ICT Aided Citizenry Participation

A Pragmatic adoption of mobiles phones to support voter education in Africa

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ABSTRACT

The United Nation's Millennium declaration touts *democracy as the pre-requisite to economic development*. However, very little work has been done in the use of technology to advance democracy in developing countries and especially in Africa.

On the other hand, a lot of effort has been put into place to bridge the digital divide in these developing countries by introduction of technologies best suited for the environment. Key among the new technologies is the mobile phone.

This study outlines a project that is based on partnerships with Non-Governmental Organizations (NGOs) specifically working on democratic communication in Kenya and South Africa. In particular we sought to empower these NGOs by increasing their capacity in voter education through using mobile phones as a voter education tool.

Voter education is a complex process that takes into account various factors such as voter demographic information, transparency, universality in reach, channel and medium of use and, most importantly, the timing has to be right. These requirements are compounded by challenges in the African context, including: lack of telecommunication infrastructure; high illiteracy; incidences of violence and vandalism mainly during an electioneering period.

We introduce the Big Board, a public information system that compliments mobile phones in the dissemination of multi-media information by the elimination of connection charges by mobile service providers, whilst providing a means to provide local content in remote areas without the need for an Internet connection.

A key finding at the end of this study was the importance of pragmatism when approaching the design of technology for developing world. By taking into account environmental factors we were able to engage in mutually beneficial partnerships between us as technologist NGOs. Whereas we provided a means through which mobile phones could be used for voter education, they provided us with the information on voter education and democracy as well as a means to measure the impact of this tool using their own evaluation techniques.

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"Attempt something large enough that failure is guaranteed...unless God steps in!"

Rick Warren

With better governance, I have no doubt that Africa holds the promise of a broader base of prosperity"

Barack Obama (US President).

1. INTRODUCTION

"History offers a clear verdict: Governments that respect the will of their own people that govern by consent and not coercion are more prosperous, they are more stable, and more successful than governments that do not.....Development depends upon good governance. That is the ingredient which has been missing in far too many places, for far too long, that is the change that can unlock Africa's potential... With better governance, I have no doubt that Africa holds the promise of a broader base of prosperity"

Barack Obama (US President).

1.1 Background

Good governance and development are important goals in their own right; however, unless governments derive their power legitimately, through democratic processes marked by regular genuine elections, the path to development is likely to be more difficult, and any gains could remain fragile and reversible [UN. 2008, UN. 2006, USINFO. 2000, Lipset. 1959, Perotti. 1996]. This means that democracy is an essential commodity in sustained economic growth, sustainable development and the eradication of poverty and hunger and, ultimately, in the attainment of the millennium development goals (MDGs) for most of the developing world but, most importantly, in Africa [UN. 2000].

Democracy means different things to different people depending on the context in which it is being used. The term has been used to refer to a government where the supreme authority lies with the people [Winnicott. 1950, Schattschneider. 1960], or a government where the political control is exercised by all the people, either directly or through an elected representative [ACE. 2005]. The word itself has Greek roots that can be translated to 'rule of the people' [Winnicott. 1950, Schattschneider. 1960, Schmitter, et al. 1991]. It can be argued that a democracy is a form of governance where the will of the people is supreme and protected either directly or through representatives [UN. 2008, Schmitter, et al. 1991, Pagliani. 2007].

This dissertation adopts the United Nations (UN) definition as stipulated in Article 21 of the Universal Declaration of Human Rights[UN. 1948]; where democracy describes a government where:

"(1) Everyone has the right to take part in the government of his country, directly or through freely chosen representatives.

(2) Everyone has the right to equal access to public service in his country.
(3) The will of the people shall be the basis of the authority of government; this shall be expressed in periodic and genuine elections which shall be by universal and equal suffrage and shall be held by secret vote or by equivalent free voting procedure."

We adopt this definition due to the pivotal role played by the United Nations through its agencies and partners in facilitating the development agenda within its member states. These states are bound to this definition as signatories to the Universal Declaration and are needed to adhere to access the various forms of support attributed to their membership [USINFO. 2000, UN. 2000, UN. 1948].

In Africa, democracy is characterized by emerging, failing and post-conflict states as well as states that have no democratic tenancies [UN. 2006, USINFO. 2000]. In order to ensure conformance and implementation of democratic practices within its member states, the UN is largely dependent on and supports activities of civil society (CSOs) and non-government organizations (NGOs), [UN. 2006, Gruhn. 1997] whose work extends from the grassroots level, amongst individual citizenry, to national and international levels, in policy and decision making [UN. 2006, Mercer. 2002].

Citizenry participation can take many forms, including discussion of pertinent issues, making the leaders accountable, and choosing of representatives [Schmitter, et al. 1991]. However, the most significant form of participation is through free, fair and regular elections, where citizens have an opportunity to choose who they want to lead them, or represent their causes in a government or institution [Lindberg. 2006a, Lindberg. 2006b].

