aloud sessions.

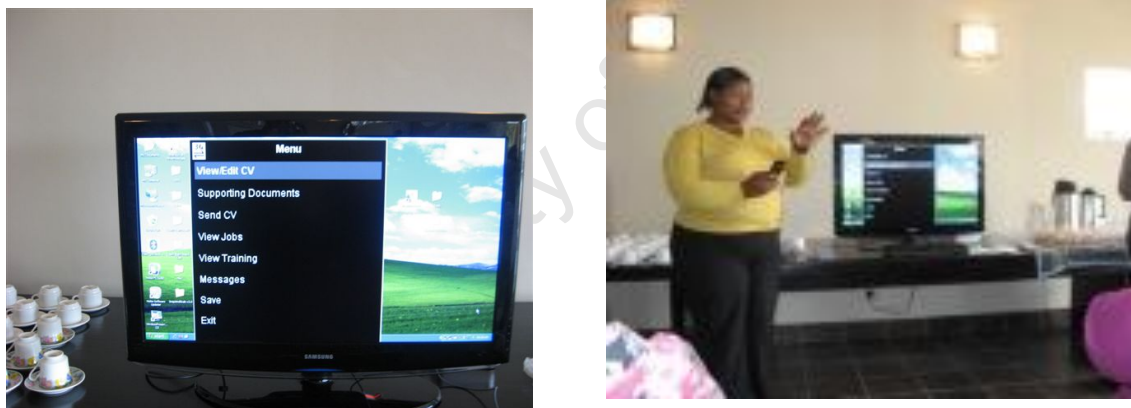


Figure 36: Demonstration and Training of Ummeli

For the employers, we carried out two one-hour sessions made up of an explanation and demonstration of the system, a comparison with each of their internal systems, and a cognitive walkthrough of the system and its output (the CV).

7.4.1. SCENARIOS

As noted previously, scenarios are snippets of narrative about real events from the user’s environment. Preece et al. [72] note that scenarios allow exploration and discussion of context, needs and requirements in a realistic manner. As with design, scenarios are used

in the evaluation process to contextualise the use of an interactive system in the users' current reality. In the case of Ummeli, the users drew and acted out what Ummeli meant to them as they walked through the various features and processes, as shown in Figure 39. This is a form of live-action role-playing which can be used in formative design [60].



Figure 37: Users acting out and talking through various Ummeli scenarios

7.4.2. COGNITIVE WALKTHROUGHS AND THINK ALOUD

'Cognitive Walkthrough' is an incremental process to evaluate the learnability of a system through observation. Its inventor [213] was motivated by the fact that users prefer to learn about a system through exploration [215]. Contextual walkthroughs [59] assume that learning does not happen in isolation; rather, it is a collaborative effort between users, as illustrated by [219] – here, the evaluation is done by a group of users; the designer is a passive observer.

'Think Aloud' complements walkthroughs. As the name suggests, users verbalise what they are about to do, or what they are doing. They are allowed to articulate their frustrations and ask questions when they face a hurdle. This allows the designer to capture challenges in the use of the system, as well as needs that have not been met.

7.5. Sample Tasks

There were specific study aims for each group: for employers, this was to ensure that the product (from the L2E model) was universally acceptable; for the unemployed users, additionally, we wanted to test its interaction and functionality.

7.5.1. JOB-SEEKERS

For the unemployed, the evaluation process was systematic and incremental, with each cycle building on the results from the previous cycle. In the first cycle of evaluation, we conducted a short training session on what the internet is, in order to familiarise the users. This training, conducted by Babs, included some of the material used earlier (in the work described in Chapter 3). Then, using a white board, pen and overhead projector, Babs demonstrated how to download the application, create an account, create a CV and send it to potential employers. Here, the tasks were:

- Download application (from location www.ummeli.org/wap);
- Install application on phone;
- Decide on log-in details (name and password);
- Create a CV by answering questions presented;
- Send CV to a fax number;
- Send CV to an email address.

7.5.2. EMPLOYERS

For the employers, we demonstrated what the system could do, and asked them to walk through the process and comment on what might be missing. We also asked them to comment on the quality of the CV output, compared to a PC-generated CV. For this task we acquired a CV from one of the cyber-café¹³ we had visited earlier, and printed a version from MobileCV for comparison. We then asked the employers the following:

- **Content quality:** is all of the essential information required from a new hire included?
- **Presentation and organisation:** is the CV clear and easy to read? Can recruiters scan the content easily, and find enough information to recommend an interview?
- **Overall presentation:** was the CV readable by the recruiter?

7.6. Design Insights

The results from this process fell into three categories: Systemic Challenges, Usage Patterns, and Functionality.

¹³ Appendix 3

7.6.1. SYSTEMIC CHALLENGES

This category includes the challenges that affected the outcome of this work but were beyond the scope of this dissertation, in that we could only attempt a work-around, but not provide a total solution for them. These challenges mostly involved the devices or the mobile network operators.

Mobile Internet Set-up

As at June 2010, South Africa had four mobile service providers (Vodacom, MTN, Cell C and Virgin Mobile¹⁴). While we had ensured that all the participants in the study had internet-ready phones, what we had not envisaged was that they would need to set up both these phones and subsequent phones that they acquired during the study.

Another challenge faced users who had more than one SIM card (swapped depending on time of use and availability of airtime). In such cases, there was a need to install mobile internet settings from both service providers, to make the mobile handset truly internet-enabled.

While it was beyond the scope of this study, we developed a 'how-to guide' for setting up mobile phones for the various handset manufacturers. This 'cheat sheet' was posted prominently around the L2E premises, and we also integrated it into the training and demonstration sessions.

Different File Locations

Users had a diverse array of mobile phone handsets: There were eight different handsets, from three different manufacturers: Samsung (SGH-E250, A110, M620); Nokia (N90, N70, Xpress Music); Sony-Ericsson (Naite). Each handset, even those developed by the same manufacturers, had different filing standards. This made it impossible to have a standardised training manual¹⁵ for all the users, as there was a need to first locate the downloaded file, install it, and then start the actual MobileCV application on the particular handset. This is a challenge we had already identified in earlier studies; and while internet search on the filing systems of the different handset manufacturers yielded some help for the immediate group, it was impossible to foresee what would happen to users beyond the prototyping phase of the study.

¹⁴ A fifth mobile service provider, 8-ta by Telkom South Africa, joined the field at the end of October 2010.

¹⁵ Manual can be found in the appendices

7.6.2. USAGE PATTERNS

This particular observation has been highlighted, as it affected how the users interacted with Ummeli; these interactions were not only an extension of what we had observed earlier, but were an indication of the intricate societal norms that dictate the usage of interactive systems in this particular environment.

1. Need for Training

While the pre-evaluation training and demonstration sessions were a good starting point for users, we soon discovered that they also needed some follow-up training sessions. These extra sessions were aimed at explaining the navigation of the system, as well as some of the wording in the CV generator questions. To enable this to happen we switched the training language to isiXhosa, and the trainer communicated the content of the training in this widely-spoken language.

Data was collected through observation; in particular, we noted that users were relying on others to use the system. In spite of the switch of languages in the training and demonstrations, the users preferred using the system in groups. The groups were not gendered, and a number of group dynamics arose.

2. Surrogate Usage

A further observation concerning the group learning was that each group was formed around one 'super-user'. The super-user would first create their own profile CV, and send the fax and email; then they'd log out of the system and create a profile for each of the other people in their group.

3. Peered Usage



Figure 38: Users Learning how to use the App from Each other

Another group of users preferred learning from each other, and using the system together rather than individually or having a single super-user, as shown in Figure 40. Each member seemed to have some subset of the total information, and they would convey this to the rest of the group as a means of aiding progress. This was more prevalent where a mobile device was being shared. For instance, an earlier version of the system was not optimised for the Samsung E250, which was a handset owned by eight of the initial users¹⁶. To make sure that they participated in the study, owners paired up with owners of other phone models and swapped SIM cards and information on how to use the different models.

7.7. Functional Changes

As noted in the previous chapter, Ummeli was envisaged and designed as a platform to help semi-literate people in Khayelitsha to access employment opportunities available on the internet in a cost-effective manner.

Throughout the first phase of designing Ummeli we used the mediation concept, both in the use of a proxy in the HAP method as well as in reaching my final design decisions. To recap:

- Use of human quality assurance: borrowing from both the L2E and government models, we targeted a largely semi-literate population, and needed someone to authenticate the content of the CVs being produced through Ummeli;

¹⁶ It turned out to be the most popular handset of the study.

- Use of a mobile phone application to mediate between the ‘large’ world of web browsing, search and form filling, and a simple mobile phone interface tailored to this population.

The first evaluation established that both MobileCV and Mediator were still a work in progress. Carrying on from the two themes above, there were still questions that were left unanswered within the current system, which in turn led to further, consecutive design decisions:

- How do you design for social and communal practices?
- How do you design textually for easy comprehension?
- What does online engagement look like in this instance?
- How do you engage a culturally different community in the design process?

This section addresses the first three questions. The last question is addressed in Chapter 9, which reflects on the methods used in this phase of the study as an outcome.

7.8. The Design Decisions

As a result of the AI approach we came up with two additional design decisions, detailed in the following sections.

7.8.1. DESIGN AN OPEN PLATFORM

The initial version of Ummeli only allowed the users to create their CVs online and send them from their mobile phones. Job-listing required prior configuration by the user; they could choose their job preference and could only access jobs under the three categories chosen. Furthermore, they were unable to enter any new job opportunities that they came across that were not listed in the search results.

The design decision here was to open up the platform, resulting in two new features and the reconfiguring of an existing feature.

1. Crowdsourcing of Jobs

The role of the community was key to this design decision. During an evaluation session, a participant asked this question: “Say I have heard of a job at Fruit and Veg, and I want to tell my friends, how would I do this through Ummeli?” There seemed to be an obvious

solution; a person-to-person communication channel such as an SMS or a phone call would suffice. But he explained: “I do not mean for this job to be for my friend, like him [pointing at another participant]; I want it to be for everyone to see, for the whole community.”

This was a generally acceptable behaviour in this community, grounded in their cultural beliefs and socialisation. More probing with L2E staff provided insight into how information is accessed and disseminated in the community. While personal social networks were integral to their livelihoods, the good of the community as a whole was of greater importance. There was great emphasis on the importance of people contributing to the wellbeing of the whole community.

This meant that the design had to reflect these community-driven tendencies; thus, though the system was capable of trawling the web for employment opportunities and aggregating jobs from various sources automatically, it was important for the community themselves to be part of the solution, contributing to the job pool. To accommodate this, we added an additional feature that allowed users to post jobs that they had learnt about from other sources into the listings the system returned from the internet, appearing as though they had originated from the internet as well. This feature not only gave the system a sense of community involvement, but also built community confidence around it, which brought about a sense of ownership.

2. Referral Mechanism and Platform Sharing

Referral and sharing are closely coupled with ‘crowdsourcing’ of jobs. In the same way that people wanted to contribute to the listings, they also wanted to refer some of the listings to their friends and family. The initial implementation of job listings allowed users to choose four job categories that they would receive notification from when jobs were available. This prevented users from viewing jobs from other categories – the initial decision on job listing was to make it as precise and clutter-free as possible; to view jobs from another category, a user would have to subscribe to the new category, which often meant unsubscribing from an existing one, as I’d implemented an upper limit of four job categories. However, during the evaluation we learnt that users wanted to view as many job options as possible; not necessarily for their own benefit, but for a larger immediate community which included family and friends. “I have been looking there for a [petrol station] attendant job for my husband, and I want to see more.” This led to a decision to scrap the subscription feature, to

allow users to view all the jobs available in all categories. The resultant change in the interface is shown in Figure 41 below.

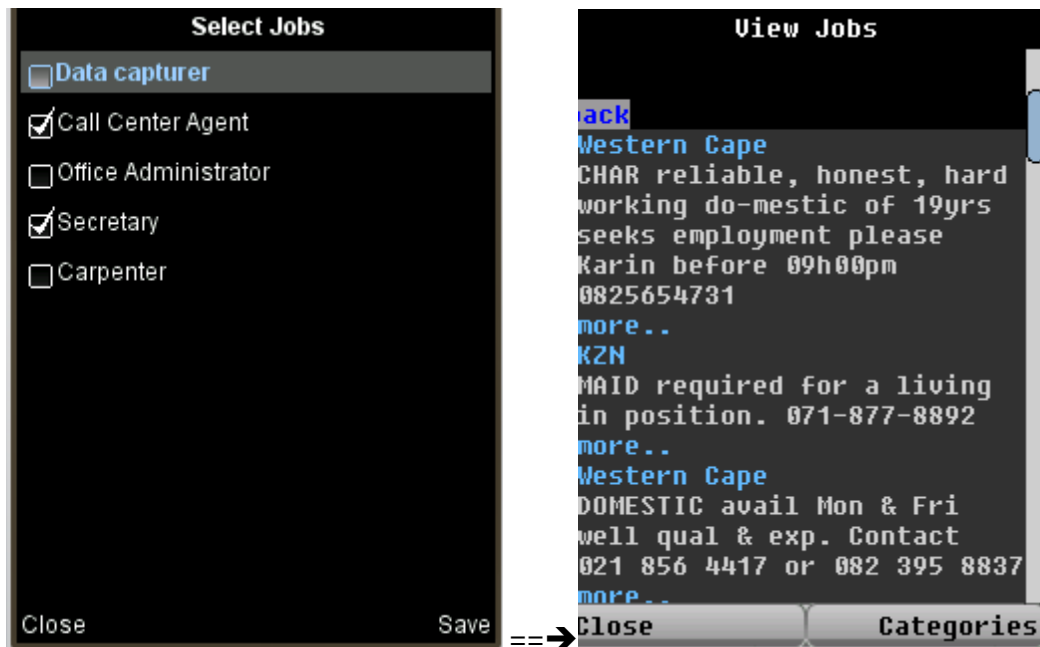


Figure 39: The image on the left shows the original restricted job listing interface, while the one on the right shows the unrestricted access

7.8.2. DESIGN PARTNERSHIP PLATFORMS

Early in the study we had noted that the users were mostly semi-literate; this became more obvious when the first version of Ummeli was deployed. Although there was an abundance of jobs, some needed users to have some specialised skill to be able to participate.

Initially we thought to implement a training listing. This would be an instance of the job listings that mimicked its technological implementation, while incorporating the improvements from the user input. But after trawling the internet for relevant information, we discovered there was a dearth of content regarding training in technical skills for semi-literate people. In an attempt to find suitable content we conducted further investigation, starting from L2E and expanding to ten other NGOs in the area that performed similar services for skills development. Using mainly telephone conversations, findings needed to include, firstly, NGOs that had an internet presence.

For those that did:

- What kind of presence is it (website, social media)?

- What kind of content do they have on themselves?
- Who is the audience for that content?
- How do they get discovered?
- Do they have a mobile website?

If they did not have a presence:

- How do they distribute their content?
- Why do they not have a presence?
- Do they want to have a presence online?
- What would they want to post online?

Findings

This slight digression in the studies led to us scratching the surface of a potentially larger area of research. Later in this dissertation we present this as a recommendation for future work.

In the context of this dissertation there were four key findings that directly affected the output:

1. Paper, leaflets and word of mouth

In spite of the large numbers of mobile phone subscribers and an increasing number of mobile internet users, many of the NGOs preferred using leaflets as the primary way of disseminating information about their organisations. However, they relied primarily on their students and alumni to spread the word about their course offerings. This supports previous findings about the emphasis placed on the good of the community.

Other than this locally-implementable way of spreading information about themselves, the NGOs also relied on a government-published directory of NGOs in Cape Town. The listings only gave contact information, but no details on the kind of training offered.

2. Assumptions about internet content consumers

While many NGOs acknowledged the important role the internet plays in development, and some actually offered basic computing-skill training, they did not all believe that the people they served needed to learn anything from the internet or had any interest in the internet. The trainers saw the skills they taught as important not for allowing students to access information about their immediate environment, but to make them employable.

3. Outdated and donor-facing websites

Of the 10 NGOs contacted, only two – including Learn to Earn – had a website, and both websites were outdated. But of even greater concern was that neither website targeted the people in Khayelitsha; they were aimed at donors. L2E's website was used just to advertise the merchandise they traded.

While there was mention of training taking place at the institutions, this was just part of the information page; the information was not aimed at an audience likely to be interested in pursuing any of the courses.

4. No mobile website

Related to the above findings, but more critical to this study, was the fact that none of the NGOs had a mobile website, as had been observed previously [156]. The two websites in existence had too many images to be suitable for small mobile-phone screens.

5. Cost

As reported extensively elsewhere [220], NGOs rely on donor funding for their operations. The funds are assigned to various projects on a 'most needful' basis. Technology is expensive. Hence, many of the NGOs did not prioritise a website as part of their outreach programme, viewing them rather as resource mobilisation tools.

6. Complexity of Technology

In this age of 'Do It Yourself' websites and social networking sites, one would have thought DIY to be an alternative route for NGOs. However, most of those questioned were unaware of the existence of DIY site-builders. Acknowledging that some of their staff did use social networking sites, they still did not see a real need to have their organisations using them for outreach. In addition, even though their staff had better-than-average technical skills, they lacked sufficient skills to be able to update content.

Designing for NGOs

These findings led to the design decision to build a skills listing with an easy-to-use tool that NGOs could use to create a catalogue of their training offerings. The listing was used as an aggregation platform for all skill training being offered by NGOs in the Khayelitsha community.

7.9. System Changes

In addition to the features already discussed above, and due to the iterative improvement of Ummeli to fit its users, the new Ummeli had the following additional features:

7.9.1. DOCUMENT UPLOAD

As the users started seeing the potential of using the platform, they conceived new ways in which to extend it to meet their needs. One of the most frequent demands was the ability to upload copies of documents onto Ummeli. The community needed a repository for all the supporting documents necessary for employment, including identification cards, driver's licences, and various qualification certificates.

This led to the development of a feature that would upload images of such documents, using the phones' own cameras. An interesting observation from the evaluation of this feature concerns phone- and SIM-swopping. The users had come to a point in their 'technical savviness' at which they knew the capabilities of their phones; if an individual's phone was not powerful enough to run the image-capture function for document upload, they would request a friend to take the pictures with his or her phone and then swop SIM cards or trade airtime and swop log-in details, so that the photographs could be uploaded.

This was the most challenging feature to implement, as at the time of implementation the technology was not sophisticated enough to allow multiple manipulation of phone memory. Additionally, the limited functionality of mobile phone handsets meant the quality of the cameras (and therefore the photographs taken) was not of a high standard. Nevertheless, the users insisted on having this feature as part of the system.

7.9.2. ALTERNATIVE CONTACT NUMBER

As mentioned previously, there is high phone turnover in the community due to various factors, including theft and pawning of handsets to get money for sustenance. Losing a phone affects employability, as potential employers may not be able to reach a candidate. With this in mind, both employers and users requested that MobileCV include an alternative contact number or email address field.

7.9.3. INTERACTION CHANGES

Due to the nature of their existence, often users were multi-tasking; at L2E, they were trying to fit their CV activity either in between classes or around the work they performed at the centre. This meant that they did not have a block of time dedicated to Ummeli. This

same scenario applied at home; they always had to interact with the system while doing something else.

In addition, the initial versions of Ummeli often crashed as users navigated out of the app, meaning they lost all the information entered on previous pages. This led to the inclusion of a SAVE button at the end of each screen, so that a session could be re-started at a later date.

7.9.4. OUTPUT QUALITY

Feedback from employers was much less intensive. After their initial inspection of MobileCV and its output, these were their recommendations:

1. Changes in the CV format

The CV format used to develop the PDF version of Ummeli was generated from a template obtained from L2E. Though it contained all the relevant information, the employers recommended the presentation be changed to be more appealing to the reader. Changes included a new typeface, reduction in margins, and highlighted biographical data section. After several iterations they were satisfied.

2. Add introduction to email text

The employers recommended a short introductory note in the body of the email, stating the job being applied for, and the name and phone number of the applicant. As they put it, this would 'personalise' the applicant to the employer.

3. Send user a PDF copy of the CV

While testing the CV fax and email functions, we observed users emailing themselves their CVs; the following day they would have printed copies. Either they needed them for distribution or to review the content. While they were aware that they could access their CV from practically anywhere, they also needed the assurance of having an actual final copy. This led to the implementation of a feature allowing them access to the PDF versions, so that they could view the output as an employer would.

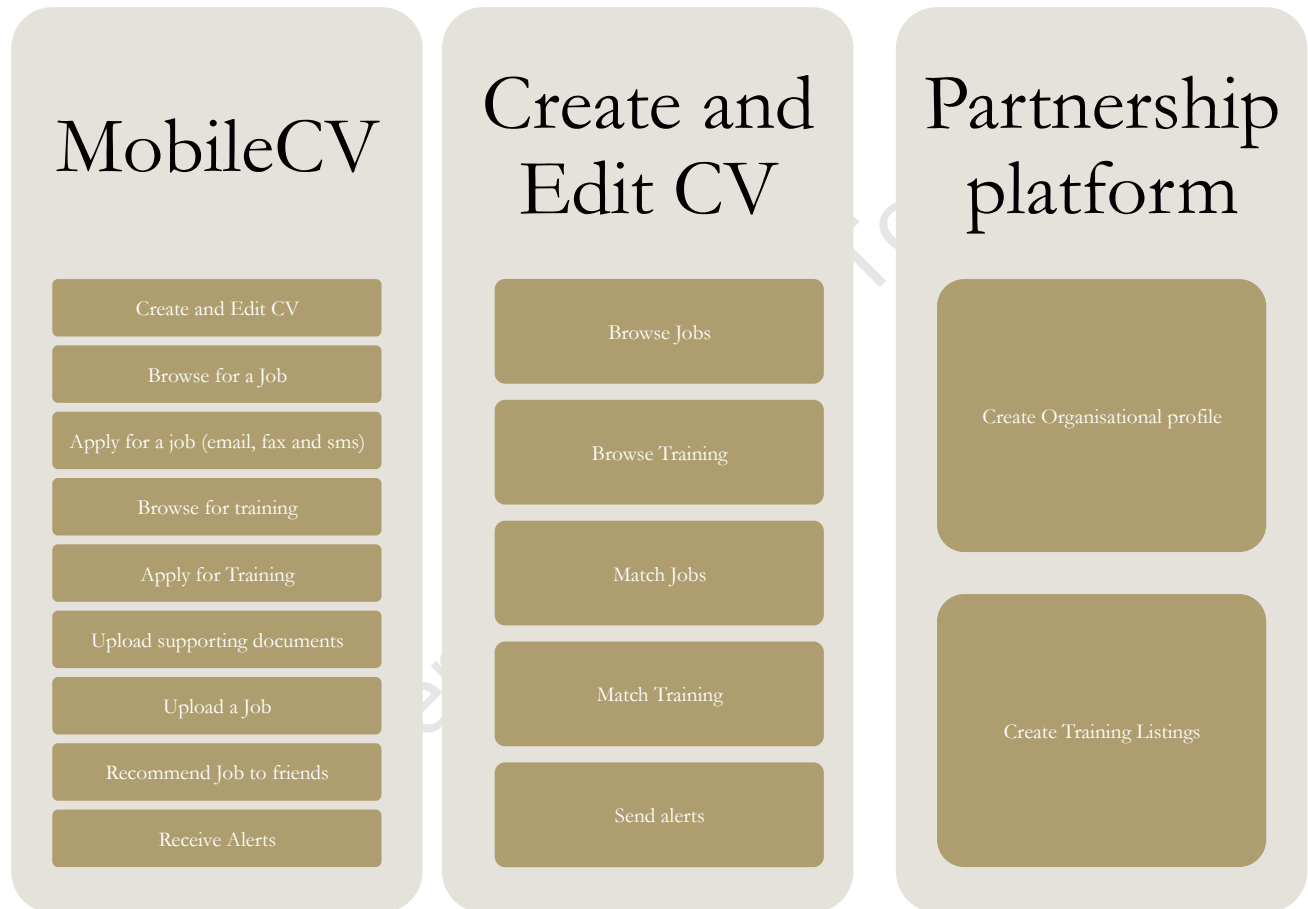
7.10. Summary of Ummeli's Features

After this stage of formative evaluation with community and employers, Ummeli had three distinct tools, each with a different target user:

- MobileCV;
- The mediator;
- The partnership platform.

The tools were linked through MobileCV, as shown in Table 4.

Table 3: Functionality of Ummeli



7.11. Overall Evaluation

As noted previously, reflection is the key characteristic of EAR, and (although termed ‘evaluation’) is essential to UCD as well. In both Chapters 6 and 7, we’ve emphasised the constant reflection on and iterative developments of Ummeli’s features. Insights gained from these processes allowed new design decisions, which in turn led us to the alteration of, adding to and maximisation of what Ummeli could possibly be.

Section 7.8 presented what Ummeli looked like in November 2010, a little over six months after the release of MobileCV. At this point, Ummeli ceased being just a lab-based project, and it became important to situate Ummeli in context. To achieve this, we employed a ‘cultural commentator’ approach first proposed by Gaver [221] and later applied by Maunder [222] in an ICT4D-specific context. Gaver’s [221] cultural commentator is a provider of interpretations and evaluations, a resource for multi-layered assessments of everyday technologies; Maunder [222] used them to reflect on the success of his intervention. In both instances the cultural commentators report on a piece of design, in a mode that would be customary for their profession.