The UN, amongst other players in the democratic circuit, are recognizing the potential of information and communication technologies (ICTs) in the promotion of democracy and democratic practices [UN. 2006, Ya'U. 2005, Anttiroiko. 2003, Kampen, et al. 2003]. ICTs are largely seen as catalysts in ensuring transparency and accountability in governing, speedy delivery of government services and free flow of information, and the provision of tools to facilitate optimal citizenry participation. [Anttiroiko. 2003, Avgerou. 2003, Okpaku, et al. 2003, Norris. 2001]

The crux of this project is underpinned by: the importance of the free flow of information in citizenry participation particularly in an election process; the role

played by NGOs in achieving this flow of information and how ICTs can be used to support NGOs in this process.

The rest of this chapter is organized as follows: Section 1.2 deals with framing and defining voter education within the elections process; the importance of voter education; strategies employed in voter education as well as challenges facing such endeavors. It also highlights on the role of NGOs and CSOs in the voter education process. Section 1.3 outlines the scope and limitations of this project; the research questions whilst giving its success criteria. We briefly explain the rationale behind this project, its motivation and the key contributions. Section 1.4 gives a brief outline to this document.

1.2 Citizenry Participation

As noted in the previous section, citizenry participation is a key pillar in a democracy. We further note that one of the ways in which citizens can properly participate is in taking part in the governing processing by electing a representative for their cause, through an election [Schattschneider. 1960, Lindberg. 2006b, Roberts. 2004].

As with democracy there are various definitions of what an election is, but for the purposes of this dissertation we will adopt the UN definition which describes an election as a decision making process through which a population chooses a preferred individual into a representative and elective position in government [USINFO. 2000, Lindberg. 2006a]. It is important to note that elections, per se, are not a guarantee to democratic society, as a democracy is a complex amalgamation of attitudes, actions and good will by both the government and the people [Clift. 2004]. However, frequent, competitive, free and fare elections play a big part in ensuring that democratic values are upheld as they present the citizens with regular opportunities to choose and change their leaders so as to determine the directions of the government through voting [UN. 2008, USINFO. 2000, Winnicott. 1950].

An election is termed as free and fair when the will of the people is upheld. This is characterized by the transparency in which they are conducted, adherence to human rights, such as freedom of speech and expression, and the ability of all eligible persons to participate and run for an elective office [USINFO. 2000, Schmitter, et al. 1991, Lindberg. 2006a] .

Therefore, a key tenancy for a free and fair election is free flow of information on, and about, the elections to enable all qualified citizenry to know about and make informed decisions on voting [ACE. 2005]. This ensures a peaceful transfer of power, as the looser is able to accept the validity of the election.

1.2.1 Voter Education

The dissemination of materials and programmes designed to inform the citizenry about the specifics and mechanism of the voting process for an impending election is referred to as voter education [USINFO. 2000, ACE. 2005, Nyamnjoh. 2005].

The goal of a voter education exercise is to make information available and accessible to all citizens who are eligible to vote. It addresses the voters' motivation and preparedness to participate. In addition to basic electoral information regarding the elections such as date, time, type, eligibility and place of voting; voter education also consists of information that enables the voters to link the importance of voting to democratic issues such as human rights, leadership and public accountability.

The most important characteristic of voter education is that it should seek to achieve universal coverage of the electorate [Enslin. 2003]. This, in effect, requires reaching out to disadvantaged groups as well as mainstream voters. Disadvantaged groups refer to persons with disability, women, and geographically marginalized communities.

The process starts early in the election period by ensuring that all people of the eligible age – in most countries it is from the age of 18 – are registered as voters. It later culminates into the election period where voters can access information concerning the process of voting (why, when and how to vote), location of polling stations, vying candidates and their affiliated political parties [ACE. 2005, Enslin. 2003, Criticos. 1997, Hassim. 1999].

1.2.2 Civil Society and Non-governmental Organizations

The government, and in particular the elections management body, is usually responsible for the voter education process [Clift. 2004]. However, for an accountable, transparent and unbiased process to take place, other non-partisan stakeholders are involved. In a democratic society citizens with similar agenda are allowed to rally together under an organized unit [Lindberg. 2006a, Hassim. 1999, Lindberg. 2007, Mattes. 2002, Ginn. 1996]. These units, with support from international and local funding, usually form what is referred to as the civil society.

CSOs (Civil Society Organisations) and NGOs (Non-governmental Organisations) are the operational arms of the civil society whose key aim is to represent the interests of the people in a non-partisan manner. This means that CSOs and NGOs are charged with the task of mobilizing and facilitating citizen participation at the grassroots level whilst protecting their interests at the national level [Gruhn. 1997, Mercer. 2002].

1.2.3 Current Voter Education Strategies

Voter education strategies can be termed as the medium governments and the NGOs employ to reach the largest possible number of voters with as much information as possible [Criticos. 1997, Bowler. 1990]. Universal coverage of voter education information is key to voter education success; this demands that the information be delivered in an open and accountable manner to as many people as possible [Hassim. 1999, Ginn. 1996].

These aspects of information delivery are mainly determined by the type of medium through which the information is delivered. A medium is a means through which the message reaches its anticipated audience. The medium not only has to cater for the given audience, but it has to have an effective impact on the voters' decision making [McLuhan. 1998].

The main aim of NGOs outreach is to ensure that the citizenry have sufficient and unbiased information delivered to them in the most palatable means to assist their decision making in an election. The means of delivering this information is largely determined by the various demographic aspects of the citizenry including, age, gender, literacy levels and geographical exclusion to communication channels [ACE. 2005]. To briefly describe some of the ways voter education is carried out, we group the strategies two categories: Interpersonal communication and mass media communication.

1.2.3.1 Interpersonal Communication

Interpersonal communication is where the voters are approached on a face to face basis, with little or no technological mediation.

Direct media is mapped over natural communication patterns and usually do not use any form of technology [ACE. 2005, Moemeka. 1994]. They are direct and mainly require a face to face encounter with the voters. These include town-hall meetings, public meetings, door to door visits, workshops and training. For an effective process,

such encounters are usually facilitated by trained voter educators and are targeted at people in the rural areas. [ACE. 2005, Moemeka. 1994, IDEA. 2006, Lowe & Scanad. 2008].

The other form of interpersonal communication used during voter education includes posters and bill-board equivalents [ACE. 2005, Moemeka. 1994]. Posters are usually placed in the line of vision of voters, with simple, easy to understand, messages that can be assimilated in a matter of seconds as the voters pass by. Bill-boards on the other hand are large public displays placed strategically in high traffic areas and are meant to attract voter attention through graphics and lighting [Lowe & Scanad. 2008].

Bill-boards as illustrated in Figure 1, are made using weather proof material and aimed at reaching out to many of the target audience simultaneously.

Figure 1: Bill Boards during Kenya's general elections

Print media and advertisement also form a large part of this form of voter education. The same material printed on posters or bill boards is usually printed on newspapers to try and get in touch with the voters who are readers. Comprehensive 'inserts' are usually put in various voter information sources to inform keener readers on the electoral process. Material of this nature is meant for deliberation and for further engagement with the reader, through interactive columns, text messaging or discussions [Moemeka. 1994, Lowe & Scanad. 2008].

1.2.3.2 Mass Media

This describes all means of transmitting messages that involve a mass medium; they are mediums that allow an individual, or a number of individuals, to reach a larger audience. Mass media is often the most efficient and rapid means through which to pass a message to a large number of people at the same time [ACE. 2005, Moemeka. 1994, Lowe & Scanad. 2008].

Mass media can further be sub-divided into traditional media and new media. Traditional media can be termed as those that existed before the era of computers and include radio and television; while modern or new media are communication modes that involve computing aspects including the internet, emails, Compact Discs (CDs) and Digital Video Discs (DVDs) and most recently the mobile phone [Jenkins. 2006].

1.2.3.2.1 Traditional Media

The Radio and Television

Radios are the most popular form of communication in voter education; for example, over 54% of the total voter education budget of the 2007 Kenyan general election went to radio [Lowe & Scanad. 2008]. After the demographic segmentation, radio messages are planted into time slots targeting certain audiences. Radio employs creative means to relate with its audience including interactive radio programs, which included feedback in the form of calls, SMS and email [ACE. 2005, Lowe & Scanad. 2008, Olorunnisola. 2002].

The success of radio is attributed to its diversity in access. It appeals to people from various walks of life, literate or not; rural or urban dwellers; the youth and the old as it is tailored very closely to interpersonal means of communication. The radio is a permanent fixture in most rural and urban homes in Africa; it is estimated that 80% of African homes owns a radio and one in every four people can access information through a radio [Jensen. 2002, Heeks. 2008].

The liberalization of radio airwaves in a majority of African states has seen a proliferation of radio stations in the form of public, commercial, and community radios, which have replaced the monopoly of a state-run radio services [Kiarie. 2004]. Additionally, at the community level, radios stations are transmitting in a variety of indigenous languages as well as in English on local content, allowing the audience to participate in various discussions concerning them [Olorunnisola. 2002, Bosch. 2006]. Hence, the radio has been by the most effective means of voter education in terms of universal coverage of voters and free flow of information catering for local content, with some exceptions, [Kiarie. 2004]. This justifies the amount of resources poured into this media [ACE. 2005, Criticos. 1997, IDEA. 2006, Jensen. 2002, Bosch. 2006].

The television (TV), although not as popular as radio, with barely 100 Million sets in the continent [Jensen. 2002], has also been used in the voter education exercise. The advantage that TV has over the radio is that it combines both audio and visuals in relaying messages [Jenkins. 2006]. The messages can either be in forms of short video clips that run for a few seconds, or lengthier productions that can either be inform of a documentary, infomercials, debates or discussion/debate that can run for 15 Minutes to an hour[ACE. 2005, Moemeka. 1994, IDEA. 2006] .

1.2.3.2.2 New Media

Personal Computers (PC), Compact Disks (CD), Digital Video Disks (DVD)

The Personal Computer has (PC) been in existence for close to three decades now; the number of installed PCs worldwide has surpassed 1 billion units, according to Gartner, Inc [Shiffler. 2008]. The PC is created in a way that offers functionality for creation, reading, storage and transmission of information.