For Ummeli, we employed a journalist who was employed at the end of that initial six-month period to capture the essence of Ummeli, and was what Gaver [221] calls a *populariser*; his work was to go into the community and write a story about Ummeli based on his journalistic experience. This was especially important, as after redesigning and redeploying Ummeli for a larger audience, we needed to know how users outside the community that was used to design it perceived Ummeli, and whether the initial goals of Ummeli were being met for this larger audience.

7.11.1. UMMELI EVALUATION AT SIX MONTHS

Six months after the deployment we hired a reporter to carry out a study in the community. He contacted 24 users affiliated to L2E in order to monitor whether Ummeli was fulfilling its purpose of reducing the cost of finding employment. (The question guideline and full report can be found in Appendixes VII and VIII respectively.) In the report, he notes that the users were highly satisfied with Ummeli:

“Ummeli, however, has been a blessing to the people at Learn to Earn, especially in helping the students with job-hunting and compiling CVs ... So with Ummeli all she has to do is to show the students how to download it, and from there it’s an each-one-teach-one scenario, and to date, she says, they have over 60 CVs already uploaded in Ummeli in a mere two months; while with <anonymised>, which they started using in 2005, the number is far less.

“In my final remarks, it is important to note that not all the interviewees were quoted in the above information; however, their sentiments were noted in the

composition of this report. I must say that for me, as a person who had never heard of Ummeli prior to this project, the feedback I got about the product from those who have used it was a positive one, and there were reports of people who had been hired through applying via Ummeli.”

This initial report reflected well on the achievement of Ummeli’s initial goals, i.e. to reduce the cost of seeking employment and to enable discouraged, unemployed job-seekers to take on actively finding a job.

As the journalist’s report relied mostly on self-reported information, we wanted to test the veracity of claims that job-seekers were using fewer resources to find employment.

7.11.2. UMMELI – CUTTING DOWN THE COST OF ACCESSING EMPLOYMENT!

We conducted an informal (also self-reporting!) survey on the cost of using Ummeli, to ascertain how much money and other resources users needed to get an interview and employment. The previous study [151] established that people in this income bracket are very cost-conscious, and were able to track their phone usage to the cent. In the initial stages of the study, we gave the users incentives in form of airtime so they could recoup what they would use during the sessions. But as the process continued and the number of users in the study increased, we stopped giving the incentive, as the users were self-driven to participate. With this in mind, we knew that we would get very accurate data usage patterns in terms of cost.

To explain this section I need to step back briefly and present some information on the cost of data usage in South Africa. At the time this work was done, South Africa had three major mobile network operators. Each of them had different data offerings. On average, the cost of accessing 10Mb of data was about ZAR2 (US\$0.25). In order to calculate the cost to use Ummeli, we compounded the cost of each of the tasks, for a first-time user and for a returning user.

For a first-time user the tasks were as shown in Figure 43 below:

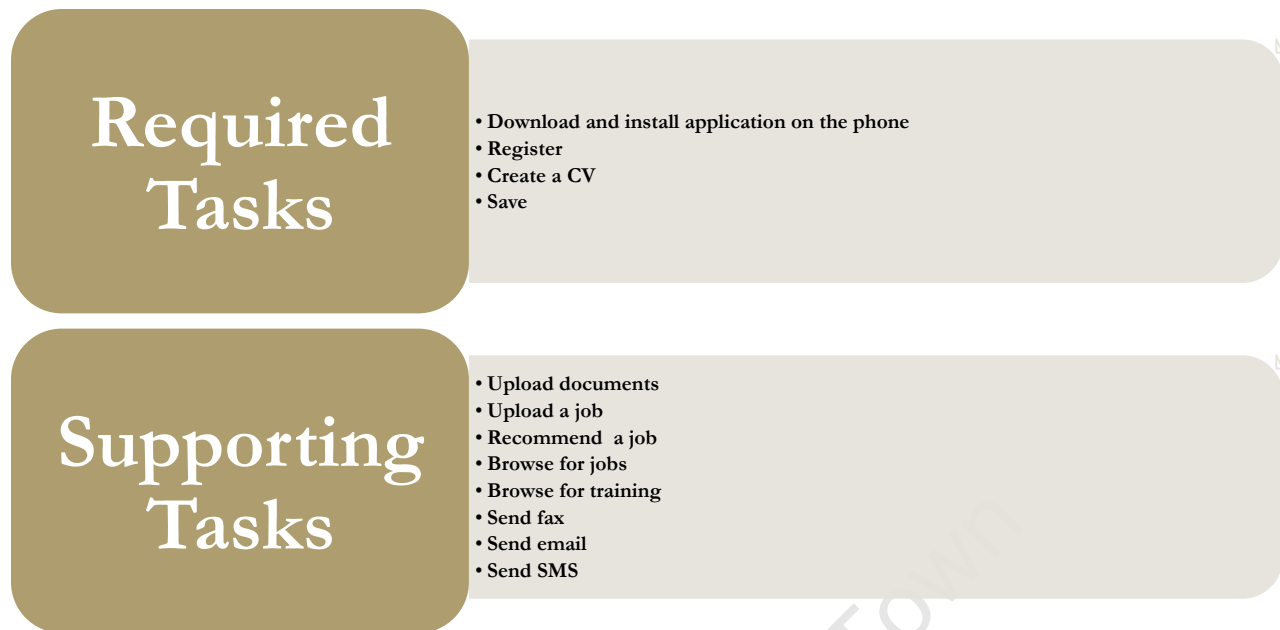


Figure 43: Using Ummeli - Typical Tasks

From the required tasks, the download of the Ummeli Application (2Mb) was the most costly, about ZAR0.40. All the other required tasks involved sending text to the server. To calculate the cost, first, we must establish what 1Mb really means, in terms of words.

We know from computer architecture that:

- 1Mb = 1 024Kb, and $1\ 024 \times 1\ 024$ bytes = 1 048 576 bytes = $1\ 048\ 576 \times 8$ bits = 8 388 608 bits.
- We also know that 1 word is approximately equivalent to 32 bits.
- Therefore $1\text{Mb} = 8\ 388\ 608 / 32$ words = 262144 words.

On average, each CV contained about 500 words, which means that 1Mb is more than sufficient to create the CV and browse through all the content. Therefore the estimated (rounded) cost of registering and browsing on Ummeli is ZAR0.10.

The most costly supporting task was uploading the supporting documents, with each image averaging 300Kb, and some users having up to five documents, bringing the total volume to 1 500Kb, over the 1Mb threshold.

The cost of faxing and browsing is the same, as users did not incur the actual cost of sending the fax, but were only charged for the amount of data used for browsing. (That is, they were charged the cost of the characters they were inputting and sending to the server via the internet.) The server would read the fax number and fax the PDF version of the CV

to the employer. Similarly, emailing is a command to send a CV to the email address provided by the user, and it costs as much as the number of characters in the email. Browsing for opportunities cost roughly the same, as mostly it amounts to viewing the opportunities in text form.

The total costs are summarised in Table 5 below.

Table 4: Ideal Cost of Using Ummeli

Task	Cost	Repetition
Download App	20	On version upgrade
Register / Edit	10	One-time registration, Edit on preference
Upload Documents	10	One-time
Upload opportunity	10	Regularly
Browse for Jobs		Regularly
Browse for Training		Regularly
Email / Fax		Regularly
SMS	0.80	Regularly
TOTAL	ZAR1.30	

Note that ZAR1.30 is what it would cost users to use Ummeli in an *ideal* situation. Technical difficulties, such as having to download the app several times due to network interference, would drive the cost up. A test of the cost of using Ummeli from start to finish for new users and returning users reported amounts of ZAR5 and ZAR2 respectively.

Despite the added expense of technical difficulties, the cost of using Ummeli was significantly lower than for using the conventional methods reported in Chapter 3. This is well captured by the journalist’s report, as well as by our interactions with the community.

For L2E, the system served a purpose very much in line with their mission. They had empowered the community with a tool to enable them to create CVs and send them, without depending on L2E. Babs said: “Now they have their own CVs, and they can send it at any time they want.” Susan noted that: “Now they do not have to depend on Learn to

Earn to send CVs for them; all we will need to do is to train them on how to use this, and they can do it on their own.”

The evaluation sessions with the two sets of employers also indicated that we seemed to be filling a gap that was otherwise unfilled. “I could actually use this, in my recruitment drives; I will ask them to just fill in their details and send them to me,” said the recruitment officer at Super Clean.

7.12. Conclusion

In conclusion, when evaluated against the initial goal *To provide a set of mobile internet tools that would cut down the cost of finding employment*, Ummeli has been successful in its design and as an ICT4D intervention. We discuss the reasons for this claim in Chapter 8. But first, a look at the research question behind this dissertation:

Can UCD methods be used within the context of Ethnographic Action Research to design and deploy a successful ICT4D intervention?

Having now deployed a functional system, we could start to reflect on the methods we had used. We had followed a participatory and user-centred approach in designing Ummeli – an ICT4D intervention, constantly reflecting and adapting to the reality of the field, as per Schon’s [113] recommendations for being a reflective practitioner. In the next chapter we therefore start by looking at Ummeli as an artefact, critically analysing our self-proclaimed success in light of wider ICT4D discussion. Then, in Chapter 9, we give a reflective account of the processes and approach we took in researching, designing and evaluating Ummeli, and how this relates to the wider ICT4D and HCI fields.

PHASE IV: REFLECTION

University of Cape

8. EVALUATION:

Sustainability, Success and Impact

ABSTRACT

Sustainability, Scalability and Impact are some of the key words when assessing the success of an ICT4D intervention. While there is no one way of measuring these metrics, there have been a number of frameworks put forward that measure the impact of the intervention against the process through which it was built. In this chapter we present two pieces of data on overall evaluations conducted at eight months and on Ummeli's second 'birthday', in July 2012. Further, we give insights on some of the lessons learnt from building Ummeli first as an academic project, and then turning it into a social venture. Finally, we give a roadmap for Ummeli in the future.

8.1. Introduction

What results in an ICT4D project being regarded as successful? More specifically, how does one determine that *this* project was successful? In scanning ICT4D literature on ways to evaluate ICT4D projects, one theme is clear: the success of an ICT4D project is mainly determined by the process through which it was developed, as well as by measures that have been put in place to ensure that it is sustainable and able to scale. It is widely believed that the process of planning, designing, developing and deployment of an ICT4D (and any other development project, for that matter) is the probable determinant of its success. It has been argued that the processes by which projects are introduced or deployed into a

developing community determine their appropriateness, usefulness, and adoption by the community.

A number of frameworks and approaches have been proposed to ensure the successful implementation of development projects. In Chapter 1 we mentioned the sustainable livelihoods approach (SLA) proposed by Chambers and Cornwall of IDS and the International IISD, later adopted by DFID, which provides a useful checklist for the design of monitoring development projects [25], [26], [27]. Another highly acclaimed approach is the Outcome Mapping (OM) approach, which was proposed by the Canadian-based International Development Research Centre (IDRC) [223–225]. Outcome mapping provides a framework where the project under development is evaluated for and by the people involved. Outcome mapping does not focus on the quantifiable impact¹⁷ of development programs on the community in terms of more schools, or better healthcare; rather it looks at outcomes in a community and their environment as a consequence of the project. Here, outcomes are viewed as changes in the behaviour, relationships, activities, or actions of the people, groups, and organisations with whom a project works directly. These outcomes can be logically linked to a project, without necessarily directly causing them. The changes are aimed at contributing to specific aspects of human and ecological well-being by providing the community with new tools, techniques, and resources to contribute to the development process [224–227].

The one thing common to both these approaches is their emphasis on beneficiary participation as a key to the success of any development project. In setting the theoretical framework of this work we introduced participatory development, an approach that has been highly acclaimed as resulting in successful implementation of development projects [17], [228], [229]. By looking at all the other approaches, one could argue that they are all indeed a form of participatory development approaches, whose difference is only found in their emphasis. Other than the involvement of the project's beneficiaries, the frameworks encourage developing projects within the context of a lived-in experience; the process should be flexible enough to cater for the needs of the community, and should ensure

¹⁷ defined as changes in state

support as well as a strong sense of leadership from both the interventionist and the community.

Due to the lack of a definitive evaluation technique for ICT4D, these frameworks have been repurposed in the design and deployment of technology-based interventions. For instance, Walton and Heeks [230] proposed what they termed a Process-Driven Approach to evaluating ICT4D. Their framework, which is primarily borrowed from the SLA framework, provides the ICT4D interventionist with a checklist through which to approach the design and implementation of an ICT4D project. They propose five elements that would ensure that an ICT4D approach leads to a successful intervention: beneficiary participation; flexible, phased implementation; learning from experience; institutional support; and programme management. Similarly, Heeks [231], [232] proposed the compendium approaches to impact assessment, which is comparable to outcome mapping. This looks at the lifecycle of an ICT4D initiative and how the impact changes over time, with various measurements at each change, where ultimately, impacts in terms of Outcome, Output and Development are measured in the same way as in Outcome Mapping. An important point to note is how similar the development approaches are to EAR.

Hence, a more appropriate means of assessing the success of Ummeli is by analysing the process that brought it about. In the following section we look at EAR and UCD in the context of Process Driven approach as well as the ICTD compendium approaches, in order to address our first research sub-question (evaluation of methods).

8.2. Evaluating Ummeli in Light of Process Driven Approach

As indicated and demonstrated throughout this dissertation, the process of designing Ummeli lies at the nexus of EAR and UCD (Figure 44).

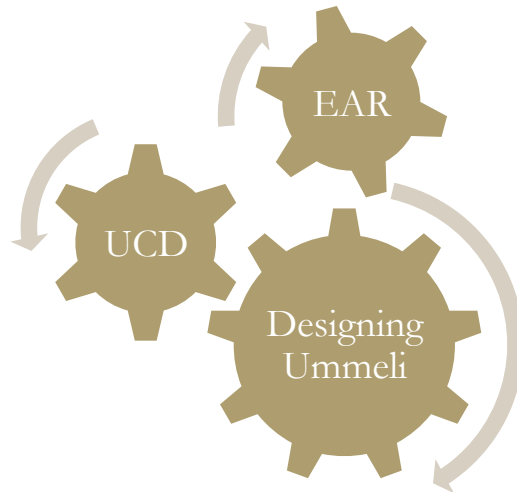


Figure 40: Designing Ummeli as a process of EAR and UCD

Therefore, the best way to evaluate Ummeli is by first evaluating the process that brought it into reality. In both her articles, Hayes ([102], [218]) notes that AR and HCI – and by extension, EAR and UCD – have a lot of similarities. They are participatory, cyclical, and iterative processes that encourage the early and continuous engagement of users. When weighted against each other, their stages of execution correspond (Figure 45).

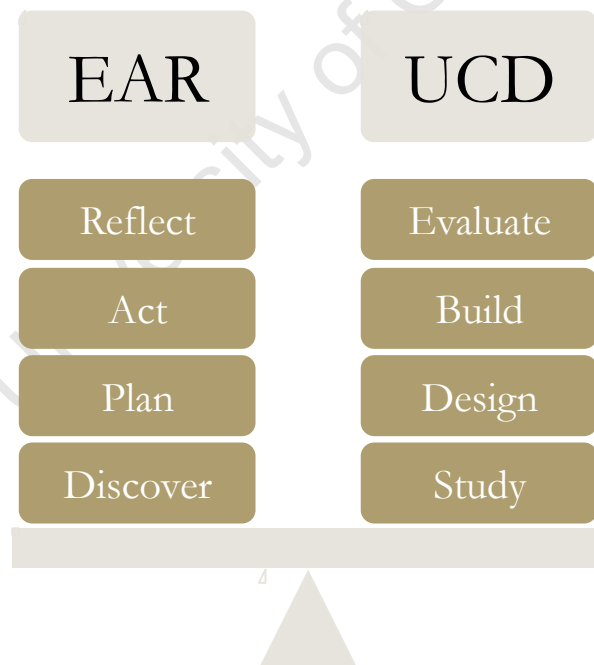


Figure 41: Weighing EAR phases against UCD stages

This means that they can work well together, which indicates a predisposition to success in the process, due to their similarities.

The first step would be to check the process of designing Ummeli against each of the principles put forward by each of these methods as best practice.

The following table summarises the reflection of our activities as guided by the principles.

Table 5: Checking the Ummeli Design process vs EAR principles

EAR PRINCIPLE	ACTIVITIES
Grounded in lived experience	Spent about 20 months in the community interacting with the different people from the community on an almost day-to-day basis
Developed in partnership	Worked closely with L2E throughout the research design, evaluation and implementation process
Addressing significant problems	Identified unemployment as a primary problem in the Khayelitsha community, further discovered that the lack of skills leads to the high levels of unemployment due to a skills gap
Working with, rather than simply studying, people	Engaged with the Khayelitsha community in their day-to-day activities and life, understanding the community by learning how they overcame challenges of unemployment, lack of technical skills and literacy. Ended up being friends with some and was still in communication long after the completion of the project
Developing new ways of seeing/theorizing the world,	Based on increasing understanding of the community's cultural and social praxis, my perspective of the design process changed, which in turn changed the resulting Ummeli. (Discussed in Chapter 7)
Leaving infrastructure in its wake.	Ended up developing Ummeli, a free and open platform to enable people find jobs and skills development opportunities. Additionally, partnered with the Praekelt Foundation to further develop, productise and scale Ummeli beyond Khayelitsha

Similarly, let's review the design process of Ummeli against UCD principles put forward by Nielsen[93]:

Table 6 : Evaluating Designing Ummeli against UCD principles

• UCD Principle	• Designing Ummeli
• Early focus on users	Ummeli was designed based on findings from a

and tasks	participatory and immersed study of and in Khayelitsha, and interaction with various stakeholders including job seekers, employers and NGOs.
• Empirical Measurements	Ummeli was constantly checked not only for usability issues, but also for how well the design realised its initial goals. As demonstrated earlier, Ummeli did fulfil its goal of cutting down the cost of searching for employment.
• Iterative design	Ummeli was constantly and regularly evaluated and revised to accommodate user feedback

Finally, to assess Ummeli against its design process, I check the two approaches against Walton and Heeks' [230] principles for a successful process-driven approach to designing and implementing an ICT4D intervention.

Table 7: Evaluating EAR, and UCD, against Process Driven Approach

Process Driven Approach	EAR	UCD
Beneficiary participation	✓	✓
Flexible, phased implementation	✗	✗
Learning from experience;	✓	✓

Institutional support	✓	✓
Program management.	✓	✓

In evaluating the design approach against the principles, it seems that these approaches attained four of the five principles. The fifth (unattained) principle (Flexible phased implementation) indicates that development initiatives should start small and adapt solutions based on feedback and experimentation. While this was true for Ummeli, this principle requires longer time frames, from 10-20 years. Other than long-term sustainability, this principle also points towards scalability, while in the context of this work as a PhD Dissertation with limited resources, this could not guarantee either factor further on, beyond the existing scope. Ummeli did find a lifeline to ensure its sustainability, which in turn led to scaling to its current user base. It is unlikely that this principle could be addressed in any PhD-based research.

8.3. Evaluation of Ummeli

8.3.1. ICTD VALUE CHAIN COMPENDIUM APPROACHES

Other than checking whether the process of designing Ummeli adhered to the required standards for designing technology-based interventions, it is important to check whether the technology itself met the required standards, as well as to check on its impact as per the framework put in place (this was our second research sub-question, stated in section 1.2.1). There are various measures that have been put in place to evaluate and measure the success of an ICT4D project. In the theoretical framework presented in Chapter 1 we pointed out the Bridges.org Real Access, Real Impact framework by which one could evaluate ICT4D projects' success. Of the twelve factors, we found ten which were relevant to Ummeli.

8.3.2. EVALUATING UMMELI WITH REAL ACCESS/REAL IMPACT

FRAMEWORK

To address the issue of non-standard ICT4D evaluation techniques, Bridges.org [233] put together the Real Access/Real Impact (RA/RI) framework to provide a holistic overview of the factors which influence the success of ICT4D interventions. RA/RI is widely used within South Africa as a way to evaluate ICT4D projects see [222], [234], [235]. In order to provide a comprehensive summative evaluation we evaluate Ummeli within this framework, for lack of a more commonly used guide. (For a full description of the final review of Ummeli, see Appendix XI.)

	RA/RI	Ummeli
1.	Physical access to technology	<ul style="list-style-type: none"> • 100% Access to internet-enabled mobile phones through direct ownership or sharing with friends • 100% 3G coverage in the community
2.	Appropriateness of technology	<ul style="list-style-type: none"> • Mobile telephony was already in use in the community. • Mobile Internet was in high demand in the community. • High rates of unemployment, high cost of searching for employment • Cheaper means of seeking employment was needed by the community = Ummeli
3.	Affordability and use of technology	<ul style="list-style-type: none"> • With an available mobile phone, the use of Ummeli from start i.e. downloading, creating CV, searching for CV and applying for at least one job cost an average of ZAR 5, and without downloading it cost ZAR 2 • Current version on Vodacom Live does not require downloading, meaning the cost of use is even lower
4.	Human capacity and training	<ul style="list-style-type: none"> • Ummeli was designed with the community, which means that it was intuitive for the user • No training was needed to use the portal
5.	Locally relevant	<ul style="list-style-type: none"> • The portal had an online CV creator, as well as jobs available in

	content, applications, and services	Cape Town and now in South Africa
6.	Integration into daily routines	<ul style="list-style-type: none"> • Unemployment is an everyday life challenge, seeking for employment is a daily occupation, and mobile phones are constantly accessible • Ummeli allows seeking employment to be part of the daily communication routine
7.	Socio-cultural factors	<ul style="list-style-type: none"> • Ummeli was designed with semi-literate jobseekers in mind, and had a combination of women and men in the design process. • This factored in any challenges that might have been brought about by lack of skills or gender. • The design process of Ummeli also took into consideration some of the social cultural factors, such as 'Ubuntu', and • The various forms of interaction with technology informed how Ummeli was structured to allow sharing, as well as cloud-based information storage.
8.	Trust in technology	<ul style="list-style-type: none"> • Because Ummeli was solving a very specific and challenging problem, user acceptance was very high. This is evidenced by the initial growth in numbers from an initial 30 users to up to 1000 when the prototype phase was finished.
9.	Local economic environment	<ul style="list-style-type: none"> • Ummeli's design was facilitated by Learn to Earn. The NGO formed a solid supporting partner in evangelising its use with the people of Khayelitsha and to other NGOs serving the community • Praekelt Foundation, which took over the management of Ummeli, has facilitated country-wide access through Vodacom Live
10.	Macro-economic environment	<ul style="list-style-type: none"> • As noted in Chapter 3, the south African government is committed to halving poverty and unemployment [171]; this is seen in legislation, including the employment service bill and the public employment service initiative.

11.	Political will and public support	<ul style="list-style-type: none"> The South African government's commitment to halving poverty and increasing employment shows a wider commitment to the cause. The use of technology in facilitating this commitment is where Ummeli comes in. In its current state (July 2012), Ummeli has been accepted by one of South Africa's biggest telecom players as a way to facilitate job-seekers finding employment
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8.4. The Future of Ummeli :

8.4.1. SUSTAINABILITY AND SCALABILITY

In the above section we looked in summary at how the process of designing Ummeli fared against some of the proposed measures of determining success; other than the time and resources afforded by the fact that this was PhD research, with certain expectations and deadlines, Ummeli was indeed successful.

The initial goal was to create a mobile internet platform that would reduce the cost of finding employment to be used by semi-skilled job seekers. Not only was this goal met, but in addition, some people did find a job from this platform.

Having created a successful platform brought up another aspect of ICT4D assessment that we had to consider. Namely, given that the platform was successful, people had become dependent on it to find employment. How then could the project be sustained beyond the scope of the PhD?

The idea behind Ummeli was never to generate money, nor was it created with any income prospects. Rather, it was created to facilitate the transition from unemployment to being employed, and hopefully from being poor to leading a life with dignity. What we had in mind for Ummeli was a social 'development' venture that would provide a basic and critical solution to this community. However, sustainability and scaling, as defined in much of the development literature, needs resources in terms of money to update and cover running expenses. Therefore, we made some investments in the Ummeli platform in such a manner that it would stay afloat for two years. Meanwhile, we worked closely with L2E to see if

they could get extra funding to keep the platform running. We enticed potential students to see if anyone was willing to continue research in the same area, and engaged a volunteer to offer technical support and maintenance of the platform.

In the process of putting these plans together we met with Gustav Praekelt of the Praekelt Foundation¹⁸. The foundation builds open-source, scalable, mobile technologies and solutions to improve the wellbeing of people living in poverty. Its programme is estimated to have reached over 50 million people across 15 countries in sub-Saharan Africa. Their vision mirrored what we had in mind: they already run the Young African Live (YAL)¹⁹ portal, with over a million youths having conversations on various issues; their research on the portal showed that the biggest demand from its users is for services such as that offered by Ummeli. Therefore, after a reimplementation in September of 2011, Ummeli was officially plugged into YAL as a complementary platform, opening it up to a larger audience. As an initial step, Ummeli retains the core features that it originally started with, such as a MobileCV, with the potential to add some of the more advanced features we considered (see Appendix X).