However, due to constrains such as cost of acquisition, energy limitation in Africa, and lack of telecommunication infrastructure, only five out of every 100 people have access to a PC [Jensen. 2002]. This means that the PC, although a powerful tool of communication, is not viable for voter education in an African context, as it is inaccessible to a majority of the population (voter education requires access to a majority of the population [Norris. 2001]).

The alternative to use of individual PCs has been the use of shared PCs with multiple storage devices. CDs and DVDs are forms of external mass storage that can be used to transmit, share and access data from a PC where network connections are not available. The portability of CDs and DVDs have made it popular in democratic practices where information is written onto them, and distributed to the voters so as they can they can view it at home, or whenever there is a PC available [ACE. 2005].

The Internet

Due to the increase of PCs per capita, in the past two decades, the internet has become an essential tool of communication both commercially and at a personal level. The proliferation of the internet into daily communication and activities has had its implications on political participation [Clift. 2004]. Political activism has gone online, with activist carrying out their work online using emails, website portals, web-logs and video streaming [Anttiroiko. 2003]). Governments, political

parties and NGOs are also taking advantage of this means of communication, and are now using the internet to reach out to potential voters. Social-networking sites have become prime areas to access voters as they perform their daily routines [ACE. 2005, Anttiroiko. 2003, Norris. 2001, Clift. 2004].

The internet has met the democracy demands of openness, transparency and ease in access to information. By using web-based applications, citizens have had more direct and active participation in their government by commenting on policies and issues on an equal platform. On the other hand, the internet has also provided the government with a platform to provide information to their citizens, to inform, educate or convince them on matters of governance [Meskell. 2008]). However, with a penetration of only 5.2% in Africa [IWS. 2008], the internet does not fulfill the universality criteria needed for voter education in this continent. Additionally, the internet is faced by challenges including dilapidated (or lack of) telecommunication infrastructure, high cost of access, lack of computing facilities, and illiteracy. Hence, internet driven voter education is only limited to a minority of voters who can access it.

Mobile Phones

Mobile phones were introduced in Africa in the late 1990s. At the time they were prohibitively expensive with less than 16 Million users by December 1999 [Deen. 2008]. However, with the liberalization of the telecommunication sector and lowered taxation on telecommunication equipment, there has been an increase in private investments in the telecommunication industry in Africa [Fink, et al. 2003, Wilson III, et al. 2003]. This has seen the mobile phone cost drop, and the numbers swell such that by June 2008, there were over 300 million mobile phones in the continent [Deen. 2008]. This is about 3 mobile phones for every ten people, compared to the 5 PCs for a population of 100 people and the 5% internet penetration [Heeks. 2008]. The mobile is comparable only to the radio, but outweighs it as it is a communal asset owned and shared with family members; unlike mobile phones which are mostly individually owned [Donner. 2008].

In as far as voter education in Africa is concerned, mobile phones potentially are the best tool as they offer a wide reach to eligible voters, allow free flow of information, offer the right to opinion and give time for deliberation. This is made possible by its nature as a mobile device and through its various services including text messaging,

multi-media messaging and voice calls. Mobile phones also give voters the freedom to create and share media amongst friends and family increasing the space for deliberation [ACE. 2005].

1.2.4 Challenges of Voter Education

As noted earlier, the key characteristic of a successful voter education exercise is to attain universal coverage of all eligible voters. In Africa, this is a requirement that brings a seemingly inexhaustible set of challenges, some of which are highlighted below.

Poverty

It is estimated that close to 60% of the African population live on less than a dollar a day [Sachs. 2005]. It has been argued that many of these people are working too hard to put food on their table or to care about politics; many of the poor have turned apolitical due to the plethora of broken promises that they have faced over the years from both governments and politicians [Lipset. 1959, Perotti. 1996, Diamond. 1992].

Violence

Due to these plethora of broken promises and other characteristics of poverty, such as lack of proper health care and proper housing (amongst others); election times are tense, characterized by frustrations, which often leads to vandalism and violence, making the voter education a complex, expensive and sometimes a risky process to undertake [ACE. 2005, IDEA. 2006].

Illiterate and Rural Population

The World bank estimates that over 50% of adults in Africa are illiterate – this is the same group that forms a majority of the voting bloc [The World Bank. 2006, The World Bank. 2007].

Ginn [1996] points out that the UN Habitat estimates that at the end of 2007, 60% of the African population lived in rural areas, usually characterized by harsh weather conditions, lack of basic communication infrastructure and lack government amenities. Of the 37% living in urban a good percentage are registered as voters in their rural areas, where they travel to vote during electioneering time [Lindberg. 2006b, Kuenzi, et al. 2007]. This complicates the development and implementation of

appropriate and relevant material for voter education, to cater for everyone as required.

To have a successful voter education process one has to take into consideration all these challenges, and many others that might occur in the course of the process.

1.3 The Project

1.3.1 Scope and Objectives

A voter education strategy can only be successful if it can overcome all the challenges to achieve universal coverage. In spite of widespread use of inter-personal communication channels and mass media in the voter education exercise, there still remains a large number of voters left out and misinformed during the process as a result of abuse and misuse of the state run processes or commercial mass media with vested political interest. This leaves the challenge of ensuring a transparent process to cash strapped NGOs, who are put under duress to: provide material to match that of the government, political parties and politicians; compete for the same transmission slots in the mass media channels, which fetch high prices on a first come first served basis and counter falsehoods presented in any of the other material whilst still protecting human rights.