From this feedback, and the roadmap discussed in the next section, Ummeli seems to be on trajectory to being 'impactful', as defined by Heeks [232]. The partnership with the Praekelt Foundation provided that last bit of the equation that would allow such an initiative to claim to be successful (the third, and final, of our research sub-questions from 1.2.1). In the closing section of this chapter we highlight some lessons learnt in attempting to launch Ummeli at scale.

8.4.2. THE IMPACT

By launching Ummeli on the site of the biggest service provider in South Africa (Vodacom), at the time of writing (July 2012), Ummeli had over 81 000 users, with a weekly growth rate of over 1 500 new users. Statistics from the Ummeli dashboard are shown in Figure 46 below.

¹⁸ <http://www.praekeltfoundation.org/about.html>

¹⁹ <http://www.praekeltfoundation.org/young-africa-live.html>



Figure 42: Ummeli, July 2012 Dashboard

Clearly, bringing the research project to scale was having an impact on the wider community, but our interest in producing this thesis is not only to make an impact on our target community, but also to consider the impact on our research community and reflect on the impact of taking such a project to scale.

8.5. EXTENDING UMMELI'S FEATURES

Ummeli, as an interactive initiative, was teased out from several different technologies, with its design being at the intersection of cloud computing and native application development. We encountered many challenges in trying to balance user expectations, device capabilities, and how far we could stretch the technology for the best user experience. For instance, uploading images from feature phones was a challenging task, the results of which compromised the overall quality and output of the system (the captured images were of low resolution). A next step to this work would be to build onto some of these features to improve the quality of the output without compromising on the user experience (simplicity). Further, with cheaper devices supporting more powerful platforms like Android and RIM becoming increasingly affordable in the market, translating this work into the various platforms will be an obvious next step.

8.5.1. REGIONAL SCALING OF UMMELI

Ummeli started as a limited prototype through a co-creation process for and with semi-literate job seekers, and the results of the initial testing resulted in refinement of their needs and eventual deployment to a wider audience. Investigation into uptake in the wider South Africa mobile-only population has seen demographics and user characteristics match those of the ‘designers’ of the system.

On the other hand, unemployment is a regional and international problem. Illiteracy is also a regional problem, and mobile phone penetration is an Africa-wide phenomenon. The convergence of all these characteristics leads one to ask: Could Ummeli work in other countries? What are the similarities in the labour markets that would make it work? And what are some of the differences that would hinder it from working?

8.5.1.1. GOVERNMENT USE OF TECHNOLOGIES TO ENGAGE UNEMPLOYED POPULATION

From our investigation, it is obvious that the government is under-utilising technology in their efforts towards halving unemployment. Our visits to the telecentres, the cyber-café's and the NGOs indicate it is not only a case of mobile phones, but new media in general. However, the almost universal access to mobile phones in the country makes it a viable tool for such a widespread engagement. Therefore, the research question would be: how can the government utilise mobile technologies, not necessarily Ummeli, to engage with the unemployed population?

8.5.1.2. BUILDING TECHNOLOGIES FOR NGOS

In this work we described very high-level findings on NGO attitudes towards the internet and technology that are aimed at the people they serve. Elsewhere we have examined the critical role that NGOs play in ICT4D in the design of technologies, immersing in communities and bringing about real change. While this critical role of NGOs in the design, development and deployment of technology is one that is highly applauded, very little work has been done about technology and development within the NGOs. The NGOs have been looked at as tools for serving the community, but how to they operate and how do their

operations affect how they execute their work, what is their attitude towards technology, and do they fully believe in taking full advantage of the internet in the execution of their duties? This is an interesting area of study that could bring rise to a specialised genre of technologies. Perhaps a generalised platform along the lines of Ummeli for NGOs could be developed; NGOs would submit information to a system that generates .mobi sites.

8.5.1.3. MICROWORKS

In the discussion in Chapter 7, we noted that while a percentage of Ummeli users were getting jobs, and discouraged job seekers are being engaged to get back to actively searching for employment, there is still a big problem of the lack of jobs in itself.

We believe it is important to start investigating the notion of microjobs in the context of South Africa's labour market realities. This means, how might we create mobile phone-based microworks for a population that is mostly young and lacks some basic technical skills? What would be the nature of such work? Who would be the supplier? What would the wages look like? How would the rural population participate? How would they get paid? And most importantly, how would this work impact their lives, the community and the country?

8.6. Turning your academic ICT4D work into a social venture

In an endeavour to ground this section on previous work as per academic practice, we could not find anything remotely academic to prove our arguments regarding the lack of academic ICT4D pilots going 'into market'. Further, we could not authoritatively claim that most of the research ends up in the form of academic publication without leaving any 'infrastructure in its wake'. Even those non-academic ICT4D projects which are categorised as pilots, according to Heeks [35], [236] are also highly likely to fail, leaving no impact. Thus we do not have an academically validated road map on how to turn one's academic ICTD work into a social venture.

What we have learnt from this experience is that, after designing that product and proving that it is appropriate, usable, used and needed in the community:

- Don't pull the plug! This applies even when writing. Pulling the plug gives a bad name to the project, and re-engaging users for a second time will be harder than allowing them to use the product even when there is minimal support. The final iteration of MobileCV ran concurrently with the new version, until all users had eased into the different channel of access.
- Engage a local partner to be the champion for the project. This can be in the form of an NGO, a church, a health centre or a school. They are invaluable; their faith in your work will allow them to champion it. Where possible, allow your project to meet their goals, mission and vision.
- Work with the local partner to set clear goals, a vision and a mission; where possible, let this mirror what the partner is already doing. Believing that the ICT4D project was developed with local stakeholders allows them to help you craft what the post-academia part of the work should be.
- Find local and available opportunities and [human] resources to allow the initiative to keep running. Students come cheap or free; provide opportunities for students to work on your project as part of their own thesis work, or part of the larger volunteerism program.
- Actively look out for partners or funders whose mission mirrors yours, work with them to ensure that the project does not lose its initial vision. While the circumstances around me meeting the Praekelt Foundation were mostly coincidental, this is rare. Therefore to get funding to go to scale, we believe that one should be always on the lookout for people who are passionate about your mission, vision and goals, and are willing to commit to make it work.
- Ensure you understand your University's policy on intellectual property (IP). Some institutional policies are written in a way that the university owns the IP for all their students' inventions, while others allow student ownership. Understanding this policy will allow you to graduate without having a legal battle with the university. Ummeli

was developed as an open-source platform, with open-source tools and standards. This meant the IP was not completely tied to an institution or a particular individual.

- Finally, get a good lawyer, some business coaching and some networking experience. While the partner or funder might provide the business knowledge to run a venture, some business mentoring is important to help understand what is actually happening with your idea. Your next funder might be an email or handshake away, so learn to meet people and talk about your work.

These are my lessons; there could be more (non-documented, but better) advice, but we are still in the transitioning process from academia into a new field. We are starting on this journey, but learning and adjusting to the realities – becoming, in Schon’s [113] words, a “reflective practitioner”.

University of Cape Town

9. Reflection: A Consideration for Mediated Design Approach

“Reflecting on my experiences, I realised that these people were more than just a way into the community for our research, they were the people who should be creating the technology for the users in the first place. Furthermore, this transitive investigation overcomes ethical issues incurred by researchers from outside a community observing and documenting processes and rituals that the community would rather keep private.”

– Gary Marsden.

ABSTRACT

The chapter is a further reflection of the process of designing Ummeli. It documents the process through which UCD, PD and HAP were adopted, adjusted and shaped through engagement with the community reality into a culturally-imbibed methodology. It begins with an overview of a theoretical framework grounding the process of designing Ummeli that was greatly influenced by its users’ culture, beliefs and mannerisms into Social Shaping of Technology (SST) theory. Further, we look at Mediation as the overarching theme for the research and the use of proxy. We also present some of the methods commonly used in ICT4D (Participatory Design) in detail, and report the effect of mediation in their application. Finally we propose a method dubbed ‘Mediated Design’ that arose from the adoption of PD and HAP in the design of Ummeli.

9.1. Preface

The identification and implementation of a good research approach or methodology is the hallmark of a good research publication in any academic field. In a given research period, a lot of time is dedicated to researching, refining and choosing a methodology before engaging with the field of study. A possible methodology candidate is usually determined by the goals of the research being carried out and the time in which this goal is to be achieved. A methodology is then adopted from its perceived success in the existing literature of similar work. Therefore, a good starting point for any research is to look at the existing body of work, identify a methodology candidate, then refine its techniques, before applying it in the field.

These are the steps that we followed at the onset of this research, culminating in a research proposal that was guided by Ethnographic Action Research [107], [237] as a field method. The design part of the work was situated in UCD's Participatory Design [115], [238] – all of which has been used successfully in the design and implementation of ICT4D.

Being African, having experienced and witnessed the immense poverty on the continent, I could not turn down a PhD opportunity to relieve people – even if only a few – from this debilitating situation. From previous projects and networks I had already identified Khayelitsha as a developing community to work with, and a previous study had suggested the mobile internet as a likely platform on which to build empowerment tools [148], [156], [239], [240].

The next steps, in UCD, are to identify the most pressing need in the community; identify a solution; identify activities that could support the solution; transform the activities into a design; build prototypes of varying fidelities in an incremental manner; iterate to make sure all activities have been captured; evaluate and deploy [56], [58], [72]. All this with the emphasis on the user, making sure they are fully understood by means of frequent observations, questions and consultation. The mantra here is: keep the user happy, and the design usable, effective and efficient [63].

However, it was in the process of implementing the first set of participatory methods for understanding the users (and keeping them happy) that we encountered numerous challenges, rendering what at first seemed obviously successful techniques – interview and observation – almost useless. My first reaction was frustration, and I questioned myself. Had I made a mistake? What was I doing wrong? Why were they not responding as I

expected them to? In the process of trying to get to the bottom of the situation I started to realise the subtle differences in the way I talk, react to challenges, and even respond to questions, between my cultural background and training and those of the community. This phenomenon is called ‘habitus’, a term advanced by the French sociologist Bourdieu [241] to explain the social construction of self and identity. In its simplest meaning it refers to personal embodiment of a pattern of behaviour, beliefs, thoughts and disposition. These patterns are a direct result of internalised social and cultural structures adopted by being in that social and cultural domain. It is this which determines how knowledge is constructed, and how any given individual perceives the world.

Hence, instead of continuing this project as planned, I had to stop – momentarily – and re-think my approach. I had to understand these patterns and practices, and incorporate them into the research process. It was here that a new project, which became my PhD contribution to the existing body of knowledge, was born. While I continued to develop Ummeli, I had to understand the community and adjust parts of the methodology I was using to fit into social reality. This meant that nothing could be predicted beforehand, as my methods, techniques and tools had to be adapted while the research was in progress. Some lessons were learnt early, while some continue to be learnt. I cannot call this research ‘empirical’ in the scientific, quantitative sense. Nor does it contain the particular rigour that is found in some HCI methods. Rather, I embraced the ideals of Schön [113], and went into the field, improvising some of the methods on a trial-and-error basis; using intuition to adopt others; but mostly muddling along until ‘by chance’, something worked.

9.2. Introduction

“Culture is the collective programming of the mind which distinguishes the members of one group or category of people from another” [242]. This description by Hofstede [242] is part of his seminal work on multi-cultural working environments that categorises culture into five different dimensions: power-distance, collectivism-individualism, uncertainty avoidance, femininity-masculinity, and long-short term orientation.

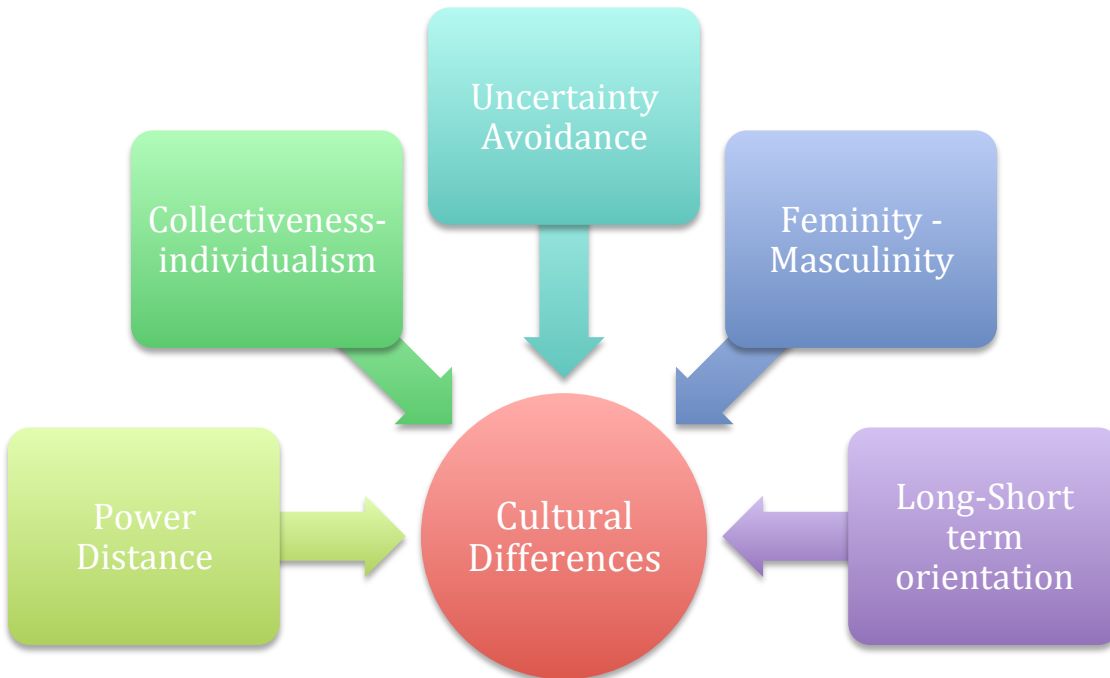


Figure 43: Hofstede's Five Dimensions

Each dimension groups together in a society phenomena that were found empirically to occur in combination, as per Figure 45 above. In this work he notes that cultural values determine how people behave and work [243][243], [244].

HCI4D or UCD4D approaches target users facing various challenges that are very different from those faced by the designer. The designers, on one hand, are usually inspired by more than just getting the design right; rather, the resulting systems are aimed at a 'higher good' [245] – they are intended to have a positive social and/or economic impact on the communities in which they are deployed. On the other hand, they are usually from a different societal, rational and cultural dimension, and there is bound to be conflict.

It is the social, cultural and (at times) emotional dynamism of developing communities that has led to the lack of a proper methodology or framework for the design, analysis and evaluation of ICT4D interventions. When determining what methodology to adopt in designing systems, a designer is guided by various issues. Traditional practitioners believe that for any scientific contribution, it is important to ground methodological approaches in existing theory to ensure that the process has rigour, structure and framework [246]. But

given the cultural diversity of the field, a number of scholars [247–252] have extended Hofstede’s cultural model [242] and agree that the theoretical association and persuasion of HCI and UCD methods are insufficient, and/or lack the validity to be applied in designing technologies for multifaceted cultures. Of primary concern is that the methodologies were created from a Western perspective, and were influenced by tendencies prevalent at their points of origin. Secondly, the researcher and designer come from a different cultural background to the user in charge of their application in the field, and will therefore be confronted by multifaceted differences in culture, ecology, economy and even politics. Finally – and probably most importantly – while HCI and UCD’s objective is to achieve a usable system, based on a given usability criterion, the objective of designing ICTD is interventionist, with the sole purpose of achieving some form of development as dictated by local realities [253], [254]. This means that any pre-defined or high-quality, properly theorised empirical research approach may not be properly applied in a setting where conditions are unpredictable, the users are unknown, and the need will only be properly defined after the research is under way. A reviewer for Gitau [156] echoes the sentiments above and notes that in the development world, “field reality and conditions are messy”; the designer or researcher is not necessarily viewing himself or herself as a ‘disinterested scientist’; rather, they are engaged in the community, as ‘actors-for-change’. Further, data collection is under informal conditions with unstructured formats as dictated by local conditions, such as the availability of participants; their interest in and capacity for participation in the process; or their general perception of the process in proximal relation to the benefits gained. If HCI and UCD are to enjoy a meaningful contribution from the development communities as ‘research fields’, there needs to be a recalibration of concepts as to what is feasible and to what extent “methodological rigour and precision is possible”[ibid].

This brings to the fore Schön’s [113] notion of the reflective practitioner. Schön [ibid] advocates the critical examination of academic methods against the field realities, to see how best they could be harnessed or domesticated to serve the current context – in this case, HCI/UCD and development. This refocuses effort and attention on what is happening in the field, rather than the proper execution of a methodology.

HCI, like any other academic discipline, has established a 'code of conduct' for its practitioners in the form of principles and goals. It provides an array of methods that have been passed down from one generation to the next. The validity of these methods lies in their replicability, giving later generations of practitioners a degree of confidence in their successful execution. The success of an HCI/UCD project is thus determined by the proper and masterful adoption and execution of these methods. This accumulative, empirical and systematic knowledge base has four essential properties: it is specialised, firmly bounded, scientific, and standardised.

Of particular interest to us is this last property: standardised knowledge. Standardised methods suggest there is a level of uniformity in the problems that they are trying to address. And this may be true in some instances; but in the case of designing ICT4D, there is not enough corresponding uniformity to call for standardisation of methods [102]. Furthermore, as articulated earlier (and supported by Schön), knowledge is not universal. The standardisation of HCI methods, we would argue, is a false artefact due to the origins of digital technology; originally concerned with task performance of office workers, generalisability of methods resulted in a homogeneity in the user base. As digital technology has escaped the confines of the office to different realms of life, and different parts of the planet, we have to examine 'standard' methods and adapt them to become standard over a more diverse user base.

In order to interrogate our (HCI) methods we look to Schön [113], who proposes two intertwined techniques: Knowledge in Action and Reflection in Action. These are both notions that arise when a practitioner examines the 'uniqueness' of a problem context. It starts with drawing from prior experience and knowledge to address the uniqueness of the situation. It is a shift from the freedom of choice granted by standardised operations to embracing and accepting the implications of involvement and exploration. It is an inquiry into the specific context through a repertoire of past experience and knowledge, where such a repertoire represents a collection of: examples, understandings and actions.

9.3. Background

So far in this dissertation, we have described the rise of Ummeli as a process that was at the intersection between EAR and UCD (with PD and HAP in extension) pointing out its contribution as a successful technology intervention towards the Development discourse. Of importance to the discussion of the success of Ummeli was the emphasis on an inclusive and participatory approach. To have maximum impact, the design process for Ummeli integrated a community of semi-literate job seekers through a representative of the community who understood the potential of technology. With both Babs and Susan in the design process, we ensured that it took into account the community's input in terms of personal characteristics and technology usage patterns, as well as cultural beliefs and mannerisms.

Looking back at the design process of Ummeli, mediation was an overarching and resounding theme; starting with the initial approach to the research, as well as the design process itself – and Ummeli as an intervention: where the term 'Ummeli' is an Nguni word (a subset of the Bantu languages spoken in Southern Africa) meaning 'mediator'. The theme arose primarily from the community, how they used technology, how they interacted with each other and the world around them, and even how they expected Ummeli to work.

As a reflection on these aspects of Ummeli's design process, let us first ground this discussion in a theoretical framework that accommodates and invites the community not only to construct the technology, as in the case of UCD, but also to adjust the construction process of the technology to fit into how they theorise the world, as influenced by environment and culture.

9.3.1. SOCIAL SHAPING OF TECHNOLOGY (SST)

The Social Shaping of Technology (SST) is a theory grounded in the premise that community and society behaviour, values and beliefs should shape the outcome of a technology design [255]. The theory acknowledges that technologies are not neutral; they are laden with human, cultural and social values. 'Technology determinism' is the notion that technological development is autonomous with respect to society, in that it shapes the society in which it exists, but is not influenced reciprocally [256–258]. This view – though applied (misguidedly) in many ICT projects – is inaccurate; particularly in the context of

developing countries, where there have been many instances of technology being used in ways other than those initially intended [45].

While acknowledging that the presence of technology has an impact on society, Pinch and Bijker [255] focus on the social forces that give rise to particular technologies. They argue that technology emerges from choices and negotiations with relevant social groups, which again emphasises the importance of participation in development. It also means that the design process should continue until all groups agree that their common artefact works. This implies that technology designers should not focus only on the effects of technology on the community, but also on how community culture and practices could and should shape that technology [255], [258–260].

In addition to the involvement of relevant social groups, Pinch and Bijker [ibid] point out the importance of interpretive flexibility, closure and the wider context, as a conceptual framework for SST. Interpretive flexibility suggests that technology design is an open process, capable of different outcomes depending on the social circumstances of the development. The envisaged technological artefacts start out sufficiently under-determined to allow for multiple possible designs, so that the final outcome is as a result of this process, leading to what they term ‘closure’ – a process in which, through iterative negotiations, relevant social groups accept that a given system design works for them [255], [260]. The wider context is very closely related to the other two concepts, as it emphasises embracing the socio-cultural and political context in which a system is designed. Over time, the notion has been adjusted by various sociologists [260] to include the relations within members of the relevant social group, how they interact with each other, and the factors that contribute to the differences in their power.

The focus of this theory is on an iterative design process with relevant social groups, resulting in a system that takes into account the social process covering their interest and interactions with each other [255], [258], [260]. This brings about the notion of designing relevant and usable interventions, a task that can only be achieved by working closely with the intended beneficiary on service or technology. In ICT4D, the notion of designing in collaboration with the potential beneficiaries of a technological intervention is widely accepted as standard practice [253], [261–263]. The reasoning behind this is that the

communities understand their own problems best, and are better placed to know what they need in order to solve them.

These theories can be extended into UCD by championing the involvement of users in the design process to increase not only usage but also usability of technological artefacts. It also gels well with EAR, because of the need to understand the users in their community.

9.3.2. PARTICIPATORY DESIGN AND PARTICIPATORY DEVELOPMENT APPROACH

Throughout this work, we have emphasised the need to bring the users to the design table; this is a concept that is championed both in the arenas of technology development and social economic development.

In Chapter 1, we introduced the concepts of participatory development and participatory design. Participatory Design (PD) was the constant anchor whose main premise is that the people destined to use or benefit from a system play a critical role in designing it. As noted before, its philosophy relies heavily on both Action Research and Ethnographic Research. It is a departure from the idea of design as automation of user tasks by systems through an expert designer, towards design as a transformative process that empowers users through technology, embracing the fact that users are the best placed to determine what improvements must be made in their lives [114–117]. No longer do users take a passive role in the design process; rather, they are viewed as experts. PD views the design process not in isolation, but in the context of the user's environment, their attitudes to and perceptions of the technology, and their interaction with each other, which all influence the final design outcome.

We also described Participatory Development as an approach to development based on the point of view of those directly affected by the developmental interventions. It uses local decision-making, culture and practices in the planning, design and implementation of development initiatives that affect them. In essence, PDA is aimed at achieving 'Self-Determinism'; in other words, it promotes the sovereignty of the people who will be the beneficiaries of the intervention. Additionally, it creates an environment in which they can identify their needs and address them by proposing and agreeing alternative solutions through the negotiation of power in both political and social contexts [17], [18], [20].

Over the past two decades of PDA's existence, many methods have evolved that encompass the concept of participation in a development sense [17]. The most widely-used methodology is the Participatory Rural Appraisal (PRA), explained here by Chambers [19] :

“(a) change and reversals of role, behaviour, relationship and learning. Outsiders do not dominate and lecture; they facilitate, sit down, listen and learn. Outsiders do not transfer technology; they share methods which local people can use for their own appraisal, analysis, planning, action, monitoring and evaluation. Outsiders do not impose their reality; they encourage and enable local people to express their own.”

A key characteristic of PRA that is beneficial to the development context, and also in the design and adoption of technology, is that it relies heavily on visual and oral techniques in identifying and addressing local needs. This technique recognises that participation is an offshoot of free expression, and emphasises adopting communication media that do not necessarily assume writing to be the best means of expression [18], [19]. This is a critical observation, especially in developing countries where formal literacy levels are low. Visual techniques ensure that local people are able to identify and present their needs in an affordable and effective manner, even if there are differences in language and culture, ensuring learnings between beneficiaries and implementers. They may include mapping exercises, in which participants relay aspects of their lives through spatial representation and modelling using locally available materials and knowledge.

However, the user demographics indicated that they were semi-literate and digitally illiterate. For instance, until the point we offered an internet training intervention, some of the community had never used or interacted with the internet. This meant they could not fully understand the full potential of the technology. These challenges rendered the users unable to bridge the gulf of execution when it came to visualising what they would need in a potential technological intervention, in this case Ummeli. And then subsequently the gulf of evaluation, which would mean them knowing what to look out for in an ideal technological intervention [62], [80].

To counter this we adopted a proxy in the form of a HAP. This was in an effort to bridge the gap and bring the two ideals together; that is, having someone who understood the potential benefits of a technology and who was able to articulate what these are on behalf of the final beneficiaries. In addition, they were able to translate the needs of the

community in such a way that they could be easily be transformed into technological features in Ummeli.

This use of proxies worked well, on one hand, in that it mimicked some already existing user habits, as noted in Chapter 5. However, it did not entirely fulfil the mandate of both PDA and PD, in that the actual beneficiary of the project was never really involved in the design process. The challenge that arose from this arrangement and process was that while the HAP technique solved the problem of building and testing an initial intervention, it did not take into account user needs that were hidden from the HAP as a result of close-proximity blindness due to constant interaction with the user group. Further, it never factored in the proxy's own personal bias on how the intervention should function. These are factors that were only noticed after the initial version of Ummeli. As it was paramount in both PD and EAR, we had to do an evaluation of Ummeli with actual users; this led to them pointing out obvious oversights in the design, as well as additional features to what had initially been assumed to be a complete intervention.