As noted earlier, new media – internet and the personal computer – is not popular amongst African voters due to cost, access, relevant content and illiteracy [Macintosh. 2002, Ya'u. 2005]. However, the increased uptake of mobile phones across the continent holds the potential to revolutionize voter education. It is estimated that close to 40% of the African population will own a mobile by the end of 2008 [Heeks. 2008]; this points towards ease of information access through this medium. Additionally, mobile phone features are increasingly being enhanced by the various manufactures to support their capacity for multimedia convergence. Multi-media convergence points to an opportunity that can see voters' access information in various formats, from various sources depending on their informational needs. In spite of cases of network and content tampering and censorship in some countries in the world, the mobile phone remains private and secure. This potential, however, is inhibited by high cost of connection paid to mobile service providers and lack of network signals in some remote areas.

Therefore, the objective of this study was to demonstrate the potential of the mobile phones for voter education, but at the same time eliminate the cost of access and the need for internet connection.

This was done by introducing a system that would provide voter education information onto mobile phones in an easy but cost effective manner. The envisioned system was intended to:

- An easy 'do it yourself' system for creation and dissemination of mobile media to voters by the NGOs.
- Eliminate the cost incurred when sourcing for persons to develop voter information.
- allow NGOs to structure and monitor of voter information content for authenticity and impact.

1.3.2 Research Questions

During the course of this study we were mainly interested in answering the following questions:

1. **We wanted to find out is the mobile phone a viable solution for voter education process?**
2. **Is it possible to develop a technology that was compatible with mobile phones and which also met the met the requirements of a successful voter education tool in an African context?**

1.3.3 Success Criteria

Having established the aims of our study, we needed to have a means through which we could determine whether we were able to reach the set objectives, in this case answering the research questions.

We set success criteria for our objectives. At the end of research we hoped that:

a) There would be a possibility for greater application of mobile phones in voter education exercises by NGO.
b) The current NGO voter education process would be complimented by mobile phone enabled tool.
c) The staff at the NGOs would create and disseminate mobile media without our assistance.

1.3.4 Significance of the Research and Motivation

At the beginning of this chapter we started by quoting Barack Obama on the role of democracy in economic development. These are sentiments shared by UN's millennium declaration which states that *"democracy is a pre-requisite to economic development* "[UN. 2000]. Given Africa's history of chronic poverty, we are led to believe that it is in part due to the not so democratic practices of its states. This a fact confirmed by the various elections that took place during the course of this study – February 2007 to August 2008 – namely Kenya, Zimbabwe and Nigeria which were all documented by various international and local election observers as undemocratic[Gettleman. 2007,All Africa. 2008, BBC.2007a].

Yet, even in the midst of the undemocratic practices, there are numerous examples cited on how mobile phones are changing the political face of Africa (seen in the next chapter).

There is, however, very little literature on work done within the democratic context of using mobile phones in Africa. This gap creates an opportunity to demonstrate the usefulness of the mobile phones in voter education, because we strongly believe that an informed electorate creates the foundation for a democratic society and subsequently development.

In chapter two we will cite some examples in which the mobile phone has been used for ICT driven development activities in Africa. However, most of these activities have required the users – a majority of who live with less than two dollars a day – to pay for the high communication charges. In addition to our contribution to democracy, we believe by lowering, or eliminating, the cost of access to information through mobile phones, its potential can be stretched even further.

Finally, we approach this project from pragmatic angle. This means that we are not designing a completely new technological tool; rather, we are extending capabilities of already existing tools. Through partnership with NGOs, we design an ICT tool to facilitate information distribution to the citizenry by modifying and appropriating two existing pieces of technology. By complimenting NGO efforts in voter education instead of working with individual voters we believe we cover more ground both in our input in democratization as well as in our design process as technologist. We will be covering these aspects of the project in the methodology chapter of this dissertation.

1.4 Overview of the Dissertation

This dissertation is organized as follows:

In Chapter two we briefly discuss the different ways in which mobile phones have been used in ICT driven development projects, highlighting two examples in which they have been used in political participation in Africa.

Chapter three outlines the various methodologies used during the course of this study, introducing the users and the criteria through which they were chosen

Chapter four outlines our findings and their implication to the ensuing system.

Chapter five gives a description of the design showing the various sequences that it took to reach it.

Chapter six shows how we went about evaluating the various prototypes and the alterations made that resulted to the final product.

Chapter seven recaps the research questions showing how we answered each one of them during the course of the study; it also outlines some lessons learnt, possible future work and contributions.

2. BACKGROUND

In chapter one, we made a brief introduction on the context on which we are framing this dissertation, which can widely be placed within the Information Communication Technology for development (ICTD) field. As we noted, good governance and social-economic development go hand in hand and it can be argued that democracy is indeed a pre-requisite to socio-economic development. Over the past three decades there has been a lot of discussion and debates on the role technology in accelerating economic development in the post-colonial Africa [Waverman, et al. 2005, Röller, et al. 2001, Wilson III, et al. 2003]. As the debates on how to harness the power of technology for economic prosperity continue for one side of the globe; the other side of the globe is enjoying an unprecedented level of technology innovation and adoption in daily personal and economic activities. This has left many techno-enthusiasts and ICTD practitioners wondering whether Africa will ever catch up to the said standards of technology use.