9.3.3. MEDIATION

Mediation carries two equally important connotations for interactive systems use and the design process: the first is *Intermediation* [264];, where an 'able other' acts on behalf of a beneficiary user to access information. The second is *Interceding*, as used in alternative dispute resolution, where a mediator intervenes between two parties with the aim of determining an amicable solution to a given problem [265], [266]. In the latter, mediation can either be *facilitative* (the mediator helps the two parties negotiate an amicable solution), or it can be *evaluative* (the mediators express a view on what might be a fair solution). Hence, in design, a mediator can take the role of intermediary, facilitator, or evaluator.

- As a facilitator, the mediator assists the design team to understand the community of interest, by enabling communication through translation, or by being a guide while the team is assessing the community. The mediator is not part of the design team.

- As an *evaluator*, the mediator uses his or her understanding of the community to assess and confirm design decisions on behalf of the community.
- As an *intermediary*, the mediator is drawn from the community and is a member of the design team, creating a bridge between the system design process and the community, acting as a proxy user and designer.

The key aim of mediation in ICT4D is to enable a design team (usually foreign to the benefiting community) to create an appropriate interactive system to aid socio-economic development.

Mediation in design, as dictated by technology use

The idea of mediation in the design of interactive systems is not new. Scaife et al [267], in their project on designing for children, describe the need to have a native informant. In their case, due to the inability of the designer to understand what a child might need, they used children as evaluative mediators, taking the role of co-designers to represent the needs of their peers. In designing technologies for developing communities, Dearden et al [204] proposed the need to involve the users in the design process, because (as they put it) “the users understand their needs, their context...”. This is echoed by Bridges.org [233], who advocate a ‘local champion’ – a person in the design team who guides the team in collecting user requirements. This suggestion has been adopted by many: for instance, Microsoft’s Technology for Emerging Markets (MS TEM) group [268] uses local people as translators or guides for accessing the community. [269], [270] propose the need for a key informant or native informant [271], and – as already discussed – Human Access Points [127] who are used to generate or verify design ideas with the design team. These individuals or organisations – usually fringe members of the community – are chosen for their ability to infiltrate the community, thanks to the existing trust of the community and an accumulation of information within the community. Furthermore, these approaches recognise that the beneficial user might not have the exposure or knowledge of the potential benefits of a technology; hence, the proxy users are most likely to be privy to the technology solutions under study [127].

Characteristics of Mediation in Design

The preceding examples demonstrate three underlying themes to the role of a mediator in the design process:

- **Articulation:** mediators help articulate the needs of the community, as seen in [233], [272], [273].
- **Interpretation:** enables translation of requirements into design practices [127] such as conceptual models and prototypes.
- **Representation:** ensures the articulation and interpretations of users are correctly conveyed into a system. This is also an iterative evaluation role [127].

1. Articulation

Identifying and understanding the user is the first step for any UCD approach. As much as understanding may come from ethnographic approaches, complete enlightenment can only come from 'walking in their shoes'. To really gain insight into the community, there needs to be an intuitive reflection from the community by the community. This is where the mediator comes in. Mediators can articulate community needs and clearly translate those needs into design language, as they have cultural understanding of what certain actions mean.

2. Interpretation

Once the needs have been clearly articulated, the next step is to translate them into design workflows. It is critical for users to be involved in this step, but usually they are left out. The mediator can interface with the design language, using local knowledge generation skills that dictate both work and information flow. Though a technology may be foreign, what it is meant to achieve is not. The mediator develops a rapport with the community about the design process. By using local metaphors, they are able to generate design ideas as well as cementing the requirements, and interpret the metaphor outcomes to form concrete models.

3. Representation

This refers to the evaluative role of the mediator; after every design phase, they can reflect on the outcomes and match them against local realities. This process is iterative and is meant to make the design process holistic. Recognition of a user's domain should have a

lead and influence on the outcome of technology; the mediator comes in to represent the user in those crucial moments of determining the make-up of the technology.

In summary, when mapped against the three forms of mediation (Facilitator, Evaluator or Intermediary), the above task could show the following:

- As a **facilitator**, an enabler can help to articulate the needs of the community as well as translate.
- An **evaluator** is a representative of the community, and assists in testing that the designer's interpretation and representation of a community's need is accurate.
- As an **intermediary**, a mediator could perform the three tasks, as they are members of the design team and constantly in contact with the community.

As noted in Chapter 2, the role of grassroots NGOs in the development discourse is well documented. A particularly important aspect of grassroots NGOs is that they are regarded as owned and run by the community. Based on this association, grassroots-led NGOs are regarded as 'fountains of local knowledge'; they provide local community expertise, an entry point to the community, and a source of background information on the community and its needs [23]. To enable the design and development of Ummeli, the three characteristics of mediation would later be an integral part of the design process, with NGOs taking some or all of the characteristics. This leads us to have a look at HAP in the context of NGOs, and how each of the characteristics related to our relationship with Learn to Earn.

9.4. Reflecting on HAP

Learn to Earn was adopted as a mediator in the development and design process of a would-be intervention tool. As noted in Chapter 2 and 3, unemployment is one of the most pressing issues in Khayelitsha. Discussions with L2E (already working in this space) led us to the need to develop a system that addresses this issue. We relied on their insights and the understanding of the community to develop the most appropriate system.

The inclusion of HAP in the design process already implies a shift in thought. Their presence alters the design dynamics from 'developer/research - user' to 'developer -

mediator – user’. This means that we acknowledge our knowledge deficiency, and are willing to learn from the field and make decisions on what is represented by both the mediator and the field. The mediator makes us aware of our own tacit knowledge and biases as well as those in the community, giving us the opportunity to change or adjust the methodology to fit the demands of the users. This also gives us a completely new perspective on the situation at hand, giving room for a more adoptable and relevant solution.

As noted in the introduction to this chapter, as well as at the end of Chapter 7, we adopted a participatory approach design in a progressive form, by supplementing UCD methods with what we found in the field, abiding faithfully by Schon’s [113] reflective practice.

9.4.1. PHILOSOPHICAL ASSUMPTIONS

The addition of a HAP to UCD yields a fundamentally interpretive method in which researchers learn by accessing perspectives on, and interpretations of, the social situation and the effects of their actions, as well as those of the community [113]. The underlying philosophical assumption is that the mediator who shares language, consciousness and meaning with the community, offers valid access to the users’ reality [99]. The primary methods used here were ethnographic in nature; hence, the data collection instruments were qualitative tools such as participant observation, semi-structured interviews and inquiry. However, this work embraces a participatory approach to development; therefore, a purely interpretive approach is not enough. Furthermore, the inclusion of a mediator is an effort to identify and address clashes in rationale and knowledge between the developers and the developing world community. This process is reflective, cyclical and iterative in nature, all of which are also characteristics of AR. Hence, we embraced an ethnographically influenced Action Research.

The next section of this chapter details the process that brought about an approach we term Mediated Design. It is a combination of EAR and UCD, as described by Harper et al. [64], wrapped around the Mediation framework. We broke the reflection process of Action Research down into three stages to match the perceived outcome: Figure 48 illustrates the spiral nature of the process. In the next section I describe each methods, tools and techniques, and how they were incorporated into the design process.

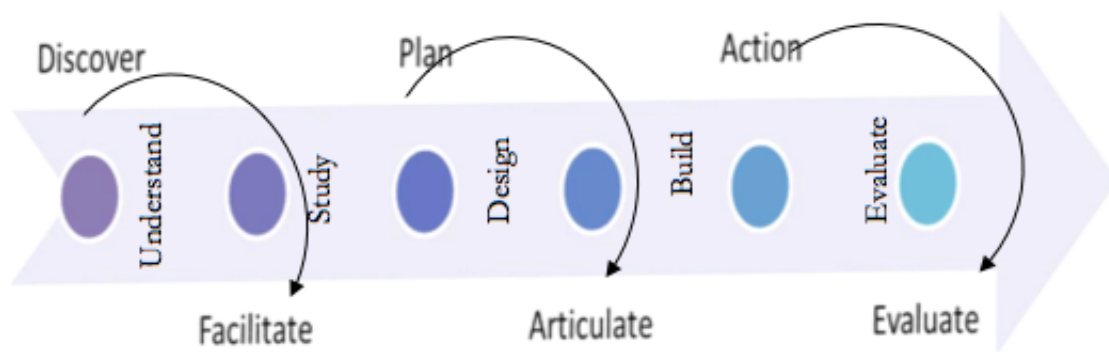


Figure 44: Mediated Design Spiral

9.4.2. EXTENDING THE ROLE OF HAP

After we decided on working with L2E, they acted as a mediator between the Khayelitsha community and me. Their key role was initially to help us identify the needs, interpret them into an actual ICTD-based solution, and evaluate the project on behalf of the actual users.

1. Identifying Needs

Like many developing communities, Khayelitsha faces an array of problems, all of which (in the eyes of an outsider) need an urgent solution. So the first hurdle was to actually identify a problem that we could solve technologically – despite each need we came across seeming important enough for my attention.

Through a series of interactions with L2E we identified unemployment as one problem that we could possibly help solve, with the hope that increased income would have a snowball

effect on tackling other problems in the community. L2E was instrumental in shepherding us to this particular conclusion; besides having been in the community for over two decades, they also dealt primarily with increasing the community's capacity, by empowering them with skills to engage in income-generating activities. Their records indicated that over 80% of people who passed through their training were employed or had been running some form of business, with an increased level of income.

2. Identification and Selection of Users

Having identified a need, next we had to face the inconsistency of users. In HCI, and UCD in general, a lot of emphasis is placed on selecting users. In PD, particular emphasis is placed on the commitment of a particular group of users, with defined roles throughout the design process [274]. The question is, who is the user? It was clear from the very beginning that L2E as an organisation was going to be part-user, part-mediator; however, the primary user was the semi-literate job-seeker who frequented the L2E premises, in search of either a job or a skill. From their daily interaction with users, L2E had an understanding of their needs and how they operate, and hence could justifiably represent them in a design process. However, a participatory approach required engagement with primary users. Initially, when we set out to evaluate MobileCV, we aimed at working with people on one of the L2E courses. And even this pool was reduced further, to those who had no computing skills and had never used the internet before the study. While I strove to limit myself to a this group of N (initially, 65 people), we soon found out that subsequent focus group evaluation session had N_i participants, where:

$N_i = N - S_i$ (S being initial users absent from subsequent evaluation iterations. S was dynamic throughout the study, i.e. we never witnessed the same absentees in consecutive sessions.)

Or

$N_i = N - S_i + T$ (T^{20} being new people who heard about the project and decided to join the sessions while the iteration process was in progress).

²⁰ Later in this chapter I discuss why I could not request them to leave the group.

Throughout the research process, the presence of a mediator gave it stability, as we were able to keep the process in line with design standards. Further, L2E's commitment to the project enabled it to reach its initial objectives. They acted as a referral point to many of the users, both S and T.

9.5. Why Yet Another Design

Approach?

Up to this point, everything had gone well. Evaluating against Harper et al's [64] goal for HCI research projects, that is, *to design or re-design a particular computing technology (be it product, service, application, or system) in order to improve upon or enhance a given experience or to create a quite different experience from before*. For Khayelitsha and Ummeli, we initially aimed at improving and enhancing the job-search experience for semi-literate job seekers, mostly by cutting down on the cost of creation and distribution of CVs, as well as the cost and time of commuting.

The process started by first learning the current needs, and with the assistance of L2E, we designed a system we believed would solve this particular problem. At first we took the typical HCI methods and route, the only departure being the use of a mediator, as adopted from previous ICTD projects and, more specifically, the method used by Marsden et al. [275]. It was while trying to be as precise and rigorous as required by any scientific discipline in applying these methods that we encountered some of the challenges that inspired the rest of this chapter.

9.5.1. METHODOLOGICAL CHALLENGES

We had assumed that we understood the needs and resources of the community, based on our ongoing interaction with L2E. Secondly, previously successful projects that used mediators in their method gave us the confidence to enter the field. The presence of L2E gave us what we thought was a head start on understanding the community. However, through regular interaction with the primary users we started to realise that the perceived understanding of the community was faulty. Although we could communicate, there were some aspects of the user's own knowledge source that could not be articulated.

This part of the work was the most frustrating for us as researchers; firstly because we were confident that we had executed the use of HAP correctly as per previous projects, and secondly because we had a well-defined area of interest, with incredible support from L2E. We had triangulated the design process and sources information; up to this point it appeared flawless. However, it was clear that though MobileCV was being used, there was a barrier stopping it from progressing to wider usage.

Initially we intended having MobileCV as a technology probe, where in its initial phase it would be inspiration for further design work. Technology probes are real contexts for collecting information about usage patterns, usability issues and the adoption process, in order to inform new designs [276]. This method was used by Ramachandran et al. [277] for early-stage design with semi-literate users, and their probes did provide insights into other design ideas.

This was a tactic that would get the actual users involved in the design process, without overwhelming them with its detail. We had hoped to learn, and then build the prototype, based on their comments and engagement with the prototype. This is a proactive approach to participatory design, hence minimising the urge to prescribe (because of my own personal bias) to the process of development – we needed the solution to emerge from the community, in the same way the previous phase (CV generation) did.

To L2E, the initial design of the system served a purpose very much in line with their mission. They had empowered the community with a tool to enable them to create CVs and send them, without depending on L2E.

This feedback shows that we had attained the goal of self-determinism, and by all indications, it was a successful outcome. The main concern was we were not getting constructive feedback or elucidating further design ideas from the intended users, unlike Ramachandran et al. [277]. We had assumed the project would take a similar learning curve. When that did not happen as expected, we tried pinning it down in terms of how we had executed the HAP approach.

Initial assumptions were that the introduction of a training aspect prior to the evaluation helped eliminate some of the initial hurdles and tensions regarding the use of the system. However, the biggest discovery was that the training had been assumed to be final, with the MobileCV prototype being the finished product. We realised that our users had no

understanding of ‘prototypes’; they had never been exposed to a design process, and so assumed that the product they were interacting with was complete. We had also stated repeatedly that we would appreciate any feedback from the user. The only feedback was advice to change the screen output colour so that it would feel more like ‘MXit’.

While admitting the mistake of not talking through the ‘prototype’ concept with the users, it still baffled us that:

- a) They took the prototype as the complete, finished product; and
- b) We were still not getting any feedback.

To counter this misconception, and through consultation with L2E, we began explicitly explaining to users that the product they had was incomplete. To convey this message, one of the staff in L2E adopted a local metaphor (a short story) to convey that the system was incomplete, but that it had a lot of potential.

After this first attempt to counter the unexpected outcome, we considered introducing a control group [278], made up of untrained individuals with similar characteristics to those who were trained. This was in order to determine whether the ‘untrained’ group would come up with some new design ideas.

While investigating the possibility of a control group and demystifying the prototype, we stumbled on various socio-cultural aspects that we had not anticipated or taken into account in our method formulation. For instance, we learnt that even if we eliminated the ‘official training’, learning about Ummeli did not take place in the confines of the research setting; a lot of peer learning took place out of my sight. We realised that even though we were to design a control experiment, the control group would still learn from their peers, who are in the same community. When we investigated the possibility of requesting the control group not to ask for help, we encountered sentiments reminiscent of the commonly-cited African *Ubuntu* spirit [279].

A phrase used by one of the users put *Ubuntu* into perspective: *Umntu Ngumntu Ngabantu* can be translated roughly as ‘A person is a person through other people’; a person’s existence is based on the existence of others²¹. It is a common phrase in the community and

²¹ It is important to note that this translation does not capture the depth of the meaning; it was translated and explained to us on a level that we could understand.

is mostly used to stamp out selfish or individualistic behaviour in the community. This motto taught us that refusal to teach others was denying oneself.

This was really a stroke of insight. Not only did we realise that we did not understand the community as well as we thought; it also gave us a new perspective on how to use the Human Access Point, in that she could become a go-between in translating the cultural idioms that were critical in the design ecosystem, thus enabling us to understand the user community as a habitus. In the previous section we described the position of mediator in the ICT4D development ecosystem in terms of articulation, representation and interpretation. We have shown how our mediators took on each of these roles; they articulated the needs of the community by pointing out the need to tackle the unemployment issue. They represented the community in the design process, and enabled me to interpret the need into a technological solution.

The downside is that they were an interface between us and the community, shielding us from interacting directly with raw cultural and societal norms. To a large extent this is appreciated in ICTD projects; however, we needed to understand the norms in order to approach the design process appropriately and design a suitable solution. This is where we extended the role of the mediator beyond what was initially intended, which was primarily to do with identifying needs, enabling us to understand the user, and giving stability to the design process.

9.5.2. USING METHOD AS A PROBE IN ICT4D RESEARCH

In retrospect, using HAP to design Ummeli was similar to using probes in design; but instead of eliciting design ideas, it was used to bring sense to a rather ambiguous area of methodology appropriation in ICT4D [280]. The method arises from the nature and characteristics of many users in developing communities, and in particular, the users in the Khayelitsha community, in that they were mostly semi-literate, with little or no exposure to the technology design process. Furthermore, as foreigners in the community, we needed someone with in-depth understanding of the community to interface between the community and me. We summarised their role as that of representing, interpreting and articulating the community needs. But during the evaluation we discovered there was an actual need to engage the community in the design process; hence, mediation could be

extended beyond just co-design into exposing me to the communities' social and cultural norms, as well as deciphering some of the activities, processes and praxis foreign to our way of doing and understanding.

This level of understanding required a deeper level of engagement with the community, based on constant reflection. Building from the EAR principles outlined in Chapter 1, we constructed this study around flexibility and fluidity of method execution, through Schon's [113] reflective practice. Therefore, while HAP provided us with a participatory approach to designing with semi-literate users, it never really took into consideration all the other factors that would arise to interfere with its proper execution.

The concept of 'probes', or more accurately 'cultural probes', was conceived by Gaver et al. [281], [282]. It was a method used to acquire inspirational glimpses of communities targeted for design. Probes are designed objects, physical packets containing open-ended, provocative and oblique tasks to support early participant engagement responses with the design process [280–282]. The concept is now widely used in other aspects; for instance, Hutchinson et al [276], [283] extended it to embrace the use of actual technological artefacts as design inspiration. Loi [284] proposes the use of a variation of cultural probes in the form of reflective and primitive probes.

We proposed using a method as a probe to gain methodological inspiration from the communities who were to be users; with emphasis on community involvement, as user participation is the backbone of ICT4D success. However, since as researchers we are part of the design process, the probe also applies to us. This is a departure from the usual type of probe, where the researcher doesn't engage directly with their use.

Starting with a familiar methodology that had previously been successfully applied in a similar context, we completed the first iteration of an EAR system cycle. The method we chose – HAP [275] – did have a track record of successfully executed projects.

When this didn't work out as planned we used the challenges we encountered as inspiration to attempt alternative methods. However, the involvement of a mediator enabled me to translate the challenges into possibility – the possibility of entirely new methods, beyond the scope of both HAP and some of the more popular UCD methods. For instance, we relayed our experience concerning the misconception about prototypes being fully functional products, and then gave the solution we used to clarify the misconception.

A suggestion from Babs (part of the HAP team) to use a local metaphor to bring about clarity on the incompleteness of the system, and so introduce the ‘prototype’ concept to the user, is one that we would not have conceived of; furthermore, we would not have conceived this specific approach had Babs not been around.

9.6. Where did this approach come from?

This illustration brings us to the inspiration behind Mediated Design. In common with cultures on other continents, Africa has a rich history of mediation that arises from her strong sense of community. The use of intermediaries or mediators is a cultural, religious and social *modus operandi* [285]. Culturally, mediation has been used as a means to link the living and the dead. Mediators, who are thought to hold special powers that transcend their current state, are said to be able to talk to the dead and hence link the realms of the living and the dead, passing messages to and fro. They are said to have a special link with divinity and are often consulted to represent community and individual supplications. Traditional healers and priests are examples of such cultural and religious mediators. Socially, mediators – usually people of outstanding status in the community – are used to mediate between two factions on matters ranging from bride-price negotiations to trade. Chiefs, clan headmen and older members of the community are examples of mediators. A few things to note about mediators: they have the trust of the community; they are esteemed and perceived to be in possession of special skills or power that the community needs [279], [285–288].

Based on these insights, and a combination of lived-in experiences, observations and informal interviews and interpretation by Babs, we were able to come up with three key themes (Language and Culture; Orality; and Communal Embodiment) that informed the creation of Mediated Design. First we discuss these themes in the context of the existing literature, as well as sources encountered through the research that acted as a major source of inspiration for what we termed Mediated Design.

9.6.1. LANGUAGE AND CULTURE

The 'language barrier' is one of the most commonly reported challenges when it comes to the design of ICT4D. And rightly so, because many of us as researchers often speak a different language from that of the community we hope to benefit. This usually necessitates the need for a translator; hence, the primary role of research assistant in ICT4D is translation from any language L of the user to the language of the researcher E. This translation never occurs as direct translation, but rather in the form of interpretation. This means that a phrase P in language L is translated into P_i , which is a phrase that best describes P in language E, where it is assumed that:

$$P_i \approx P$$

In many cases, design decisions D are made from the researchers' understanding and interpretation of P_i .

That is, design decisions are a sum total of P_i

$$D = \sum_{n=1}^K P_i, k = n \rightarrow \infty$$
$$P_i \not\approx P$$

However, as we found out, there are many elements to a language which render that assumption inaccurate. For instance, have you ever heard the phrase "*I do not know how to say that in English?*" To many observers, this could come across as 'lacking mastery of English'. However, the more we engaged with the community, the more we became aware of concepts in isiXhosa that were foreign to us in English or, more accurately, could not be fully articulated in English and vice versa. This means that concept B found in language L has no similar expression in language E; and similarly, concept B in language E cannot be captured appropriately in language L.

$$B \in L \not\exists E \therefore P_i \not\exists E$$

Let us look at how this observation affected how we carried out the design of Ummeli, specifically looking at some of the methods.

Interviews

This was one of the biggest sources of frustration during the study. Our initial study design started off with formal interviews, where we used a recorder to record the interviews. The study was designed so that it would accommodate the feedback of individual users, to supplement that of both Babs and Susan. However, after a couple of weeks of attempting to do the interviews, we were not getting much in terms of ‘useful’ feedback. First, we attributed this to the language barrier, and hired a translator who would assist in the process. Meanwhile, because of the distance between the study community and our homes, we had cultivated the habit of hanging around the community for the day to maximise the number of people we would interview. When we were not conducting interviews, we took part in activities in which the community was involved, and had meals together, chatting about matters other than the study (life, marriage, education, HIV, etc.). It was in these informal settings that we started learning about the community; most importantly, it was during these sessions that the users pointed out that the translator was misrepresenting the ideas the community were trying to convey²². During our ‘hang out’ sessions we made conversation, by means of the users stringing together words to convey a message. When one person encountered a word or concept that they did not know how to convey in English, a group of them would first discuss the meaning of the answer they wanted to discuss and then, together, string an answer together in English. The first thing we did was drop the interviewing aspect for this part of the study, instead integrating the questions into our ‘hanging out’.

Langazelela/Umnqweno (Yearning)

Another instance of culture coming into play was in the evaluation. It was literally impossible to elicit negative criticism of the Ummeli system – an observation common in many ICT4D studies. In our initial evaluations we received a unanimous *It is okay, sisi*, and *It is easy to use, sisi* and *We are happy with it, sisi*. Even after we adjusted the questions to make sure we captured the problematic areas, the response remained the same. It was only after weeks of frustration, and out of desperation, that we changed tack. Babs spoke to the users in isiXhosa – and the users became engaged as they never had before. While the

²² We had hired a person with some research-assistance skills; although her translation was not entirely erroneous, the users said she did not convey what they were telling me correctly.

previous sessions had been conducted in English for my benefit, as Babs had indicated that the users could at the very least understand English, we allowed this session to run in isiXhosa, and settled down to observe the users engaged with each other, Babs, and the system. Only when we received the feedback did we realise what had happened.

“I asked them to give me their desires,” said Babs. We asked Babs to explain. She hesitated; it was clear from her expression that conveying the concept in English was difficult. But she forged on. “You see, ‘desire’ is similar to asking someone to give an ‘expected’ future. Here we do not think in terms of what we don’t have; it is about what I can possibly have,” she continued. “I told them to imagine that they had all the power in the world, and should discuss what ability they would add onto Ummeli.”

It was at this point that we realised two things:

- a) There was no concept of criticism in this particular group of users (all with the exception of two were drawn from the Xhosa culture).
- b) We had made a mistake in conducting the sessions in English.

To ensure our interpretation of Babs’ explanation of events was correct, we questioned someone intimately familiar with both the isiXhosa and English cultures. She noted that in the isiXhosa culture it is wrong to criticise, even positively. The only people allowed to are elders; and even then, it is not said as directly as it would be in English. Instead, criticism or problems are wrapped in a protective covering of positive sentiments. Hence, when Babs used the concept of *Umnqweno*, or more accurately the phrase “*Nilangazelela Utoni?*”, it literally meant “What are your yearnings?”. It captured the depth of what the users were required to understand in order to make contributions to the design process.

Because of this, we altered our evaluation approach to adopt Appreciative Inquiry [128], so we could build on this optimistic cultural inclination. (We stuck with the word ‘desire’ when making further design decisions, which explains the title of Chapter 4). In addition, the remainder of the study was conducted using a combination of isiXhosa focus groups and our ‘hanging out’ sessions, and we asked Babs to reflect back on each of the sessions.

Prototyping

My deployment of MobileCV as a high-fidelity prototype or probe was on the assumption that the users understood that the system was incomplete; we had not taken into account that they might never have encountered an incomplete technological system, and could not

articulate criticism. While explaining ‘prototype’ in English is fairly easy, translating to isiXhosa meant using metaphors of incompleteness that were relevant to this community. In this case, preparing of traditional meals was most appropriate, as it also consists of regular tasting, observation and rekindling of fire.

More formally, the notation of design decision D can be extended to include cultural aspects C where culture consists of Values (V), beliefs (B) and understanding (U):

$$D = \sum_{n=1}^K (Pi) + C ; K = n \rightarrow \infty ; C = \prod (V + B + U)$$

However, as illustrated previously with language, we are now aware that the perceived cultural aspects (C_i) are not equivalent to the actual user culture (C):

$$C! \approx C_i$$

Which means that design decisions (D_i) that take into account the cultural aspects (V_i , B_i and U_i) of the user were likely to be more accurate than those made in isolation:

$$D_i = \sum_{n=1}^K (Pi) + C ; K = n \rightarrow \infty ; C = \prod (V_i + B_i + U_i)$$

9.6.2. ORALITY

Orality describes how people think, communicate and learn in cultures where writing has not been internalised. The orality theory [289] argues that when textuality is made the standard of literacy, the identity and knowledge of oral cultures is ignored and dismissed. The theory argues that writing has fundamentally transformed our consciousness, and points out that we need to understand oral communities on their own terms rather than from our own ‘literate’ perspective. Ngugi wa Thiongo [290], [291], expanding on the concept of ‘orature’ initially coined by Piu Zirimu of Uganda, notes that in many African societies, oral traditions play a central role in knowledge representation, transmission, and expression. Orature, as defined by Zirimu and cited by Ngugi [291], refers to the use of spoken utterance as an aesthetic means of expression, pointing to an oral system of aesthetics that does not need validity from the literary. Its major elements – riddle, proverb, story, song, poetry, drama and dance – are interconnected, and employ

imagination in an attempt to explain the universe. It is a 'complete aesthetic system' in the sense that the content of an oral performance, the material and social conditions of the performance, and the worldview informing the choice of content and conditions are all integrated. Success in attaining an oral aesthetic requires four underlying conditions [290–292] :

- **Architectural space:** typically an open space, and most often a circular space. The choice of a circle is not incidental; it has a symbolic unifying import in African traditions.
- **Time frame:** relates to the functionality of a particular performance, for example work songs being performed during work time or rite-of-passage performances coinciding with the necessary time of the ritual. The length of time also establishes conditions for performance.
- **Oral mises-en-scène:** refers to the different 'ambiences' that can be created on the basis of costume, light source, etc. Ngugi [291], writes that "one can imagine the play of shadows and light on the bodies and costumes of the actors. The sources of light, whether fire, the moon, or the sun, could create different ambiances".
- **The audience-performer relationship:** This is the most important part of the performance. The audience play varying roles within performances; for example, as critics or co-performers, such as in stories "where a choral phrase or song or response" is taken up by listeners who then become a part of the action. In such "real-time" (live) performances, production and consumption intermingle dynamically.

To a casual observer, oral tradition (or as Ngugi [290] refers to it, 'orature') is an aspect that is entirely lost in the design process. Many of the methods used in design embody some form of textual literacy. Everything from questions to observations requires an engagement with the written word. As Ong [289] rightly says, this form of literacy has transformed consciousness such that we are unable to grasp how oral cultures work; furthermore, as Ngugi [290] explains, a higher value is often placed on writing, ignoring the fact that Africa primarily generates, represents and transmits knowledge orally.

Earlier in this chapter we mentioned the use of a 'local' metaphor to demystify the concept of prototypes. While this metaphor could easily be relayed as a series of generic steps for preparing food, we noticed that when Babs relayed metaphors, she personalised them and associated them with the community. The metaphor was a form of story used to pass on a message.

Another example of orature in design is the use of storytelling to improve a design as well as encourage its use. The following is a story that Babs narrated in isiXhosa, which she then translated:

“Once upon a time there was a beggar who lived in Kimberly [the place known for having the largest diamond deposits in the world]; the beggar sat under a tree, and every day, begged for something to eat. One day the beggar died. Because people knew he had loved his tree, they said ‘Let us bury him under his beloved tree.’ When digging the hole to bury him in, the people encountered a big box; in the box there were hundreds of diamonds. And everyone said, ‘Yoh! If he only knew what he was sitting on, he would never have begged again.’”

The moral of the story: if the users had cell phones, with the system already installed on them, but never used them, it would not benefit them. (The digging implies productive activity.)

This story brought with it a sombre mood, and some discussion. Babs used similar stories on various occasions to engage the users in discussions – not only regarding the system, but also about matters relating to their self-improvement.

We have listed Ngugi's [292] four conditions; two or three of them were visibly present during this study. For instance, we had started by using focus groups [293], [294], but realised that we were not getting a lot out of the session. Looking deeper, we realised there was a lot of animated talk among the users, but none of them was willing to come out and say what the discussion was about. At this point, out of desperation, we told them to group up as they wanted to, and to come up with a small presentation on their 'desires' for Ummeli. The groupings formed very rapidly (to our surprise); they were in oval/circular shape, and none had a definite leader. Our assumption was that the circular shape was really out of convenience, and the shifting leadership was because no one would volunteer

to take it up; more observation pointed towards the dynamism of the audience/performer relationship, where ideas were generated, discussed and simulated simultaneously.

No-one seemed to be bothered about other people talking over from them. This was something foreign to the culture we were accustomed to, where one person is in charge of the meeting, and people take turns to speak. While the groups were required to nominate a presenter, we saw all group members contributing; at times, groups even received contributions from people who were not in that particular group, but had something to say.

The use of riddles to pass on a message was very apparent during this session. For instance, in order to request me to add a referral feature into the Ummeli system, one of the users said the following:

“Say I work at Fruit & Veg, and my boss says that they want more workers, how do I let people know this through Ummeli?”

Pragmatically, this change of tack made it possible to do in two hours what we had been unable to do for two months. This particular session elicited design ideas for some great features (discussed in Chapter 7). The sigh of relief and the promise of progress led Babs to remark, “Why did we not think of this before?! Next time we are starting with this.”

9.6.3. COMMUNAL EMBODIMENT

The final theme we will discuss is communal embodiments, and this can be related back to Hofstede’s [242] individualism vs. collective dynamism. When ‘community’ is mentioned in Africa, it is usually used in relation to *ubuntu*. The term *ubuntu* is one that has come to be associated with African communal heritage [279]. However, looking at the word out of context does it a disservice. This is something that we experienced during the evaluation of Ummeli.

To understand the depth of *ubuntu*, it needs to be placed in the context of a whole phrase, sentence or conversation. For instance, *Umuntu Ngumuntu Ngabantu*, a phrase that we came across during this study, allowed us to experience this depth. The phrase can be translated as ‘A person is a person through other people’. This is an attitude that came across from all my users, without exception. Particularly so when we explained the concept of prototyping, and requested them not to circulate the application to their friends. There was an outcry, and a general misconception that we did not want to help the community in

general. In every session the unanimous feedback was “We want this rolled out into the whole community”.

This was captured in the report prepared by the journalist who acted as our cultural commentator [295]. There were also those who approached us privately, to request using the system for their loved ones:

“But I want to help my friend get a job!”

“My husband said he needs iJob for carpentry and driver.”

“Is it okay if I give my friend my password to use on their phone?”

To be able to continue the study without angering the users, we had to compromise. We negotiated that they would not create profiles for their loved ones, but they could use the system to search for jobs; although not entirely satisfied, the users agreed to these terms. This resulted in new user walk-ins, as they assumed that once someone had participated in an evaluation session, they were automatically allowed to create their own profile. Checking the user-assessment logs indicated even our best efforts at negotiations and compromise were unsuccessful with some. The study was meant to have 65 users (and only 45 were present at our final evaluation session), but the logs during the last day of the evaluation showed 105 unique users; a number that grew to 2000 by the time I began writing up this particular finding in April 2011.

Another issue from *ubuntu* is trust; a factor that we believe led to a challenge that still remains unresolved. All users resisted the use of passwords, even when we explained to them explicitly that it was for their own safety and for the security of their data. They still were adamant that there was no point to them. Susan proposed using role-playing to pass the message on about the importance of security. But even this did not stop the users from distributing their passwords to their friends and family for use. A final interview indicated that out of the initial 65 people, 50 allowed at least one other person to use their profile to access employment opportunities.

This brings us to the term *Siyazenzela*. After overcoming the initial hurdles of engaging with the user to participate in the design process, a dynamic form of user participation emerged. *Siyazenzela* is a characteristic of *ubuntu*, and roughly means ‘We are doing it for ourselves’. It is similar to what we would refer to as ‘ownership’ in participatory design. However, it is communal ownership rather than individual ownership; and as it was

explained to us, it has more of a sense of comradeship: “We are in this together”. This emerged especially when the users saw some of their ‘desires’ take shape in the system. For instance, initially we had only envisioned using the system to disseminate CVs – inspired by the high cost of finding employment, and observing one of the users typing out her CV on her mobile phone²³. But during one of our ‘hang out’ sessions we also observed the users who had been on our earlier study [198] searching for jobs using their mobile phone browsers, noting down addresses and contacts in a dedicated notebook. Assisting them to navigate the internet through simple ‘smart search’ tips suggested the idea of a mobile phone job aggregator. When presented with this idea, the users contributed enthusiastically to the design of the interface.

Instead of typing in a job search, the aggregator worked with job categories that were provided and rearranged by the users, based on their preferences. The feature was extended to search and aggregate training. On seeing their desired jobs popping up, the users were suggesting ideas voluntarily. For example, we did not have a messaging feature built in to the system; we had not even thought about it. But when one of the groups suggested that they would want to tell their friends about jobs, we added a feature that could accommodate referrals by suggesting a job to the system administrator. When we asked the reason for the sudden change of heart, the simple answer was “*Siyazenzela!*” – it is for us, and our community.

Another outcome from the *siyazenzela* concept is that we are assured of the continuity of the project. Initially we gave out airtime as an incentive for becoming a user; after the first round of evaluation, we noticed that users arrived with airtime already loaded into their phones. Babs suggested we stop giving the airtime. At first we thought we would lose the users – but they continued to show up for the sessions, and again they said “We are doing it for ourselves”.

But a more interesting observation is that the number of users actually increased. After an initial design of MobileCV was in place, we realised we needed actual users; we dedicated four months to the design phase. There were bi-weekly evaluation and design sessions with

²³ This CV is appended to this dissertation, with the permission of the owner.

smaller groups of 10 people over a period of three weeks, and a combined debriefing session with all the users in the fourth week. It was there that we saw the faces in the groups change as new people were integrated into the ongoing design process. While we had anticipated drop-outs, we did not expect new people to join the design process. Of note is that none of the ‘new’ users ever had to ‘play catch-up’; they were on par with the rest of the group that had gone through initial training.

Finally, as we mentioned, *ubuntu* sabotaged our planned control group experiment. While getting design ideas to improve the system was important, the users were more interested in extending the benefits to the larger community.

As we have stated more than once, we wanted to ‘make a difference’, a socio-economic difference. Our orientation was ‘where is the money?’ – or, basically, ‘we must end poverty with this project’; perhaps a little ambitious, but a guiding principle nevertheless. However, while the community themselves were interested in finding employment for themselves, they were more focused on enabling the whole of Khayelitsha, and beyond, to find the money as well. (Mazrui, cited in [296], terms this different view ‘social cultural’.)

As one user put it: “This is a very nice initiative, *sisi*, we want to be, *sisi*, we want to spread to Khayelitsha, iNyanga and Gugulethu [neighbouring and interconnected low-income areas].”

9.7. What is the make-up of this approach ?

From the above experiences, concepts, practices, theories, and principles, we note that Mediated Design carries with it several characteristics, including: it is *Culturally Blended*; it has *Communal Embodiment*; it is *participatory, interactive, and iterative* with the community; and it is a *Reflective and Consultative* process with the mediator.

9.7.1. CULTURAL BLENDING

Cultural Blending occurs when there is an interaction of cultures, exposing persons from one culture to ideas, practices, and ways of life different from their own. As discussed

earlier, Social Shaping of Technology acknowledges that cultural habits and beliefs in a community (more so in a developing world community) are the ones to shape the design of a technology [256]. Hence, the shaping of the technology is blending the technology with the community. It occurs from appropriating features, interaction modes and usage for local understanding and needs. Subsequent technologies thus involve the blending of the theories, principles and methods that brought forth the technology with the social/cultural practices of the beneficiary, developing community and resulting in new design approaches.

9.7.2. COMMUNAL EMBODIMENT

We have noted that in Africa, culture is communal; hence, any artefact introduced into the community should be encouraged or built upon this communal embodiment. In the context of mediation, note that in Africa, the presence of a mediator does not eliminate the involvement of the actual user; rather, the mediator creates a bridge that allows the community to benefit socially, culturally or spiritually. This has been translated into how communities embrace social/economic advancement, including education and the use of technology.

Thus, in order to realise appropriate interactive systems, the design process as well as the resulting system should be able to exemplify this strong sense of community. In addition to the sense of community, communal embodiment also requires utilisation of local knowledge that shapes these communities. Knowledge is created and expressed in various oral forms that are widely understood in the community. Hence, it is important to ground the design practices within this oral background to allow the community to easily participate, engage, express and organise themselves in the manner with which they are most comfortable.

9.7.3. PARTICIPATORY, INTERACTIVE, AND ITERATIVE

In UCD, involvement of the user is vital to the success of creating interactive systems. This can only be achieved through engaging the users in a participatory manner throughout the design process. This is illustrated by the various methods we have discussed that put the user of the system at the centre of the process. Also discussed were the various ways African traditional practices offer means that allow the community to interact and

participate in knowledge creation. These are approaches that are adopted in systems for a richer design experience.

9.7.4. REFLECTIVE AND CONSULTATIVE

We have noted that mediation is a consultative action that takes place between two parties, with constant reflections of actions or decisions. In the case of Mediated Design, the underlying principle is two levels of user involvement. One is community participation; the second is the use of a mediator to synthesise the design process, to translate and articulate it from local knowledge and symbolism to design language. This is a process that requires regular and cyclical reflection with the design team and with the community. The mediator sits as a proxy of the two praxis and uses reflection as a reconciliation mechanism.

9.8. What are some of the Methods in the Mediated Design Approach?

In the previous section we discussed characteristics that arose from themes that stood out throughout this study. We believe this to be one of the contributions of this work. It introduces methods that arose from taking into consideration the ‘must-have’ characteristics of a method in order for it to work in the context of our study. Having already tested this method, we want to formally introduce methods, mentioning the genesis of each.

9.8.1. DEEP HANGING OUT

As noted in section 9.3, when interviews that had been part of my design study failed, we opted to ‘hang out’ with the users as a way of getting initial ideas, as well as to get feedback on the system. Our adoption of this method was more relevant upon our understanding of *siyanzenzela*, i.e. comradeship. As explained earlier, in our attempt to maximise time spent with the community, we ended up staying for entire working days. This gave rise to friendships and intimate conversations with the users. Initially, these conversations were not intended to be part of the data collected for the study. However, they actually inspired

many of the features that arose in subsequent design stages. After the users noticed that we were interested in their social life, which extended further than our objectives, which were generally interpreted as technology, they opened up more. They started inquiring about various aspects of mobile phones, which we answered, and they traded back by giving tips on personal issues such as how to keep a man, and cooking isiXhosa meals. (You can read [297] for a detailed reflection on this.)

The phrase Deep Hanging Out (DHO) was first suggested by anthropologist Clifford Geertz [298], as a research method to immerse oneself in a cultural, group or social experience at an informal level. As noted from our experience, lessons learned from this approach may typically end up being key insights of the research outcome. In contrast to other approaches, DHO is a form of participatory observation in which one is physically present in the group for extended periods of time or for long informal sessions [299], [300]. While our concept of DHO might be slightly different, the phrase captures our proposal of a more embedded and informal engagement with the user. This method has its roots in AR, in that it blurs the boundary between the participant and the researcher, as in AR. However, by embracing the *siyanzenzela* spirit, we also became the user and a comrade, rather than a researcher. DHO was particularly beneficial as interviews, both formal and informal, had failed, but inquisition on particular actions was acceptable during the 'hanging out' sessions. Here, the users strove to enable us to reach our goals on their own initiative, for instance as was seen in the group translation.

9.8.2. NARRATIVE PROBES

Throughout the study, we noted that there was a lot of storytelling taking place at any given stage. As noted previously, African tradition is oral in nature. Here, externalisation and internalisation happened through creatively crafted oral imagery. It was a communal action that meshed practices and values passed down by word of mouth. In order to achieve an all-encompassing design process, there should be techniques to accommodate inclusion of oral tradition as the communal aspects in this social habituation.

On the other hand, probes are an excellent means of eliciting ideas. The ideas are a by-product of reflection on current status [280]. While Gaver et al. [281] note that probes are a

good form of inspiration, they require some form of skill or literacy in order for the users to engage with them, otherwise they are seemingly ambiguous to the users in developing a community setting. In the absence of the technology and the skill to use it, Hutchinson et al's [301] technology probe is highly unlikely to be effective. Instead, we propose *Narrative Probes* as a means to elicit and inspire reflective action, attitude and experience.

Narrative Probes are an oral narratives-based process that can be used to paint a picture of a system based on cultural belief. They can be drawn from various sources including oral tradition and urban legends as a means to elicit reaction to various aspects of the design process. Narrative Probes are especially important where users have no prior experience or exposure to technology. They can be used to mirror technological characteristics in a naturally understandable means to give the community of users a descriptive inspiration on how technology could affect their lives. This allows them to engage with the idea behind the technology rather than the technology itself, giving an all-round assessment of their expectations, attitudes and perception.

9.8.3. ORATORY UNITS

Earlier we noted Ngugi's [292] conditions for orature. One of them is the relationship between audience and performer, as well as the architectural space. In oral tradition, instead of having an exclusive leader and audience, these roles are interchanged. Kitzinger [302], [303] describes *Focus groups* as a form of group interviews that rely on the communication and interaction between the users in order to generate design ideas. As noted earlier, when we ran our first focus group, where Babs was the facilitator, we received no information. We had assumed that it was because Babs was intimidating the users from participating; hence, we changed our approach. When we altered the structure so that the group was not an interview process, but rather a discussion on a riddle about the system that Babs posed, we got a lot of good ideas. Further, when it came to evaluating the system, instead of the process being viewed as criticising the system, they looked at it as something to unravel, similar to a riddle.

Hence, we propose that instead of having structured focus groups with all the necessary paraphernalia and a facilitator, free-forming and flowing *oratory* units are adopted. This

can be done through changing the structure of the group to accommodate the communal practices. It is comprised of users talking to one another, asking questions, commenting, commentating and exchanging experiences and opinions. A further alteration was that there was no leader, and no-one was compelled to lead the discussion; however, a narrative or a riddle was given to start off the discussion. This was particularly useful in exploring how people think and act, and what was important to them. This is because, in a group setting, people are able to examine and clarify their opinions in a manner that individualised discussions are not able to achieve. Further, instead of the researcher sitting in the focus group, these units give a collective and aggregated understanding on opinions, attitudes and interaction, ensuring a collaborative and cooperative experience.

This approach saw the users voice their opinion as one, and a comradeship was born in the process. There was confidence building; especially in cases where there were persons in the community who were perhaps digitally and textually illiterate, socially excluded by gender or age, or who did not speak the same language as the designers.

9.8.4. ROLEPLAYING AND HUMOUR

One of the highlights of the evaluation sessions was the roleplaying, and the humour that went along with it.

Walkthroughs are described as a hand simulation of the systems or parts of it to determine that it is able to carry out specified functionalities [213]. Traditionally, walkthroughs were meant to be utilised by the design team in a lab environment [213–215]; where the prototype was peer-reviewed on given criteria, by other designers. However, with the increasing number of novice users, walkthroughs are now being used in context with real users, with walkthrough sessions being unstructured engagement between the user, the designer and the prototype [216], [217]. Walkthroughs allow for critical reflection; as users step through the various tasks, they take stock of prior actions and visualise the next step before the actual action takes place.

Situating walk-throughs in an oral culture can thus be a fun event, in which the users literally roleplay the use of the technology in a real-life setting; and when combined with the oratory units, the users adopt different characters that interact with the intervention, and act out the various scenarios of use or desired use. A related aspect to this would be

humour. While this might have been a dynamic emanating from this particular group of users, we found out that combining roleplay and humour allowed the users to engage more, allowing even the shy members to relax and participate in the exercise.

9.9. How Is Mediated Design Used?

Firstly, we are not claiming that the ideas reported above apply in all HCI4D situations. In some cases a straightforward application of UCD or PD will provide the desired outcome. However, there are times and situations that call for a mediator and culturally suited methods.

Throughout the research experience we were confronted by aspects of ourselves as researchers that made us realise the need for not only a deeply immersed researcher and designer's engagement, but also the need for an involved mediator. The involvement of a mediator and inclusion of methods similar to those used and proposed here can only happen gradually over several iterations, cycles and phases of a research and design process, as the methods adopt to the users' praxis. This leads us to emphasise and recommend that mediated design or versions of it be used in the context of an Action Research approach. AR provides the benefit of flexibility, reflection and iterative improvement on the field and on the research process.

Using the AR cycle, the first phase when you discover a new situation is to study it; then plan, act and reflect; then start all over again. Since AR is a participatory approach, all these stages will require user participation. The mediated design approach recommends that during the initial cycle of the study, you engage a mediator, while in subsequent cycles you engage both the users and the mediator. This process is summarised in Figure 48 below.

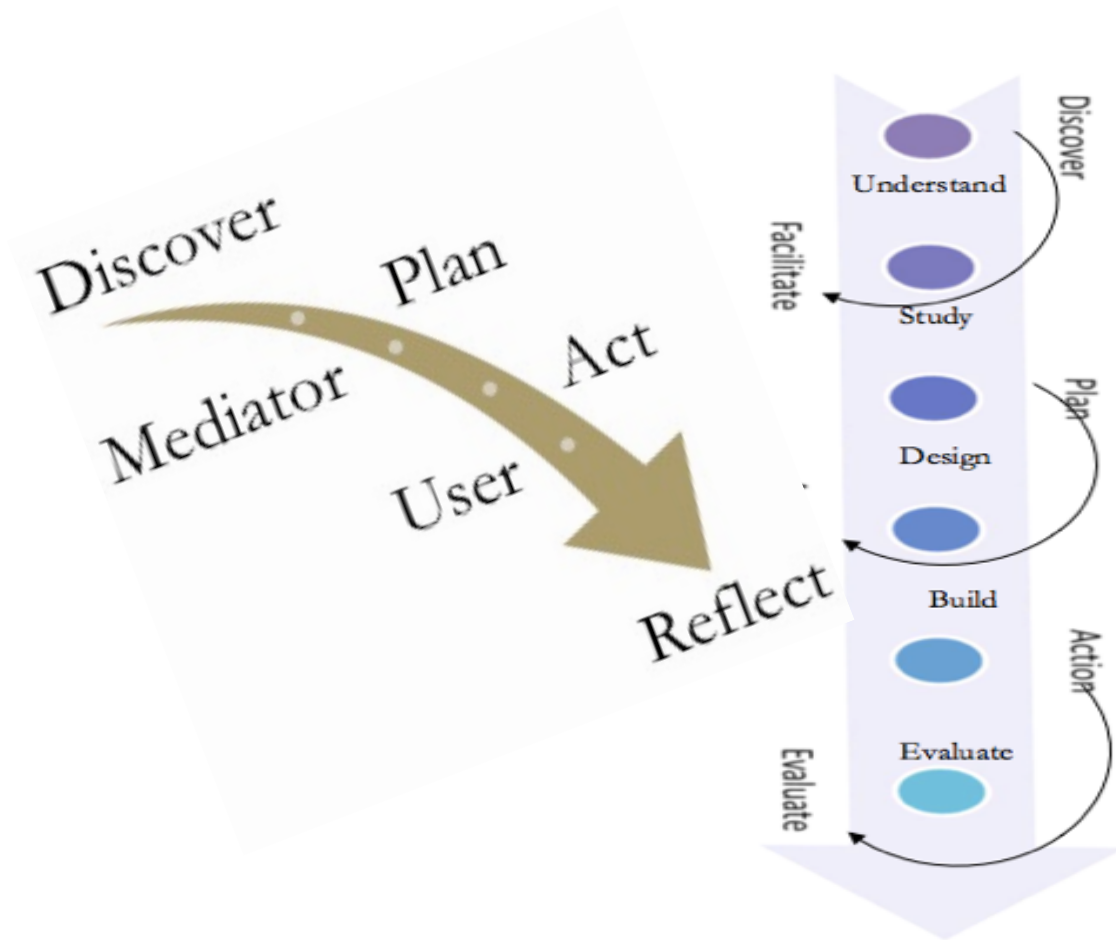


Figure 45: Cycle One, and Subsequent cycles of mediated design

In subsequent cycles, the mediator embraces the other roles in facilitating, translating, articulating and evaluating, as illustrated above.