In this chapter we address some of these concerns on the use of technology in economic development activities and more specifically its feasibility for use within democratic activities. We draw our literature from NGOs, multinational, industrial and academia work, as well as writings by individuals working on similar work. The literature presented in this chapter is by no means exhaustive of the massive collection of works done and that continues to be deployed in various contexts across the globe and in Africa. We highlight on just a few of the examples that would allow us to make an arguable case for this work.

In the next section we tackle the 'digital divide', a concept that quickly crops up when discussing the role of technology in socio economic development. We then focus in on mobile phones, a technology that has seen an exceptionally high adoption and usage rate in Africa. We also highlight some of the areas that mobile phones are being used to alleviate poverty, commonly referred to as mobile services (mServices), before we focus on how mobiles phones have been used for democratic activities. In Section 2.4, we derive our premise of using mobile phones for this project and finally in Section 2.5 we give a way forward in the form of our project specification, highlighting its various features.

2.1 The Digital Divide

As the debate on the likelihood of technology in transforming Africa goes on, there also emerges the concept of digital divide. This is a concept that has been termed as a 'civil rights issue in a new (information driven) millennium [Selwyn. 2002]. There are many approaches to defining the digital divide, but to really understand this concept, Selwyn [Selwyn. 2002] suggests looking at the concept in its totality. His suggestion is never to overlook 'digital' which is the underpinning factor in the concept itself. Taking this suggestion, the digital divide can be used to simply refer to the "gap" in the possession and utilization between technology "haves" and "have not's" [Selwyn. 2004, Rahman. 2007]. Others look at the digital divide as simply the presence or absence of computers and the internet [James. 2007]; even, the UN Information and Communication Technologies Task Force, has adopted a similar concept by setting up the "the digital solidarity fund" to finance projects that address "the uneven distribution and use of ICTs"[DSF, 2005]. However, this minimalistic approach to looking at 'the digital divide' as a lack of ICTs-"hardware, software, networks, and media for collection, storage, the processing, transmission and the presentation of information (voice, data, text, images)" has left even the most dignified of fellows in the ICT industry yearning for a better approach; most prominent is Bill Gates, Founder and Chairman of Microsoft having been famously quoted saying: "The poor do not need computers; they need food, clean water, and health care"[Verhovek,2000].

It is with this in mind that we take a look at the 'digital divide' from a different perspective.As we will see in the next section,studies indicate that the digital divide in Africa is just a symptom of other underlying factors of exclusion, and will not be bridged by only addressing the inequality access of ICTs. In addressing the digital divide in Africa, one has to come to terms with other issues that the poor are facing including: food security, literacy, health service, gender gaps, geographical and social exclusion. In addition to the basic human needs, there are those obvious limitations directly linked to use ICT including: lack of online skills and freedom of use and lack of awareness about ICTs [James. 2007, Tongai, et al. 2005, Hawkins, et al. 2006, Fuchs, et al. 2008]. This is not to say that providing ICTs is wrong; but, experience has shown that without taking care of other factors; investment in ICTs will not do much in terms of helping this people.

2.2 Mobile Phones: A Solution to the Digital Divide

Having said that, there is a growing body of evidence indicating that investment in technological infrastructure generates economic growth dividend, as ICTs are being used for market reach and expansion; reducing cost of communication and interaction; and increase in information flow. This means that more people can be used for economic or social purposes at shorter time with less money [Waverman, et al. 2005, Tongai, et al. 2005, De Long, et al. 1993].

In particular, over the past decade, upon the liberalization of the African telecommunication industry, the technological landscape has greatly improved [Wilson III, et al. 2003, Fink, et al. 2003]. Starting at just over 16 Million in the late 1990s the mobile phone industry has grown several thousand fold in Africa, out pacing adoption for all other regions and any other piece of technology. Media reports indicate that by the end of 2008 there will be over 300 Million mobiles in sub-Saharan Africa [Deen. 2008, ITU. 2008]. This indicates that the penetration rate fast approaching 30%, compared to the 5% internet penetration [IWS. 2008]. These numbers have had their effect on the African economy, studies indicate that the mobile phone is the technology with the greatest impact on development. One such study done by the London School of Economics indicates, that for every extra 10 phones per 100 people in a typical developing country, there is a 0.59% GDP growth [Waverman, et al. 2005, The Economist. 2005] .