9.10. Finally, when does one use Mediated Design?

As illustrated in this work, mediated design works best in situations where the community of users is very different from the one that the researcher is accustomed to, resulting in what we refer to as a rationality clash. So what is rationality?

In system design, 'rational' expresses elements of reasoning that have been invested behind the design of an artefact. Spohn [304] notes that actions are assessed as rational, relative to

our empirical beliefs or judgments about the happenings in the world, and relative to our interests, desires, values, and thus according to our subjective standards (Figure 48).

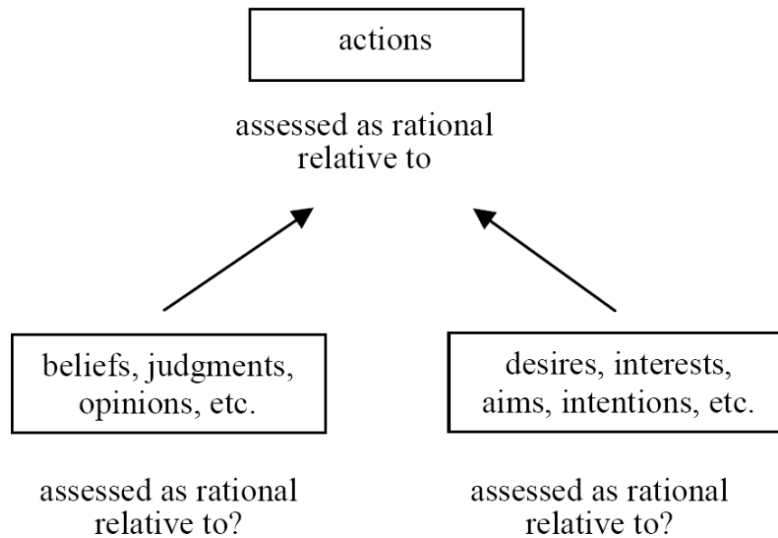


Figure 46: Rationality as determined by various internal factors, adopted from [306]

Furthermore, Weber [305] proposed that interpretation or the undertaking of an action is oriented on the past, present and future behaviour of the society. This orientation is what he refers to as rational. He categorised rationality into four different types: the first, which he called *Zweckrational* or purposive/instrumental rationality, is based on our expectations about the behaviour of other human beings or objects in the environment. These expectations serve as a means or motivation for us to pursue and attain a given goal. The second type is what he calls *Wertrational*, based on conscious belief in a value for its own sake. That is, an action is undertaken because of our own intrinsic reasons; this could include ethical, aesthetic, religious or other motives that may not necessarily lead to success. The third type is affectual, determined by our feelings or emotions and those things that we find meaningful. The final one is traditional; this is determined by our ingrained habituation, that is, the environment that we live in and the people that we live with. Further, he notes [ibid] that although the categorisation seems distinct, rationality occurs as a combination of all the orientations.

Hence, a rational clash occurs where the researcher's own rationality does not match that of the users. The clash can occur due to various factors, including when the goals of the study as well as its expected outcomes are based on contradicting values from different habituations and cultures; where research outcomes contradict researcher expectations and vice versa. In such cases you will need a mediator to interpret the rationality as well as the methods to bridge the gaps of interpretation and expectation; hence, one should use mediated design.

9.11. Conclusion

In this chapter we have attempted to distil our experience in the design of Ummeli into a proposed methodology for a culturally and socially different user and researcher/designer engagement. Navigating this engagement is a careful balancing of various factors to resolve the design mystery. We have noted that while the involvement of a mediator is of paramount importance, engagement with the real users is essential and should be undertaken for a successful design experience. We have proposed some ways to carry out this engagement, that integrate culturally relevant aspects. While these ideas worked in the case of Ummeli, we believe they can work in other cultures if we factor in how information and knowledge is collected and disseminated in those cultures.

10. Conclusion

Concluding a PhD dissertation, especially one in the EAR genre, is challenging if one is to avoid repeating what has already been covered at length. Were this a systems development-style thesis, Chapter 8 already contains what would be considered a conclusion chapter: we evaluated the system against each of the research goals articulated in Chapter 1, and commented on the functionality and utility of the system. However, in Chapter 9 we indulged in some reflection (a core part of EAR) concerning the methods we had used and the efficacy of our approach; meta-reflection, if you will. Therefore, this chapter highlights some of the key points from that reflection.

We first look at what designing Ummeli meant in the context of PhD research in HCI and in Development, as well as on South African labour market policy. In the last section we reflect on self; as EAR kindly allows for the personal reflections of a researcher that illustrate how the research process changed them.

10.1. Contribution to the Field

We would view this work's contribution to the body of knowledge in two ways: in Ummeli itself, as well as in the process that resulted in Ummeli. Furthermore, the process of developing Ummeli has a two-pronged contribution, first in introducing a new method – Mediated Design – into the field, and second in the application of Appreciative Inquiry in both Usability Evaluation and Participatory Design, a unique distinction of this work from similar research in the field.

10.1.1. UMMELI AS CONTRIBUTION

At the time of this work and the initial design of Ummeli, 2009-2011, there was no evidence of a similar initiative in South Africa or elsewhere in Africa; we even checked other emerging markets. The closest concept we came across was eCV²⁴; the user registers on their website, giving details such as email address, name, mobile number, and in what industry and city they are looking for a job. Once registered and the account has been verified via SMS, the user can then set up a profile and complete the details for a CV. They can save multiple versions of their CV, and include a cover letter as well. Once the CV has been set up, to apply for a position via email, all they need to do is send an SMS in the following format: “*ecv (email address to email the cv to) (your CV id)*”.

Another one was Souktel, which allows users to create miniature text message-optimised resumés that can be browsed by employers; Souktel subscribers then automatically receive text messages with info on potential jobs, and have the ability to browse the service's listings. Employers also have the ability to use mobile phones to browse resumés, and can contact potential employees via SMS to schedule an interview.

Ummeli is unique in that:

- 1) First, **user interaction relies entirely on mobile internet**, where users are able to create their own CV online, via a J2ME or Mobisite. The CV is of the same quality as one created on a PC, and this is inspected in terms of formatting and content

- 2) Ummeli has **implemented interaction with employers through email, fax and SMS, all from within the application itself**. This means the employer has multiple means to browse through the various CVs. The latest version of Ummeli allows employers to have an interface where they can view CVs for a particular position sent from Ummeli users.

Other than the CV creation,

- a. Ummeli allows users to upload supporting documents such as certificates, identification cards and drivers licences onto their profile from their mobile phone.

²⁴ <http://www.startupafrica.com/2009/06/ecv-email-cv-mobile-sms/>

- b. Ummeli jobs are sourced from a wide variety of sources, such that it gives the users a wide range of jobs with ranging skill-set variation.
- 3) A most attractive feature in this section is the **ability of the users themselves to upload jobs onto Ummeli.**
- 4) Fourth, Ummeli not only offers job and training opportunities, but **also looks into the well-being of the users, and offers tips and advice on how to navigate through unemployment and job seeking.**
- 5) Finally, and most definitely the most powerful feature of Ummeli, **is that is a social networking tool**, in that it offers job seekers communal support mechanisms, through interaction with other users; **basically a Job-Seekers Anonymous.**

10.1.2. THE RESEARCH AND DESIGN APPROACH

Was the approach to designing Ummeli unique? Certainly not, as UCD and EAR have been widely used to develop ICT4D interventions. However, what EAR offered was a platform and some guidelines to experiment with various methods of research and design. In particular, and as has been demonstrated, the approach saw the design process progress from UCD to HAP to Mediated Design as we adjusted the methods to field realities.

Then how is Mediated Design different from UCD, HAP and a host of other methods in the ICT4D field? Mediated Design takes the participatory approach to designing ICT4D as a culturally imbibed process. Therefore, it takes into account methods, process, and approaches used within the context of a given to knowledge generation environment

The knowledge generation is done in partnership with the community, where a member of the community who is versed in technology is used to interpret, facilitate and translate some of the logically different actions into a design.

In addition to Mediated Design, this work applied Appreciative Inquiry as a means to support Usability Evaluation and Participatory Design. This incremental use of AI was applied as a means not only to be inclusive of the community with PD, but also to add

flexibility to the design process depending on local needs and means of knowledge generation.

10.2. Implications of Designing

Ummeli

The design process for Ummeli could possibly have effects on several dimensions beyond the ones highlighted here. These are specifically and deliberately highlighted to give the reader a standpoint on issues to do with research, HCI, development and policy.

10.2.1. PHD ICT4D RESEARCH

One of the greatest challenges that I faced as a Computer Science major doing ICT4D research was the idea of combining applied research theory to ICT4D practice. The tension lies in finding the line that separates the two. Where does research end and practice start, and where does practice start and research end? Can one do ‘good’ ICT4D research, and produce ‘good’²⁵ ICT4D interventions?

This dilemma was not unique to us, and cropped up in a mailing list that consists of graduate students in ICT4D from across the globe. The most debated sentiment was that as a graduate student there is a tension between doing good ICT4D research – that is, writing good code and publishing papers – or simply to do good; that is, to help people with a practical ICT4D intervention. To complete an ICT4D project on one’s own, it is necessary to be conversant with a number of skills and disciplines; multi-disciplinarity is mandatory. And, as with all multi-disciplinary endeavours, one risks falling between the disciplinary gaps, or being seduced by one discipline or task over another. Therefore, the researcher must keep a clear idea of what he or she expects of themselves and from the community; basically, what was their motivation in going into ICT4D in the first place? What can confound research motivations in ICT4D research over many other fields is working with

²⁵ ‘Good’ in the sense of being recognized as such by the wider academic community.

participants who are vulnerable, and grappling for the hope of a better livelihood from any source by any means. Hence, each intervention in the form of research that goes into their environment is often viewed as a valuable resource rather than the ‘experiment’ as viewed by the actors (graduate student or otherwise). Therefore, the act of withdrawing an intervention at the end of an ‘experimenting’ period is like cutting off a much-needed lifeline. This phenomenon, when repeated in many of these easily accessible, vulnerable communities, leads to what has been termed ‘research fatigue’ [306]; in some cases, the community starts using the research process rather than the research outcome as their lifeline (see [237] and [238] for examples of this in Kibera, Nairobi).

In such cases the ‘experiment’, which is the research, is compromised, as elements have

“...mastered the art of selling their stories to those who pay a good price for them when they are simply supplying what the market demands. Young, relatively educated men, especially, seem to find this a viable alternative to crime. But it also compels them to ‘otherise’ their own communities, to pathologise their existence and to dislocate themselves from their day-to-day reality in order to sell convincing stories.” [238]

This is as a result of the participants never actually seeing the benefits of the research input, usually in academic journals and international conferences. More than anything, there needs to be a report-back mechanism to the community on how their input into the research process could possibly affect their lives in the immediate future.

10.2.2. IN HCI AND DEVELOPMENT

The question we asked at the beginning of Chapter 8 was: What makes an ICT4D project successful? This is a difficult question when working from two domains, HCI and Development. HCI looks at the success of the usability and usefulness of product; in this case, an interactive system. The first of these measures is using the heuristic evaluation criteria; after going through this testing, the product can be deemed useable. Secondly, the

product is checked against the user's systems requirements; that is, does it meet their needs. If the product meets the requirements it set out to meet, then it is successful.

In Development, the metrics are less clear. In Chapter 1, we looked at how development is defined, measured and approached. We noted that development is a very complex topic, with numerous ways of defining, approaching and measuring it. This multi-view measure of development makes it very hard to gauge the success of an ICT4D project, especially one done in the limited period and with the limited funding available for a PhD. These limitations are challenging, as for an absolute development project to be deemed successful, it must fulfil the sustainability and scalability criteria.

How, then, do you determine whether a PhD ICT4D project has been successful? The easiest way out is to say that a negative result is still a result, and write about it. However, there are several alternatives. The first is the aforementioned community champions, who will champion the project beyond the scope of the PhD. We applied this technique when we made L2E co-creators and innovators of Ummeli – they actually owned the process and the design. Another way would be get external buy-in; there are many individuals and organisations who may be willing to fund a good cause. Find one who believes in the project and give them the project to scale, or get into partnership with them. This was the case for the Ummeli relationship with the Praekelt Foundation; the partnership with the PF has seen Ummeli meeting both the sustainability and the scalability criteria.

10.2.3. ON POLICY

While reviewing materials to inform this work, we came across the Employment Service Bill of 2010 [181], which provides for a Public Employment Service, mandated to put together a database of job-seekers and job opportunities across South Africa. This was an exciting development that though it happened late in the research, not only strengthened the argument behind the research, but also increased our resolve to make Ummeli as effective as possible. However, what saddened us about the Bill was the mechanisms and measures that the government had resorted to using in undertaking the tasks at hand.

In one case we read that the government was procuring buses to roam the country registering unemployed people. With this mechanism, the target was to register 600 000 jobseekers by 2013; this, compared to the over 20 million people who are looking for a job. In terms of value, a new bus costs roughly ZAR 1 million (according to the Mercedes Benz²⁶ website); if the government was to procure five of these buses for the registration drive (about ZAR 5 million), then add overheads such as fuel, venue hiring and staff upkeep during the tour (approximately ZAR 500 000) – this would come to about ZAR 5.5 million in total. By any standards this is a huge amount; even with ZAR 9 billion in total allocated to such initiatives, it's still a considerable amount of money.

On the other hand, South Africa has almost universal mobile network coverage, considerable penetration and usage of mobile phones, and over 15 million of the population access the internet via their mobiles; this is without counting the other people who access the internet through existential or nomadic means, as discussed in Section 5.3. This group of users use less than ZAR 5 to go online on their mobile phones; a negligible fraction of what would be used to buy the buses.

The questions, therefore, are what if:

- The government, instead of using all the money in the manual process, negotiated with mobile phone operators to offer the registration process for free?
- The money could be used to subsidise the cost of accessing job listings?
- The government could use said monies to create employment, by using mobile data collectors living in communities to register their peers? Or set up a centre where uploaded CVs go through quality control?

We believe there are a number of ways that the government could engage with new mobile phones, the internet and the mobile internet to tackle unemployment in an affordable and effective manner.

²⁶ http://www.mercedes-benzsa.co.za/mercedes-benz/eMB/Buses/prices/buses/bus_Prices.asp

10.3. Further Research on Mediated Design

We have already discussed extensively the methodology that resulted in Ummeli, in the reflection section, and pointed out ways in which UCD and HAP were modified and adjusted, within the confines of EAR and the wider AR paradigm, to fit with the on-the-ground realities.

As researchers interested in the designing of interactive systems in Africa, it would be interesting to see whether our assertions on the unreplicability of methods holds true when it comes to Mediated Design. While it worked successfully in the context of designing Ummeli, would it work as well in designing other interactive systems in other domains?

10.3.1. IDENTIFYING A GOOD MEDIATOR

In this dissertation we have described extensively what mediation entails, and our own experience of a mediated design. However, we were placed in a good starting position, having had an existing relationship with Learn to Earn and some of its staff. Hence, when it came to identifying a good mediator, we already knew who they were and what their objectives were in the community – we already knew that they were well-known and trusted in the community. An important aspect to us was the fact that they also embraced technology as a means for change.

However, this is not usually the case. As has been documented extensively, many ICTD designers are located in countries different from their own residence; thus, in cases where a designer or researcher lacked the head-start of having previous knowledge or a relationship, how would one start identifying and engaging a mediator? This is a question that requires further research that would build up this body of work.

10.3.2. EXPLORING COMMUNITY CONSTRUCTION AND TECHNOLOGY DESIGN

The theme of community and the role it played in the research, design and deployment of Ummeli is one that came through strongly. However, our experience and discussions with those in our immediate environment unearthed the fact that the formation of community varies in different parts of the world, which in turn alters its role in how individuals perceive technology. While *ubuntu* is assumed to be a universally acceptable value in Africa, it would be interesting to know if there are variants of *Ubuntu*, and how this could affect the construction and consumption of technology.

Hence, the other thread of research that is of interest concerns the question of the construction and understanding of communities, and how this could affect the way people interact with technology. This is beyond the current hype of social networks; it can actually impact communities. We look forward to a time when Community-Computer Interaction is as common as Human-Computer Interaction is today.

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Appendix I: L2E Profile Capture

One

LearntoEarn™
Est 1989



A hand up not a hand out

GRADUATE DATABASE

GRAYLINK

YES

NO

PERSONAL DETAILS FORM

PERSONAL DETAILS	
Surname:	
Other names:	
Day time contact number:	
Gender (EE reporting requirement):	Male <input type="checkbox"/> male <input type="checkbox"/>
Race (EE reporting requirement):	Black <input type="checkbox"/> Coloured <input type="checkbox"/> Chinese <input type="checkbox"/> Other <input type="checkbox"/>
Citizenship:	
SA ID / Perm residency /Work permit:	

Do you posses a valid driver's license?	
Email address:	
Address:	
Street	
Suburb	
City	
Province	
Country	
EDUCATION:	
Highest qualification you have completed:	
1. Name of institution:	
Date of attendance:	
Name of qualification:	
Date of qualification:	
2. Name of institution:	
Date of attendance:	
Name of qualification:	
Date of qualification: (DD/MM/YY)	
WORK EXPERIENCE:	
List your work experience:	
(e.g. domestic worker DD/MM/YY)	
1. Date:	
2. Job title:	
3. Company name:	
4. Company type:	

5. Duties:	
6. Reason for leaving:	
Are you willing to relocate?	Locally <input type="checkbox"/> Internationally <input type="checkbox"/>
Type of employment you would like:	Perm <input type="checkbox"/> Contract <input type="checkbox"/> Temp <input type="checkbox"/>
Your area of expertise:	
Key achievements:	
(e.g. academic, community, sport)	
Other Skills:	
Languages:	
1. Name of language:	
	Speak <input type="checkbox"/> and write <input type="checkbox"/>
	Speak <input type="checkbox"/> and write <input type="checkbox"/>
	Speak <input type="checkbox"/> and write <input type="checkbox"/>
REFERENCES: (Full Name & Designation)	
1.	
2.	
3.	
For office use: TRAINER'S COMMENTS (Course Tr.)	
Attitude	Good <input type="checkbox"/> Bad <input type="checkbox"/>
Attendance	Regular <input type="checkbox"/> Irregular <input type="checkbox"/>
Attire / Presentation	Neat <input type="checkbox"/> Untidy <input type="checkbox"/>
Punctuality	Always <input type="checkbox"/> Sometimes <input type="checkbox"/> Never <input type="checkbox"/>
Level of Education	Post Matric <input type="checkbox"/> Matric <input type="checkbox"/> No Matr <input type="checkbox"/>

OTHER COMMENTS	
For office use: TRAINER'S COMMENTS (Business Tr.)	
Attitude	Good <input type="checkbox"/> Bad <input type="checkbox"/>
Attendance	Regular <input type="checkbox"/> Irregular <input type="checkbox"/>
Attire / Presentation	Neat <input type="checkbox"/> Untidy <input type="checkbox"/>
Punctuality	Always <input type="checkbox"/> Sometimes <input type="checkbox"/> Never <input type="checkbox"/>
OTHER COMMENTS	

I _____ attest that all the foregoing information is the best of my knowledge.

Appendix II : Ummeli Paper Prototype

wap browser

1 2 3 4 5 6 7

Next >

Personal Details

Enter your first name
shikoh

Enter your surname
gitau

Enter your date of birth
year month day

Are you a man or woman?
 man woman

Options Exit

wap browser

< Previous Next >

Contact Details > Physical Address

Enter your house number
32

Enter the name of the street
main

Enter the location
langa

Options Exit

wap browser

< Previous Next >

Contact Details > Other Contacts

Enter the postal code
1234

Enter the province
western cape

Options Exit

wap browser

< Previous Next >

Other Contacts (continued)

Enter your phone number
082 123 4567

Enter your email address
shikoh.gitau@gmail.com

We will send this C.V. to your email address

Create an email address

Options Exit

wap browser

< Previous Next >

Education > School

Enter the highest grade you passed at school
12

Options Exit

wap browser

< Previous Next >

Education > Other Certificates

Enter the certificates you have

Enter the name of the certificate
woodwork

Enter the name of the institution
learn to earn

Enter the year you passed
2007

Enter another certificate

Options Exit

wap browser

< Previous Next >

Work Experience

Enter the work you have done before

Enter the company's name you worked for

Enter where the company was

Options Exit

wap browser

< Previous Next >

Work Experience (continued)

Enter your main duties

Enter the date you started working
month day

Enter the date you stopped working
month day

Enter another job you had

Options Exit

wap browser

< Previous Next >

Languages

Enter the languages you use

Enter the name of the language

Can you speak the language?
 yes no

Can you read the language?
 yes no

Can you write the language?
 yes no

Enter another language

Options Exit

wap browser

< Previous Next >

References

Enter people who can be contacted to find out more about you

Enter their name

Enter their phone number

Options Exit

wap browser

< Previous Next >

References (continued)

Enter their email address

Are they your:

- previous employer
- religious leader
- community leader

Options Exit

wap browser

< Previous Next >

Motivational note

Enter a motivational note saying why you think you should be hired

Options Exit

wap browser

< Previous

Send your C.V.

Enter the employer's email address that you want to send your C.V to

If you want your C.V to be faxed to the employer, enter their fax number

Options Exit

Match Jobs

Job Category

Enter Text

Description

Enter Text	<input type="checkbox"/>
	<input checked="" type="checkbox"/>
	<input checked="" type="checkbox"/>
	<input checked="" type="checkbox"/>
	<input checked="" type="checkbox"/>
	<input checked="" type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>

Select All

Advanced Search

Qualified Candidates

Enter Text	<input checked="" type="checkbox"/>
	<input checked="" type="checkbox"/>
	<input checked="" type="checkbox"/>
	<input checked="" type="checkbox"/>
	<input checked="" type="checkbox"/>
	<input checked="" type="checkbox"/>

Select All **Recommend**

Interested Candidates

Apply **Send Alert**

Jobs and Skills Mediator 

All Jobs

Job Category	Description

Jobs and Skills Mediator

Jobs and Skills Mediator

Names	Contact Details

Edit CV

CV Content

Advanced Search

▾

▾

▾

▾

Appendix III: The MobileCV Screen shots

Login

Username
[]

Password
[]

Login

Register

Exit

Register

Username
[]

Password
[]

Confirm password
[]

Register

Exit Back

Create Your CV

1 2 3 4 5 6 7

Personal Details

Enter name
Milton

Enter surname
Madanda

Date Of Birth
10

August

1961

Select Gender

Close Save

Create Your CV

1 2 3 4 5 6 7

Professional Certificates

1. Hons (UCT)

2. BSc (UCT)

Add

Next >

< Back

Close Save

Menu

View/Edit CV

Send CV

Select Jobs

Select Training

Recommended Jobs

Recommended Training

Messages

Save

Exit

Select Jobs

Data capturer

Call Center Agent

Office Administrator

Secretary

Carpenter

Close Save

Send CV

Send CV

Enter Email Address

someone@gmail.com

Send CV

Appendix IV: Ummeli – Mediator

The screenshot shows a web browser window with the URL <http://www.ummeli.org/viewcv.php?username=amish>. The page features a navigation menu with 'Users', 'Jobs', and 'Training' tabs, and a 'LOGOUT' button. The main content area is titled 'Users » View/Edit CV' and displays the 'Curriculum Vitae for Amanda Ngamiana'. The personal details are as follows:


Field	Value
Firstname	Amanda
Surname	Ngamiana
Date of birth	20/1/1988
Gender	Male
Email	Amanda.Ngamiana@gmail.Com
TelephoneNumber	0788590676
Address	9152

The screenshot shows the Ummeli Mediator web application at the URL <http://www.ummeli.org/index2.php>. The page displays the 'Users » View users' section, which lists all users in a table. The table has columns for user names and actions (Edit, View CV, Download CV). The user 'Andile Magazi' is highlighted in yellow.

All users		
Amanda Ngamiana	Edit	View CV Download CV
Amanda Libala	Edit	View CV Download CV
Andile Magazi	Edit	View CV Download CV
Andiswa Tsutsu	Edit	View CV Download CV
Andiswa Mankune	Edit	View CV Download CV
Annelisa Maqanda	Edit	View CV Download CV
Annelisa Maqanda	Edit	View CV Download CV
Asanda Kuze	Edit	View CV Download CV
Asikelelwe Zokufa	Edit	View CV Download CV
Ayanda Tibini	Edit	View CV Download CV
Ayanda Nicholas Tibini	Edit	View CV Download CV

Firefox | screen shots - s... | Mediator - J... x | (JPEG Image, 32... | Applications Ca... | Native Apps Ac... | Google | Engineering Re... | (82) Twitter / H... | Nope, this isn't... | +

http://www.ummeli.org/jobs.php




Users | Jobs | Training | Update | LOGOUT

Domestic	Jobs » Clothing / Machinist All Clothing / Machinist jobs Western Cape Cutter Needed For a Clothing Factory with at least 3 years experience. 021 447 0620 View Western Cape EXPERIENCED MACHINISTS NEEDED URGENTLY! Contact: 071 242 4428 OBSERVATORY AREA View Western Cape Leather arm machinist experienced: Bags & folders. Precise, versatile, with initiative, proud of own work. R800 to R1200 per week. Full time employment. Contact 021 713 0168 View Western Cape CLOTHING FACTORY MANAGER Highly skilled manager required for large Ladies outerwear factory in Woodstock Must be able to control/discipline large staff, Must have knowledge of garment construction, be able to set & achieve daily targets and be hands o... View Western Cape WORKSTUDY OFFICER Experienced workstudy officer required for ladies outerwear. Temporary position. E-mail CV to : eise@fahrenheit.co.za or fax : 021 592 0046 View Western Cape View
Call Center	
Secretary / PA	
Administrator / Clerk	
Clothing / Machinist	
Driver	
Hotel / Catering / Waiter	

8:47 PM 7/12/2011

Firefox | screen shots - s... | Mediator - A... x | (JPEG Image, 32... | Applications Ca... | Native Apps Ac... | Google | Engineering Re... | (82) Twitter / H... | Nope, this isn't... | +

http://www.ummeli.org/training/addtraining.php



Users | Jobs | Training | LOGOUT

View Trainings	Training » Add Training Training Training details Title <input type="text"/> Description <input type="text"/> <input type="button" value="save"/> <input type="button" value="cancel"/>
View/Edit Training	
Add Training	

8:48 PM 7/12/2011

Setting up Internet on your phone

Works in the same way as the one on the computer, but on your mobile phone; many modern phones have internet on them but in order to use them you will need to activate them. You will need to dial the following codes and go to phone set-up → GPRS settings and say OK [Demonstration]

- MTN: dial *123# ,
- Vodacom: dial *111#,
- Cell C dial *143#

Using WAP

WAP is the function on your phone that allows you to go to the internet.


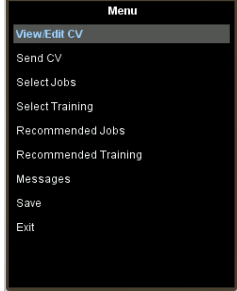
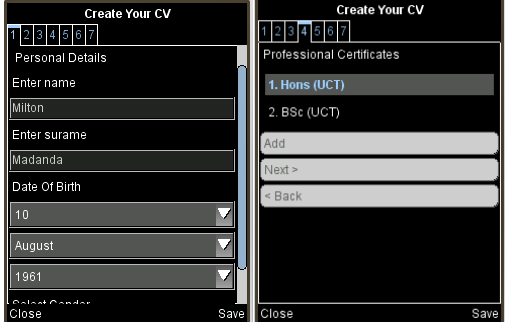
To go to the internet you will need to go MENU then WAP/Internet and select it, this however depends on your phone. Here you can put in the website address if you have it.


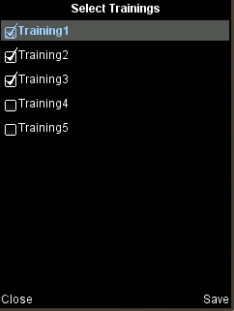
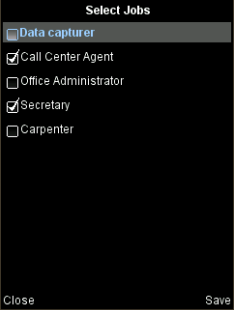
Accessing the application

Go to : www.ummeli.org/wap

Click down, continue, install, ok

The Application

	<p>REGISTER</p> <p>User Name : A name that will identify you to the system, something that you can easily remember every time you access the system</p> <p>Password: A secret word that will protect your details on the system; use something you can easily remember.</p>
	<p>FIRST PAGE</p> <p>Here you see all the features Ummeli offers , the screens to navigate through the whole of Ummeli.</p>
	<p>CREATE PROFILE</p> <p>Add information to your profile by adding or selecting one of the options.</p>

	
	<p>SELECT A TRAINING CATEGORY</p> <p>Here you select a job category whose opportunities you would want to see in your profile</p>
	<p>SELECT A JOB CATEGORY</p> <p>Here you select a job category whose opportunities you would want to see in your profile</p>

Appendix VI: Employer CV Screener

•

•

1. Organisation Profile

1.1. Organisation Name

1.2. Organisation Type

1.3. Industry

1.4. Sector

1.5. Employee Size

1.5.1. How many employees work at this organization across all locations?

1. 1

2. 2-4

3. 5-9

4. 10-19

5. 20-99

6. 100-499

7. 500+

1.5.2. Please indicate their percentage according to level of skills.

1. % Skilled Labour

2. % Semi-Skilled

3. % of Unskilled (Blue-Collar)

2. Method of Hire

2.1. What method do you use to hire your staff

2.1.1. Direct Hire Staff

2.1.2. Outsourced Staff

2.1.3. Both

2.2. If Both Please Indicate % of staff

	Direct Hire	Out-sourced
2.2.1. Skilled		

2.2.2. Semi-Skilled		
2.2.3. Blue-Collar		

3. Communication

3.1. How do you communicate about new positions (Please rate according to frequency, with 1 being least frequent and 7 most frequent)

	1	2	3	4	5	6	7
3.1.1. Internal Notice Board							
3.1.2. Newspapers Columns							
3.1.3. Newspaper Classifieds							
3.1.4. Online Career Portals							
3.1.5. Online Classified Ads							
3.1.6. Internal Emailing							
3.1.7. External Email List							

-
-

3.1.8. Others (Please Specify)

-
-
-
-

3.2. What are your preferred ways to receive applications (Please rate according to level of preference, with 1 least preferred and 7 most preferred)

•	• 1	• 2	• 3	• 4	• 5	• 6	• 7
3.2.1. Drop-in							
3.2.2. Email							
3.2.3. Fax							

3.2.4. Calls							
3.2.5. SMS							

•

3.3. How do you communicate with potential candidates (*Please rate according to level of preference, with 1 least preferred and 7 most preferred*)

•

	• 1	• 2	• 3	• 4	• 5	• 6	• 7
3.3.1. Email							
3.3.2. Fax							
3.3.3. Calls							
3.3.4. SMS							

•

3.4. What are the criteria used in screening a candidate based on their CV (*Please rate according to level of importance*)

Appearance and Style (<i>Visual Appeal</i>)							
Content and Layout (<i>Does it contain all the relevant information in collect flow</i>)							
Completeness and Length (<i>Does it have the correct information and in the right length</i>)							
Professionalism and Integrity (<i>Does it contain any errors – grammatical etc</i>)							

Others (Please Specify)

Given the above criteria, please evaluate the attached three CVs.

CV Sample A

Appearance and Style <i>(Is it Visually Appealing?)</i>							
Content and Layout <i>(Does it contain all the relevant information in correct flow?)</i>							
Completeness and Length <i>(Does it have the correct information and in the right length?)</i>							
Professionalism and Integrity <i>(Does it contain any errors – grammatical etc?)</i>							

Other

What did you like most about this CV?

What improvements would you recommend on this CV?

Other Comments

CV Sample B

Appearance and Style <i>(Is it Visually Appealing?)</i>							
Content and Layout <i>(Does it contain all the relevant information in correct flow?)</i>							
Completeness and Length <i>(Does it have the correct information and in the right length?)</i>							

Professionalism and Integrity <i>(Does it contain any errors – grammatical etc?)</i>							
--	--	--	--	--	--	--	--

Other

What did you like most about this CV?

What improvements would you recommend on this CV?

Other Comments

CV Sample C

Appearance and Style <i>(Is it Visually Appealing?)</i>							
Content and Layout <i>(Does it contain all the relevant information in correct flow?)</i>							
Completeness and Length <i>(Does it have the correct information and in the right length?)</i>							
Professionalism and Integrity <i>(Does it contain any errors – grammatical etc?)</i>							

Other

What did you like most about this CV?

What improvements would you recommend on this CV?

Other Comments

Appendix VII: Question Guideline, 6 Months

Bio

Gender

Age

Level of Education

Additional Skills

Are you employed?

- Nature of Job (Part-time, full time):
- Monthly Income: is it enough? How much do you think it would take to live comfortably for a month?
- How long have you held it for?
- Number of years worked in total (this job plus other jobs you have ever worked)

Experience

If unemployed:

- Duration of unemployment
- Are you actively looking for employment? How would you typically look for employment?
- Reason for unemployment
- Have you attempted to search for employment in the past month, week?
- How much would you use in typical job search exercise. [is this about money? Unclear]

Household Details :

- Adults [] Children [];
- Employed [] Unemployed []
- Total Household Income

- Number of Dependants (Are there people in the rural home that you support financially, How many?)

Searching for Jobs

Do you have a CV?

If yes? (other than Ummeli)

Did you make it?

If yes: Did you know how to make it, or did you get help making it? If you got help, where? Who describe? **[what does this mean?]**

How much did it cost?

What is the last job you applied for? How did you find out about it?

Technology/Mobile Phones

Have you ever heard about the internet?

What is it?

Have you used it? Where? Show me?

Do you have a mobile phone?

What do you used your mobile phone for?

Do you use MXit? What other things do you on the phone apart from calling and SMSing? (Bluetooth, music, pictures, video, games)

Does your phone have a camera?

Do you use it? Tell me some of the things you use it for.

Do you take pictures with your phone? How many do you take in a week?

UMMELI

Have you heard about Ummeli?

Would you describe it for me?

What do you think of it?

Have you used it?

What did you do when you last used it?

Can you show/describe it for me?

Does it make you feel more confident in finding a job? Why?

Are you happy with it? What makes you happy about it?

Would you use it alone or with other ways of finding of employment?
Have you told anyone about it? In what context? Who did you tell? Were they interested in using it?
Having gone through the training, would you be willing to train others how to use it?
Are you happy with it? Tell me some of the ways that you would improve the system if you had the power to do so? (Give peoples paper to draw)
If you were to describe Ummeli in one sentence, please do so? In one word ?

Susan

Mission, vision and goals of learn to earn
What have you done to try and meet them?
Number of graduates per year? Growth rate since inception?
Motivation behind each of the programmes?
Average age, literacy level?
Percentage of females and males?
According to you, what are the rates of success in achieving your mission?
How do you measure this success?
Job Placement is one of your goals, do you mind describing to me what are the ways you have tried to meet this goal?
The challenges that you face? Ways you have tried to overcome them?
Describe to me Graylink? How did you get it? What are its advantages? Does it meet your goals? Does it meet student goals? What has been its success? Before Graylink, what are the ways that you tried to meet this task?
About Ummeli?
What do you think about it?
According to Shikoh, the idea was created primarily from what you do? Would you mind describing this process for me?
What are the things you would have done differently?
Are you happy with the outcome of the process? What are the particular areas that you are happy with? What would you want the system to achieve? If there was a chance for further improvements or functionalities, what would they be?

Have you had a chance to talk to the students (or Babs) about the project? What is your general view on the system based on this reaction?

Babs

Do you mind describing to me what your job at Learn to Earn is?

How long have you been doing it?

You have a program that empowers students with life skills. Please describe this.

Job placement is one of your roles. Please describe to me the various steps that you take to empower a student to find a job.

Describe Graylink to me. How did you get it? What are its advantages? Does it meet your goals? Does it meet student goals? What has been its success? Before Graylink, what are the ways that you tried to meet this task?

About Ummeli?

What do you think about it?

According to Shikoh, the idea was created primarily from what you do? Would you mind describing this process for me?

What are the things you would have done differently?

Are you happy with the outcome of the process? What are the particular areas that you are happy with? What would you want the system to achieve? If there was a chance for further improvements or functionalities, what would they be?

Have you had a chance to talk to the students about the project? What is your general view on the system, based on this reaction.

Appendix VIII: Report Back , 6 Months

My observations by Elvis Dyosi, sent 11/15/10 4:05 PM

This is a report on my observations on the interviews I conducted at Learn to Earn in Khayelitsha to assess the use of a downloadable mobile phone application (Ummeli) produced by Shikoh Gitau as a means of facilitating an easy and more affordable means of searching for employment and to assess mobile phone use in the township (i.e. Khayelitsha)

About Learn to Earn

Learn to Earn was established in 1989 as the Baptist Training Centre. It was renamed Learn to Earn in 1995 under the directorship of Roché van Wyk. Since inception, over 8 800 people have been trained through Learn to Earn. Learn to Earn has its training centres in Khayelitsha, a township 30 kilometres from Cape Town, and in Zwelihle, by Hermanus. One of its objectives is to enhance the quality of life of people from disadvantaged communities and facilitate the restoration of self-respect and dignity, and they aim to do this by training and equipping unemployed persons in various skills, inter alia: sewing / garment-making and carpentry, so that they may become self-supportive and independent (from Learn to Earn's vision statement).

About technology or mobile phone use

Internet

All the participants had a general knowledge as to what the internet is and this knowledge differed per age group. The participants who ranged from 20-25 years seemed to know more about the internet compared to those from 30 upwards. But in both cases the participants noted that they access the internet mostly on their mobile phones as opposed to accessing it on personal computers or laptops as is traditional. However a point worth noting is that the general view that the participants had of the internet was of a space where one can go to and search for information and not a space where they can go and upload information themselves.

On mobile phones

All the persons interviewed had mobile phones and most of the phones had GPRS which allows them to access the internet. The participants told me that they mostly use their phones to access applications such as Mxit, The Grid and Facebook; other than this they use their mobiles to capture images which they sometimes share with friends and family.

On Job Searching

Job searching for people in the townships involves among other things spending money on transport, compiling CVs and many other issues. My interviewees, being people from the township themselves, were no exception, and one of their fears was that the CVs they drop at the box that says leave your CV here at Pick n Pay never get any further than the dustbin. Furthermore they raised the unusually high cost of putting together a CV as one of the major setbacks in the process of getting a job. The costs of putting a CV together is estimated at around R20 for a four-page CV with each page costing R5, plus additional cost for making copies which is about 50c a page. This is taken into account together with the transport fees that one would need to go and submit the CVs at the various places in question at that given time.

About Ummeli

One of my interviewees told me that Ummeli is like a 'classified' (advertisement), only now in a mobile phone. Ummeli seems to be an answer to all the problems encountered by the township people who are searching for jobs, and I suspect that was the main reason for its creation. However as with all technological innovations there's always space for technical problems and Ummeli according to the interviewees who have been using it is no exception. Neliswa, a graphic design student at Learn to Earn, for instance, highlighted that it is not easily usable on all handsets; she said, "I would have used it more if it had worked on my phone." Her phone is a Samsung E250 model and according to Babalwa, a Placement officer at Learn to Earn whose job description includes working hand in hand with the students in using Ummeli, highlighted that they have been having problems with the Samsung handsets since the inception of the application (i.e. Ummeli).

Ummeli, however, has been a blessing to the people at Learn to Earn especially in helping the students with job hunting and compiling CVs. Babalwa told me that before Ummeli they were using Greylink to load their students' CVs online, this she says was a tedious duty as she had to do it in conjunction with other duties and she barely made progress at it. So with Ummeli all she has to do is to show the students how to download it and from there it's an each one teach one scenario, and to date she says they have over 60 CVs already uploaded in Ummeli in a period of merely two months, while with Greylink, which they started using in 2005, the number is far less.

Babalwa also told me that there is a newer version of Ummeli which was introduced in the course of my interviews and she believes it now operates with no hitches. She however mentioned the digital divide as a persisting problem stating that some of the students don't have mobile phones that have GPRS and therefore can't access the internet making it hard for them to use Ummeli as it is, and there's not much they as Learn to Earn can do about that besides suggesting that they (the students) upgrade their mobiles. She also mentioned that the newer version comes with a feature that allows the user to add attachments which is something she has listed as a weakness of the application before and is very happy that it has been enabled.

Students' suggestions on how to improve the product

With the hype/feedback I got from the interviewees about Ummeli I then asked for their opinion on how they would improve Ummeli as a service. Neliswa said: "I would make it to connect faster, and also have it work on computers, because I've heard it only works on cell phones, and also set up a website for it." Nandipha had this to say: "I would make it faster, just like when you send a message you go to create messages and then you write and I would make it fast like that because now it takes longer," and Anelisa said: "I would fix the current problems that it has now and also include information about education like tertiary courses and school that offer certain courses."

There were many other brilliant ideas on how to make Ummeli more productive for the community as a whole and there were mixed feelings as to the question of opening the service to the larger community. Some felt it was a good thing, whilst others seemed to be enjoying the privilege of being in the know. Yolisa (36) said even though they are not encouraged to tell the rest of the community just yet, she enjoys the feeling of bragging to her friends about her CV which is on her phone, while they have no clue that this is even possible.

Final Remarks

In my final remarks it is important to note that not all the interviewees were quoted in the above information. Their sentiments were, however, noted in the composition of this report. I must say that for me as a person who had never heard of Ummeli prior to this project the feedback I got about the product from those who have used it was a positive one and there were reports of people who had been hired through applying via Ummeli. There was of course a unanimous outcry about the technical problems the product was giving of late. Overall the result yielded from these interviews is a positive one that shows people are happy with the project, and are looking forward to using it in the future.

Appendix IX: Interview Script, 26 Months

Introduction

Ummeli has been in existence for two years, first as a research project at the University of Cape Town, and now as a product with the Praekelt Foundation. Since its initial deployment Ummeli has scaled from its initial area of deployment in Khayelitsha, Cape Town, to being used by users across South Africa.

This exercise is aimed to look into how Ummeli is perceived by this new group of users; what do they like about it, what are their greatest frustrations, and what would they want to see Ummeli grow into.

Based on the feedback of this exercise, we would like to measure Ummeli against its initial objectives, as well collect some user needs that could grow into new features for the future of the product.

Method

This exercise will be in the form of a 15-minute phone interview; a randomly-selected group of 20 users who are currently using Ummeli and have interacted with the platform will be contacted. From a list of 100 posts, on the “my Ummeli story” exercise, we will select every 5th post as a potential participant, and then every 4th post if the 5th post is not available.

Key Questions and Concerns

Where do you live?

How old are you?

How long have you been using Ummeli?

How did you find out about Ummeli?

What do you like about Ummeli?

What is your favourite feature?

What don't you like about Ummeli? / How do you think we can improve Ummeli?

Do you currently have a job? What job do you have? (If you do not currently have a job, what was your last job?)

How much do (or did) you earn in one day? (*optional question*)

What do you need most at the moment: education/training OR a job?

Have you told anyone about Ummeli? Who? What did you tell them?

‘Did you get a job on Ummeli’?

An analysis of 327 responses from a
subsection of subscribers to the career portal

August 2012

[Type the abstract of the document here. The abstract is typically a short summary of the contents of the document.]

INTRODUCTION

'Ummeli is a mobile-based job search and career portal hosted within YoungAfricaLive on Vodafone Live! It was built and launched by Praekelt Foundation in October 2011 and currently has a user base of 80 000 people and is growing daily. Its purpose is to create a gateway for youth and low to mid-wage employees to enter into the mainstream economy. This is done through the non-traditional means of using a mobile phone to join a network of connections of potential employment. It provides information on a range of opportunities such as personal/self-development, career opportunities, bursaries for further study, short courses, volunteer positions, internships and job opportunities. Users are also able to create 'user profiles' which can later be converted into CVs and used to apply for jobs. They are also able to submit these CVs by email for free for the jobs that they might be interested in. Ummeli, however, not only aims to link job seekers with work, but also seeks to empower communities to create their own opportunities by providing tools for communities to put together their own projects. Apart from the content featured on the platform, which highlights 'how-to' guides for entrepreneurs, it also showcases motivational stories about successful entrepreneurs who have been able to create opportunities that have changed their lives.

Having operated for over a year, the staff members attached to this project requested a mid-term evaluation of whether the job search/career portal was working. The aim was that the findings from this analysis would be presented to them in a workshop, to facilitate a discussion on their strengths and potential areas of improvement. This resulted in this 'analysis' being conceptualised, whose aim was to investigate whether the subscribers to Ummeli had secured employment through the use of this job search portal. Once this question was answered, a second question arose, concerning why individuals were able or unable to secure employment. An analysis of 327 responses to the question 'Did you get a job on Ummeli?' (which had been posted on the portal) was conducted.

This report will provide a descriptive discussion on how this analysis was conducted. It will begin by outlining the method that was used to analyse the

written responses, before providing a more detailed discussion on what the specific findings were. Based on these findings, there will be a brief section on some key questions and points for discussion - based on some thoughts and questions that arose for me as I examined the data. The purpose of this section is to highlight some of the areas that could be unpacked in more depth, in the feedback/workshop session. This report will conclude with a few suggestions/ recommendations that were highlighted by users on the portal that can be used to ensure that ‘Ummeli’ becomes more proficient in achieving what it set out to do.

METHODS

The process of reviewing the responses began with carrying out some background reading on the overall project to better understand the purpose of Ummeli and how it works. The purpose of this was to understand what the project had initially set out to do, before analysing from the responses whether it had followed through on its mandate.

The purpose of Ummeli, which was derived from the ‘organisation’s website, was “Ummeli is meant to be a practical tool that helps communities create their own employment opportunities ... by sharing and setting goals that allow them to initiate their own projects...How it works is you create a profile to market yourself; connect with others; share ideas and tips; find out about self-development opportunities, training courses, or how to get involved in a community project; job searching; sharing jobs; and reading inspirational and motivational articles”.

The next step was to read through all the responses, to get a sense of how many participants had secured employment, how many had not and, if not, were there any reasons cited for this? Through this initial reading, it became apparent that a number of users had posted the same comment more than once and as a result there were numerous repetitions.

<p>IPP, Page 10, Batch 1</p>	<p><i>I didn't get a job from this site but i'm hoping to get job soon as i'm seeing progress into this site.i'm encouraging job seekers in ummeli to be patient and never loose hope,ummeli takes people to new lives.</i></p>
---	---

□	IPP, Page 10, Batch 1	<i>I didn't get a job from this site but i'm hoping to get job soon as i'm seeing progress into this site.i'm encouraging job seekers in ummeli to be patient and never loose hope,ummeli takes people to new lives.</i>
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There were also some users who had not directly answered the question asked and either submitted their personal information to seek employment, used the comment section to discuss various life challenges they were facing or submitted reasons for why they liked or disliked 'ummeli'.

P, page 7, batch 1	<i>we all hv dfferent opportunity in lyf,all of us we need gr8 things in lyf,ummeli is a gr8 web 2 try ur lucks.</i>
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The result of this first read through was that the repetitive comments and those that had not answered the question were identified and removed from the data pool, and were coded as;

- Irrelevant – which included the respondents that had not directly answered the question, but may or may not had provided some feedback that was deemed useful for Ummeli.
- Repeats – included all the responses that had been posted more than once.

With the responses in the irrelevant section, I chose to include them in the suggestions section at the end of this document as some of the responses provided data that would be useful for Ummeli, and as far as the repeats were concerned I ignored them completely.

The remaining data was then read through a second time and with each reading, the question was asked 'Did you get a job on Ummeli'? From this reading, the data was coded into 3 categories, based on the responses.

- Yes - which included all the respondents that had found jobs through using Ummeli

S	<i>I was sitting at home and started to login inside my phone internet and find a work</i>
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a good work.

•

M P, Page 3, Batch 1 *ummeli it is very good and easy way find a job, i thank god to show Ummeli, you help me to get a very wonderful job, so anyone sees Ummeli please and join cause it is your chance to get Ummeli wakho, love you lots*

•

P, Page 7, batch 1 *I was not working and im living with my family life was hard no food no money no nothing then a friend tell me about ummeli and then i join ummeli i keep on tryng to find a job and then one day my phone ring ,i didnt who is that and then some one said u got a job ooh i was so happy i jumped a lot i told my family and they were happy for me now i work im happy and i can put food on the table , i would like to encourage youth that dont loose hope and hold on to ur dreams so that ur dream can come true and i would like to give a big big thank u to ummeli u've changed my life keep on doing great job if it wasnt u ummeli i wouldnt be here where iam ,may god bless you and give you strengh to do more great job ,thank u*

•

• No – included all the respondents that had not or did not find jobs through using ummeli.

S- Page 1, Batch 1 *No i did not get any job its been 6 months now i have tried and tried nothing but that does not mean i will stop using it,i will keep on trying*

•

B- Page 2, Batch 1 *Since i joined ummeli on january,no one i heared him saying they got job from ummeli.I dont see any discharges since i've joined ummeli.Always i see people seeking the jobs at ummeli,not getting jobs and no one get interview.I always lossing hope cause when i think to post the jobs that i seek,i disappointed.Other jobs seeker see that no jobs than they seek for love.Many people have experience/skilled but nothing can helped us to get jobs to live*

in a peaceful life.Ummeli please make discharges for the people,most posted jobs from people they need money,jobs seeker always want job to get money/gave us job after getting it we can gave u money people.PLEASE HELP US ALL UMMELI.....

•

***B T, page 3,
batch 1*** *actually still i didn't got a job up to so far but i won't give up on writting at Ummeli i hope one day you will help me Thank you.*

•

• Interviews included all the respondents that had not yet secured employment but had been invited for an interview

***INJ,
Page 6,
Batch 1*** *I started to know Ummeli two months ago,day and night searching job as if i was playing, i was doing for just and funny but miracle just happen to me yersterday,i wasn't expecting a call of work or to asked to be interview.I hear my phone ring when pick up the phone they state their name asked if they are taking to the right person,when i reply by "yes",they say you asked to be interview.I'm so excited'UMMELI GAVE ME A JOB*

The data was then analysed for a third time to examine if there was any more detail that had been provided for why some individuals were able to secure employment and why others were unable to do the same. For this analysis the data under 'yes, no and interviews' was examined.