These studies do not conclude that the mobile phone will purge Africa of its problems. However, the fact that the mobile phone has done better where many other forms of technologies have failed is a matter of interest. According to the following researchers [Donner. 2008, Donner. 2007, Waverman, et al. 2005, The Economist. 2005] the success of the mobile phone can be attributed to three simple characteristics in usage

a.)*Incremental*: the mobile phone has not replaced any of the existing process in communication but rather it has enhanced them by speeding up the processes and cutting down cost. They have enhanced voice communication by making it easy, flexible and practically instant no matter the distance of the persons communicating.

b.) *Transformative*: the mobile phone has changed the way things, especially service delivery, is done making them more efficient. The mobile phone has changed the way some things used to be done. Money transfer services in various countries in Africa,

are now relying on mobile services providers against prior reliance on banks, and manual delivery.

c.) *Productive*: The mobile phone has facilitated productivity through new and old wealth creation means; of important mention is commerce. Through creative means, mobiles phones have made trade of goods and services easier.

Additionally, the mobile phone does not require expensive investment in infrastructure as there is no need for permanent power supply and telecommunication cabling per handset as is the case for most of the other pieces of technology; it also does not require high literacy levels as it supports a cheap form media convergence, access and sharing allowing for voice communication in a flexible and mobile manner. This allows users to map it against the usual communication patterns [Donner. 2008, Donner. 2009].

Finally, with more players in the telecommunication industry, the price of acquisition and use of mobile phones has radically reduced, making mobile phones more affordable [Kalba. 2008, Mureithi. 2003].

Statistics show that 90% of the developing world lives under the 'mobile network' footprint [InfoDev. 2007]and over 50% of Africa has mobile network coverage [Kalba. 2008]. With this we can arguably conclude that the real digital divide that matters is between those with access to mobile network and those without [The Economist. 2005].

2.2.1 M-Services

The past decade has seen a plethora of services being offered through mobile phones. These services, known as mServices, range from health to job matching; for example The Open Knowledge Networkproject has been running a pilot project using SMS push and pull services relating to health (special focus on HIV/AIDS), jobs, and community news[One World, 2005]. The pilot is based in one of Nairobi's informal settlements, where the organization believes that most people have access to mobiles [Scott, et al. 2004]. This describes one of the many ways in which mobile phones are being used to impact social, human and economic development[Donner. 2008].

In the next section we dig deeper into some of the common uses of mobile phones in Africa, before we embark into discussing its uses in democratic participation.

2.2.1.1 mEducation

In education, the mobile phone is being touted to succeed where the PC failed in the delivery of material to learners even in the remotest areas of Africa; equalizing the quality and content of learning material among the learners, and relieving a load off the overstretched educators.

MobiDic is a South African initiative that is enables users to access dictionary content via their cellular phones. The objective of MobiDic is to assist users to improve their language skills and enhance reading and writing abilities. It works by simply sending the word for which the user needs an explanation to a short code number, which instantly sends a definition in return through SMS. The initiative by the South Africa Broadcasting Cooperation (SABC) is targeted at previously disadvantaged groups to increase English literacy[Merck, 2005].

Another education initiative is Mobile-Math for girls (M4Girls), collaboration between Nokia, the South African Department of Education and Mindset Network (an NGO promoting rural Education). The project uses Nokia 6300 mobile phones loaded with educational material to help improve the mathematics performance of Grade 10 girl learners. This project was piloted in two schools in South Africa's rural areas, where pupils from these schools access educational games and other content that have been specifically created to meet the needs of the South African national curriculum. Initial results indicate that there is high intake of this material by learners. The learners viewed mobile episodes (mobisode) were initially short videos that ran for 3 minutes through which learners were taught various facts with each session (due to increased demand in material and information, the duration of the mobisodes eventually needed to be increased). The intake of mobile media, especially video, is contrary to the belief that mobile media needs to be short in order to retain user attention. This initiative has increased the interest of learning mathematics among the girls [Barnard, et al. 2008].

2.2.1.2 mEconomy

The mobile phone over the past decade has created an economy of its own. Not only is it facilitating the mainstream economy in terms on communication, it has opened a whole new industry for the thousands of unemployed people through the sale of airtime and mobile phone accessories; for the tech-savvy people it has opened up an opportunity for mobile phone repair. Others are selling and buying commodities on their mobiles and monitoring market price s[Donner. 2008].

The Grameen Bank is a livelihoods alleviation project model started in Bangladesh to encourage entrepreneurship among poor women [Yunus. 1998]. The model that started by assisting women with small loans to start small business, was adopted to provide mobile phone services to rural villages, the women would then earn their income from managing the phones. This model has now been replicated and the Grameen Village Phone has also introduced its programs in Uganda and Rwanda [Donner. 2007, Osterwalder. 2004]

Similar models can also be found in Kenya, where a community based youth organization is creating jobs amongst its members by giving them a start up kit of a phone and a phone stand commonly known as 'simu ya jamii' (community phone); in west Africa, there is the rise of the umbrella ladies, who set up shop anywhere and put up there GSM phones for people to use [Donner. 2008].

On visits to a cross section of towns in Eastern and South Africa, one will note that numerous small to medium scale shops across are selling mobile phones and mobile phone accessories alongside other commodities or services core to their business; others have completely changed their shops to cater for the growing mobile phone demand and only concentrate on mobiles[1].