The section above highlighted the method that was used to examine the responses that had been posted on the Ummeli website to the question asking 'Did you get a job on Ummeli'. Examples of some of the responses that could be found in each of the categories have also been provided. The next section will provide a more detailed discussion on some of the findings from the data that was analysed. It will be divided into 2 sections; numerical findings and thematic findings.

FINDINGS

The purpose of this section is to highlight what was found after the responses were examined. The numerical findings section will answer the question 'Did you get a job on Ummeli' and will detail the percentages and numbers of responses that had secured employment, had not secured employment, or had been able to secure an interview. The thematic findings will answer the question of 'Why did you/didn't you find a job on Ummeli' and will discuss the specific reasons that were cited for this.

Numerical findings

As was noted in the introduction, there were 329 users that had responded to the question 'Did you get a job on Ummeli?'. However, after analysing the data it was found that 2 respondents had posted their messages in two parts and thus these were coded as 1 response instead of 2, bringing down the number of responses to 327.

Of the 327 responses;

- 31 respondents had found jobs on Ummeli
- 135 had not found jobs on Ummeli
- 7 had been invited for interviews
- 96 did not respond to the question and were coded IRR
- 58 responses had been repeated more than once.

This, then, concludes that of the 327 final responses that were examined, only 173 responses – from the ***yes, no, interview categories*** – were analysed for whether they had found a job on Ummeli or not. The other 154 responses were either coded as irrelevant or repetitions.

We can then conclude that of the 173 responses that were analysed, 17.91% of the respondents had secured employment using Ummeli, 78.03% had not secured employment via Ummeli and 0.57% had been invited for an interview with a potential employer that had been found via Ummeli²⁷.

²⁷ It is important to note at this point that whilst the numbers for those that did not secure employment are much higher than for those that did, these findings are based on only 173 respondents which comprises of 0.25% of the entire Ummeli user base of almost 80 000 people.

 **Thematic findings**

As mentioned above, this section will discuss the specific reasons that were cited by the users for why they had or had not been able to secure employment with Ummeli. It will be divided into 2 subsections; “Why I was able to secure an interview/employment” and “Why I have been unable to secure employment”.

“Why I was able to secure an interview/ employment”

A number of respondents pointed out that because Ummeli is free it opened up an opportunity for them to apply for jobs that they otherwise wouldn’t be able to access.

One of the most important factors linked to this was the expense involved in buying newspapers and career guides which were a primary source of where they could access information about which jobs were available for them.

<i>G N, page 3, batch 4</i>	<i>I like ummeli,it is free,helpful,ummeli big up you got my vote,i used ummeli to find work,helping others to find work too,!</i>
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A second reason that was cited for individuals securing employment was the availability of an online CV tool. This tool allowed them to create a CV which was the first key to them accessing these job opportunities.

<i>N K, page3, batch 1</i>	<i>..... I sow a poster of a work that i meet it requirements and responded by emailing my work profile, they also responded informing me about the place,date and time for interview.....</i>
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<i>G N, page 3, batch 4</i>	<i>I lost hope,but since ummeli was automatically introduced to my internet life my hope was rebuiled,now i'm working,earning and enjoying life because of ummeli ,the most thing i like about ummeli is that we create cvs online, applying job online via email</i>
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A third reason that was highlighted was the usefulness of the articles and tips on interview preparedness that were key in their succeeding at the interview level.

<p>N K, page 3, batch 1</p>	<p><i>....the tips I read here help me a lort to remove fear and secure an interview, the tips of using my skills to make money also help me make extra profit, I learnt a lort from your role models I study and adopt the process of their success....</i></p>
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Finally, some respondents also pointed out that ummeli had opened their eyes to the numerous choices they had in terms of job opportunities, skills development or considering finishing their matric so as to access more opportunities

<p>T, page 1, batch 2</p>	<p><i>yes i did get a job i saw the post on ummeli and then i applied iam now permanet as a call centre agent in company called vodacom i now working i wont suffer again because at home im the older one my two sisters are still at skool we lost our parents on 2005 since then life for us was very tough so i thank the ummeli users they changed my life if it was'nt for them and their motivation tips maybe i would'nt be here thanks to you my brothers and sisters may god bless u all</i></p>
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<p>NC, page 7, batch 3</p>	<p><i>When i join ummeli i did see different kindz of job that i wl learn for and it give me hope</i></p>
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“Why I have been unable to secure employment”.

No money to travel to the interviews, which were at times located far from their homes. There was also a lack of finances to buy airtime to call the prospective employers or to even print their CVs or buy newspapers

<p>ND, page 6, batch 3</p>	<p><i>Ummeli has helped me in so many ways. It has brought me closer to the outside world and individuals who are also seeking jobs that I can interact with. Buying a paper everyday just for the jobs section is pretty expensive,</i></p>
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since I'm not working, but ummeli is giving it to me free of charge everyday all day with free Email.

n, page 4, batch 3 *people do not afford to buy the news paper every now and then,so this site must try and post the vacancies that are in the newspapers e.g the herald,even post e.t.c. please help us the are so many people that are using this site.*

A number of respondents pointed out the extensive number of job openings in Gauteng, Western Cape and KwaZulu-Natal, but a gap in other provinces such as Mpumalanga or even North West Province.

n, page 5, batch 2 *i did not find any job o n ummeli,but i am still looking.the jobs that are advertised here are in gauteng most of the time.*

0, page 5, batch 2 *No i did not find any job o n ummeli. I live in platinum city, Rustenburg. No jobs here*

There were some respondents who stated that there were not enough jobs that were being posted on the website. This response led me to register as a user on Ummeli and I found that there were several hundred jobs that were available on Ummeli, yet many of the respondents pointed out that there were not enough jobs available. This brought to the fore the reality that these positions require particular skills that the majority of the applicants are not equipped with and as such it would appear that there are not enough jobs suitable for them.

n, page 3, batch 2 *I am looking for a job but I did not get one here, as there are no jobs. This website is useless, thank you*

A number of respondents pointed out that they had applied for jobs. However, either they were not invited to come in for an interview or the relevant

organisations did not respond as to whether the applicant had found a job or not and subsequently they spent a number of months awaiting responses.

Sph- P2, Batch 1	<i>Idnt get job on ummeli every day I send my CV but they didnt respond whether I get it or not</i>
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Sh, page 2, batch 2	<i>I never found any job at this site , but I have hope one day I will hear something from the companies that I applied from.</i>
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Some respondents reported system errors where they were unable to upload their data sufficiently when applying for jobs. This included tabs that were not working, as well as links that would time out.

A &S, page 2, Batch 4	<i>I did not get the job because when i send my cv it says i must complete it by filling the latest grade passed and i did but it keeps on telling to fill there i dont know what to do now</i>
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Some respondents complained that a number of the opportunities that were uploaded were not 'legitimate' jobs in that applicants were at times asked to pay a joining fee in order for them to jump start the application process, and others did not exist.

M, page 4, batch 1	<i>No i did not get a job from ummeli. according to my view and from what i have experienced -the site is now full of scams more especially in Call centre jobs. They did advertise that they have a vacancy, when you call them, they will tell you to come with R200 for admission fee. As a job hunter ummeli is a good site for us,but i think you (ummeli)must come up with a solution so that the scammers be warned not to rob people from your site and i also suggest that sometimes the job adverts must be proved that they really exist before published.</i>
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There were a number of respondents that had not found jobs but had been motivated to start their own business and to become self-employed and in turn they were employing other young people as sales agents.

<p>K M, Page 1 Batch 1</p>	<p><i>Ummeli has been of great help to me because it has helped me connect with other job seekers and share information with them on available jobs and opportunities. Though i am a postgraduate with a BA Honours degree ,finding a job is difficult these days,so instead of mourning and complaining about scarcity of jobs especially to educated young people like me ,i opened my own small business selling Avon beauty products. I am now a sales leader and providing part time employment to many young people in my community as sales representatives. I would like to advise all Ummeli users to do something for themselves instead of waiting someone to employ you.</i></p>
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<p>GM, page 1, batch 3</p>	<p><i>I have always admired beautiful things artwork,fashion and jewellery that i want to design one day, i saw and article that said if you cant find a job why dont you create one and it heat me! i am pretty creative i could use that to earn a few bucks...so i bought a starter kit beadbox with alot of things and instructions on how to make them.then i started doing lovely pieces and sold them around my kasi even my mother helped by selling at her workplace and i got some bucks and it helped me alot and till now iam going to ask my cousin to help me put some at her salon to create some clientele. thank you ummeli for helping me realise that i have my future at the palm of my hands litellary!</i></p>
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Finally, although a large percentage of individuals did not secure employment, they were still hopeful that one day they would and they were encouraged to keep using the website

<p>S- Page 1, Batch 1</p>	<p><i>No i did not get any job its been 6 months now i have tried and tried nothing but that does not mean i will stop using it,i will keep on trying</i></p>
--------------------------------------	---

L M, Page 1, batch 1	<i>Wow with this new ummeli im realy inspired,encouraged,motivated. Yes im still never secure any interview nor employment, but not loosing any hope that i will at sometime secure one or be employed through this ummeli network.</i>
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This was also coupled with a number of respondents stating that although they had not secured fulltime employment, the tips posted on the site were extremely useful.

P, Page 5, batch 1	<i>finding a job here on ummeli is kinda difficult... but when it comes to tips, advice and motivation we apreciate that a lot it does help u7 as we are unemployed .lets keep this site a site a where we can get jos,bursaries,learnerships.but al in all its getting us somewhere.</i>
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N, Page 2, batch 4	<i>Ummeli is an inspirational youth portal and when you feel like your world is tumbling down on you there is always something motivational and inspiration to give you hope and happiness. I'm stil looking for a job and always have a hope that when time is right i will get it . I use some tips to inspire other young people in my area and they are loving it.keep up the good work guys for what its worth you are doing a great job to give hope and value to the youth. Thanks for that you are amazing</i>
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KEY THOUGHTS/ QUESTIONS

Having examined the data, a number of key questions and points of discussion were raised.

From the analysis, one of the key points was the need for ‘Ummeli’ as a project, to locate itself within the national broader discourse in relation to youth unemployment.

✚ Where does ‘Ummeli’ fit in, with the ‘current ongoing conversation’ between various stakeholders as well as the national strategy on how to respond to youth unemployment?

✚ As a forerunner to the integration of ICTs and youth unemployment in South Africa, what strengths can ‘Ummeli’ bring to the forefront that will allow it to operate on an equal playing field with other stakeholders who were responding to this issue?

- Was this project aware of what was happening in other sectors so as not to repeat what was already being done? How can ‘Ummeli,’ as a tool, have a continuous interface between;

- unemployed person(s) and communities?

- Government?

- Institutions of higher learning and research think tanks that are currently engaged in research around youth unemployment, labour legislation, skills development and mobile phone technology – and some of the challenges that exist within this area?

- ‘The rest of the world’ (which would be products that are similar to Ummeli or have facets that could be adapted into Ummeli to make it more ‘cutting edge and responsive)?

- Potential donor funders such as DFID, CIDA, DBSA?

It was deemed important for this project to define its role within this ‘space’ because it responded to a unique gap that had been somewhat overlooked/bypassed within the current conversation and there was an immense amount of potential for this project to play a key role in filling this gap.

Going back to the initial purpose of ummeli **‘to be a practical tool that helps communities create their own employment opportunities’-**

- **How** was this going to happen practically? How can we use this tool more effectively to actually achieve this purpose?

- Would it require a partnership with CBO’s, NGO’s, Corporates that were carrying out their SED projects?

- Was their information that the department of Social Development could provide that would be useful in this regard?
- When we say communities, do we mean the rural poor? The urban poor? The broader South Africa? We need to define our parameters so as to tailor Ummeli to be more effective, because different contexts might require Ummeli to function as a specific tool for them – which then begs the questions:
 - Is it a flexible tool that is also multi-faceted?
 - Is Ummeli – as a tool – able to take on and withstand any shifts in legislation that might affect it?
- We also then need to understand the dynamics that exist within these communities as well as any assumptions that may have been made about the nature of these communities that could hinder/hamper/exacerbate the creation of these employment opportunities
 - This could be in relation to the social cohesiveness of the communities
 - The availability of social capital and social networks to assist this process or the lack of these that might result in the process being hampered
- Is it working, based on the simple response of whether people were able to get jobs? If yes, what can we do to make it better? Based on the No responses, what was in the hands of Ummeli to to help more people access jobs?
- Is there any way to assist individuals who have ideas that could create opportunities within their community with funders, corporates and government that could fund these initiatives, hence fuelling job creation?
- A number of respondents assume that the role of Ummeli is to either give them jobs or to find the jobs for them – how do we deal with these assumptions so as to retain the numbers but to also ensure that the users have a proper understanding of what the function of Ummeli is?
 - Is it in the way the ‘about us’ section has been phrased or worded? Does it need to be reworked?
 - Could this be a potential challenge with the increase in users?

- There were also respondents who stated that there were not enough jobs that were being posted on the website; yet there were several hundred jobs that were available on Ummeli. This then begs the questions:
 - Is there a gap/disparity that exists between the jobs that are posted on the site and the respondents? This would therefore mean that the users do not have the qualifications to meet the requirements stipulated in the job posting.
 - Is there any way to encourage skills development so as to increase the number of workers in the market?
 - What is the user profile of the individual that uses ummeli?
 - Age. Gender, socio-economic status, rural or urban, education levels
 - Is the service (jobs posted for example) meeting the need of this user or is there a gap here that needs to be addressed?
 - How can we address this issue of low skills, unemployment with matching/finding opportunities that could be suitable for this level of user?
 - Is there any way to support entrepreneurs who have unique ideas and who would perhaps want to seek funding and start up their own businesses?

RECOMMENDATIONS

In the methods section, it was noted that there were a number of responses that were marked 'irrelevant', which included the respondents who had not directly answered the questions asked and may or may not have provided some feedback that was deemed useful for Ummeli. The recommendations from this section are drawn from the respondents who provided feedback that was found would be useful for Ummeli.

- It was noted that there was a need for links to bursaries, sponsorships as well as more learnership and internship opportunities
- There was a request to create more distinct categories for the articles section such that all articles relating to lifestyle were grouped together, interview tips together, CV writing etc.

- There was also a complaint that the job postings were often not removed once the application date had lapsed and there were a number of old applications still on the site
- Some respondents complained that a number of the opportunities that were uploaded were not 'legitimate' jobs in that applicants were at times asked to pay a joining fee in order for them to jump-start the application process, and others did not exist. There was a request that all applications be vetted before they are posted on the site, in order to control this.
- There was a request for more profiles of individuals who had been helped by Ummeli to motivate those who still hadn't found jobs to persevere.
- There are many people who do not know about Ummeli and how it can be used to help people and therefore more marketing is needed
- There was also a request for feedback on whether or not the CVs had been done correctly and were meeting the correct requirements.
- There were some frustrations with Ummeli being used as both a social networking site and a chat room and there were requests to monitor this and to put more restrictions in place to ensure this does not happen as it was a deterrent to many of the users.

Appendix XI : Real Access , Real Impact

1. **Physical access to technology:** Is technology available and physically accessible?
2. **Appropriateness of technology:** is this the appropriate technology according to local conditions, and how people need and want to put technology to use?
3. **Affordability of technology and technology use:** Is technology access affordable for people to use?
4. **Human capacity and training:** Do people understand how to use technology and its potential uses?
5. **Locally relevant content, applications, and services:** Is there locally relevant content, especially in terms of language?
6. **Integration into daily routines:** Does the technology further burden people's lives or does it integrate into daily routines?
7. **Socio-cultural factors:** their use of technology based on gender, race, or other socio-cultural factors?
8. **Trust in technology:** Do people have confidence in and understand the implications of the technology they use, for instance in terms of privacy, security, or cybercrime?
9. **Local economic environment:** Is there a local economy that can and will sustain technology use?
10. **Macro-economic environment:** is national economic policy conducive to widespread technology use, for example, in terms of transparency, deregulation, investment, and labour issues?
11. **Legal and regulatory framework:** How do laws and regulations affect technology use and what changes are needed to create an environment that fosters its use?
12. **Political will and public support:** Is there political will in government to do what is needed to enable the integration of technology throughout society?

Curriculum Vitae

Shikoh (Silvian) Gitau

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Education

Doctor of Philosophy, Science, University of Cape Town, February 2010- 2012

Thesis Topic: *Designing Ummeli: A case for Mediated Design, a participatory approach to designing interactive systems for semi-literate users.*

- Prof. Gary Marsden (UCT, Computer Science), Dr. Jonathan Donner (Microsoft Research)

Master of Science, Computer Science, University of Cape Town, 2007-2008

Thesis Topic: *ICT Aided Citizenry Participation: A pragmatic adoption of mobile phones to support voter education in Africa.* Prof. Gary Marsden (Supervisor)

Bachelor of Science, Computer Science, Africa Nazarene University, Nairobi, 2001-2005

- Bsc Honors , (Top 5% of my graduating class)

Work Experience

December, 2010 – to date Google Inc, Emerging Markets

User Experience Researcher,

- Was the first UXR for in Google in Africa and Emerging Markets.
- Day to Day work involves
- Benchmarking what “usability” means in Africa and EM
- Navigate user Needs in EM to position Google as a market leader in terms of relevant products
- Heavily involved in outreach programs including amongst Academics, Women in Computing and the developer community

June 2011 – to date : Guietings Education Trust (GET) (www.ge-trust.org)

Founder,

- Established GET a faith based charity to support economic development through
- Supporting gifted children from rural and poor backgrounds have an equal and competitive education background through educational scholarships, mentorship and early exposure to computing skills.
- Establishment of computing centers in rural primary school
- Provision of basic computing skills training for both adults and children
- Success
- June 2011, 5 students being supported; A computing center established in Kamwaura, Nakuru, Kenya ; 270 Children and 26 Adults trained in basic computers

June 2010 – to date : Ummeli (www.Ummeli.com)

Founder of the first African Job Search oriented Mobile Social Networking site,

Users as of June 2012: 75,000 active users

January 2011 – to date ; iHub_Research (research.ihub.co.ke)

Co- Founder and Research Mentor

Established the Research Arm of iHub.co.ke , research.ihub.co.ke

- Supports in strategic leadership of the organization; structuring research projects and outputs, Aids in attract funding from various sources,
- Facilitates in attracting and engaging talented trainers, speakers and staff growing the organization from 2 to over 12 fulltime employees, with weekly research workshops for the community.

November 2008 - June, 2010 Microsoft Research, Cape Town, South Africa

Research Assistant

August 2007 - May 2008, Institute for Democracy in Africa (IDASA), Cape Town, South Africa

Part time ICT consultant

Dec 2005 – Feb 2007 Center for Multiparty Democracy (CMD), Nairobi, Kenya

Programs assistant and later as Projects Co-coordinator

May 2005 – Dec 2006 Changing Worlds Career Developers (CW), Nairobi, Kenya

IT and Business Analyst

Jan 2005-April 2006 Africa Nazarene University (ANU), Nairobi, Kenya

Lecturers Assistant

2004 UNICEF / Ministry of culture and gender/National Aids Control Council, Nairobi, Kenya

Peer Counselor/Volunteer Trainer

Skills and Competencies

Problem Solving and Research

- Developing and creating a research project for my PhD and Masters Program
- Innovation, trouble-shooting, occasional crisis management and self-reliance especially in relation to designing and coordination of concurrent running projects in course of my PhD, and while working at CMD-Kenya and my postgraduate research programme
- Identification of key research/business issues
- Extensive project/research proposal, academic and report writing

Communication/Presentation

- Communication/presentation skills for a diverse range of audiences highly developed by the facilitation of a variety of workshops on topics including development, technology, Gender based violence, democracy, HIV/AIDS awareness and treatment literacy, professional writing skills and advocacy.
- Numerous oral presentations of research findings to academic and layman audiences at departmental symposia as well as at collegial, national and international conferences
- Co-authorship of a scientific paper in an international peer-reviewed journal as well as conference papers
- Effective teaching skills developed through lecturing, tutoring and project supervision of undergraduate students

Interpersonal/Leadership

- Mentoring, listening, and coaching skills developed and enhanced through active mentorship at ANU
- Positions of responsibility held include project supervision of undergraduate students and various leadership positions including board member of Youth for Leadership 2007 (www.yfl2007.com), treasurer of the Kenya National Policy Challenge and a member of the student council at ANU, Nairobi, Kenya

Organisational/Team Work

- Effective organisational skills developed through extensive workshop and lecture design and delivery, the
- Project management skills developed through strategic planning of CMD-Kenya's Programs Unit , PhD and MSc. Studies.
- Participation in a large ICT for development research group

Computing/Programming Languages

- Working Knowledge in C++, C#, Java, Java Script, Visual Studios, Python.
- Microsoft PC and Apple Macintosh familiarity
- High proficient user office software applications including word processing, spread sheets, PowerPoint, desktop publishing, web design, e-mail and the internet

Research Interests

- Harnessing African Knowledge in Systems Development.
- Archival of African indigenous knowledge
- ICT driven health initiatives.
- An inter-disciplinary approach to Socio-economic development in Africa using Information Communication Technologies (ICT);
- Question, existing understanding and approaches to ICT driven development activities;
- Explore bottom-up approaches to utilizing new media such as Internet and mobile phones in social-economic development.

Awards, Distinctions and Fellowships

- 2012: Top 10 Women in Computing in Kenya, Africa Knowledge Exchange Finalist for Research on Ummeli
- 2011: Recorginization by South African Airways (Sawubona Magazine) as a woman innovator and pioneer
- 2010: Received a Motion of congratulation from South African Parliament and Speaker of Parliament as an African Woman Achiever
- 2010: The Google Anita Borg Memorial Scholarship Award
- 2010: The ICTD scholarship for Students in Developing countries
- 2009: The Grace Hopper Celebration of Women in Computing Scholarship
- 2009: Hasso Plattner Institute, ICT for Development Fellowship
- 2008: UCT International Students' scholarship
- 2007: Department of Computer Science Postgraduate scholarship
- 2005: Oxford Rhodes Memorial Scholarship- Finalist
- 2005: Africa Nazarene University's Leadership and Character Award
- 2005: Africa Nazarene University's Academic Merit Award
- 2003: Kenya Leadership Institute- Best Research Presentation 2003
- 2001 – 2004: Dean's Merit List and Honors Roll, ANU

Publications and Presentations up until Dec 2010

- Gitau, Shikoh, Marsden, Gary, & Donner, Jonathan. (2010). After access - Challenges facing mobile-only internet users in the developing world. Proceedings of the 28th international conference on human factors in computing systems (CHI 2010) (pp. 2603-2606). New York: ACM <http://research.microsoft.com/apps/pubs/default.aspx?id=122707>
- Gitau, S; Diga,K, Bidwell, N and G.Marsden Beyond being a Proxy User: A look at NGOs" Potential Role in ICT4D Deployment,(2010) in the proceedings of the 4th ICTD conference, December 13-16 London
- Gitau S; Plattiga, P and K.Diga: ICTD Research by Africans: Origins, Interests, and Impact (2010) in the proceedings of the 4th ICTD conference, December 13-16 London [PDF]
- Nithya Sambasivan; Shikoh Gitau; Ilda Ladeira; Nicola Bidwell; Light Ann; Jahmeilah Roberson; Nimmi Rangaswamy, Gender Matters: Female Perspectives in ICT4D Research,(2010) in the proceedings of the 4th ICTD conference, December 13-16 London
- Gitau,S., Marsden,G & J.Donner (2010, 10-15 April) After Access: Challenges Facing Mobile-Only Internet Users in the Developing World, Paper to be presented at CHI 2010, Atlanta, Georgia, USA.
- Gitau,S., Donner.J & G.Marsden (2010, 11-12 March) A second look at the mobile-only Internet; job-seekers in Khayelitsha, South Africa describe their first 6 months of mobile internet use. Paper to be presented at ICTS and Development conference. New Delhi, India.
- Gitau, S., & Marsden, G. (2009, 24-28 August). Fair Partnership: Working with NGOs. Paper presented at the INTERACT Conference, Uppsala, Sweden.
- Gitau,S., Marsden,G & J.Donner (2009 September. 30-October 3). The First Byte: A real taste of the internet at the base of the socio-economic pyramid. Paper presented at the Grace Hopper Celebration of Women in Computing Conference, Tucson, Arizona.
- Gitau,S., Donner.J & G.Marsden (2009, 27-30 October). i-Internet? Intle” (beautiful): Exploring first time internet use via mobile phones in a South African women’s collective. Paper presented at the 3rd conference of the International Development Informatics Association (IDIA), Johannesburg South Africa.
- Donner, J., & Gitau, S. (2009, 30 September). Four frames of social software use by mobile-centric internet users Paper presented at the GLOBICOMP Workshop: A preconference workshop of UBICOMP2009, Orlando.
- Donner, J., & Gitau, S. (2009, 1-2 May). New paths: exploring mobile-only and mobile primary internet use in South Africa. Paper presented at the W3C Workshop on the Africa Perspective on the Role of Mobile Technologies in Fostering Social Development, Maputo.