Over the last ten years, the face of how business is done in Africa has changed; the poster child of many ICTD presentations is that of the fishermen along the East African and Indian coast who call ahead of docking to inquire about the demand and cost of their catch [Donner. 2008, Diga, et al. 2007]. The one mobile phone used for personal calls is also used as a trading tool; this practice is saving the fishermen a lot of time of moving from one port to another to sell their fish which might easily go bad if not sold in time. This is a model that has been borrowed by Kenya's Safaricom, who have incorporated an mCommerce service known as Sokoni [Safaricom. 2008]. Sokoni advises farmers and buyers on commodity prices across the country, through a menu based application and SMS response to queries. Therefore, in the very least, mobile phones have had a significant impact towards the alleviation of livelihoods

[1] This is a conclusion made by the author of this dissertation as a result of her experience in her country of residence (South Africa) and her home country (Kenya) as well as a visit to Uganda and numerous discussions with people from these two regions. It is important to note that no scientific methods were used in the observation in direct relationship to entrepreneurship, but the observation were made due to the interest the author has in the use of mobile phones in development activities.

amongst many poor people, through the provision of jobs and expansion of market increasing profitability.

2.2.1.3 mHealth

Mobile phones are being used in numerous ways in accessing healthcare services and information. The activities range from simply being able to call for an ambulance or order a medicine prescription from nearby hospitals, to more technical ones that allow doctors to diagnose patients in remote areas through mobile based applications [Chetty. 2005, Kaplan. 2006]. Several NGOs have seen this potential of mobile phones to improve health care in Africa and have taken advantage of it.

SATELLIFE is an NGO that works in developing countries to support health service providers with information through the use of personal digital assistants (PDA) [AED-Satellife, 2007]. In East Africa they use PDAs for information dissemination and data collection on both infectious and chronic diseases. The PDAs are equipped with a virtual library and directory on the various symptoms and medical conditions field and an encyclopedia of known treatments. The PDAs used in conjunction with GSM cellular networks are updated on a regular basis and in cases where the disease incidence is beyond the user's capacity, the PDAs are used to relay information to better qualified persons. During a two year study, SATELLIFE discovered that the handheld devices was easily adopted by new users, and provide a cost-effective alternative to personal computers for many functions. The users could successfully send and receive data, news and medical updates even in areas with no internet connectivity and electricity, which describes the majority of Africa [Rwashana, et al. 2008, Mitchell, et al. 2009, Al-Ubaydli, et al. 2005]

2.2.1.4 mDemocracy

Figure 2: Nobody thought of the SMS:

Translation: The sign at left identifies the assembled group of suits as "experts in election strategies." The guy in the middle says, "Meetings, interviews, news articles, debates, banners, posters... nobody thought about SMS messages!" (Adopted from: International Herald Tribune as cited in [Chambers, et al. 2006] *)*

As noted earlier, there are limited studies in which mobile phones have been formally used in Africa for democratic purposes. However, in the developed world, even as early as the year 2004, there was an explosive use of mobile phones for the dissemination of democratic information in particular voter education material. For instance, in the 2004 presidential elections in the United States, a campaign known as "rock the mobile vote" was aimed at providing information about presidential candidates to America's youth via the cell phone[Terdiman,2004]. In the same year after a terrorist attack in Spain, the results of the impending elections were changed due to a text message sent out to people criticizing the competency of the sitting government that had been set to win it; the New York Times Head Line said it all "Cell phones may have tipped the scales in Spanish election" [Pfanner,2004]. . This shows that information sent by mobile phones has gained access to groups that would otherwise be categorized as a-political, increasing their ability to make a decision and value the electoral process. Other examples include Britain's premiership elections in 2005 which utilized the mobile phone from the beginning of the campaign to inform voters on the voting process, locations of polling booths and how elections work, up until announcing the final election result [Coughlan, 2005]. In the same year, the Philippines elections saw the presidential elections results come under high criticism as a result of a ringtone presumable made from conversation between the president and an aide. The ringtone which spread across the country indicated that the then sitting president had doctored the elections result to her favor; even after winning, the President resigned because of internal pressure caused by the allegations [David. 2005]

These are some of the examples summarized by Chambers et al. [Chambers, et al. 2006], a political strategist quoted in a Washington post article saying "The way I think about it is, if we can support our 'American Idol' contestants by texting, why not our presidential candidates?" [Vargas, 2007], in reference to the current adoption of the SMS in interactive reality shows on television and radio [Miller. 2005]. The article highlights a growing list of the 2008 American presidential candidates using mobile phones to reach out to their supporters. It estimates that three-quarters of Americans own mobile phones and more than 15 billion text messages are sent within the country each month. As illustrated in figure 4 above, the SMS and the

mobile phone is a technology that can no longer be ignored in politics and governance [Chadwick. 2006].

Other than this obvious and direct use of mobile phones by strategists and political parties, there have been more subtle uses of mobile phones in combination with other technologies. The most recent one has been combining the use of mobile phones with social networking services (SNS). For instance, YouTube, a multimedia sharing site has enabled a function that allows users to download and view videos on their mobile phones, as well as upload some on the web portal. Therefore if this trend of media sharing through mobile devices continues, we believe that we will see much more grassroots participation in the form of mash-ups of mobile phones and the internet [Chambers, et al. 2006].

As noted in the introduction, Africa is still catching up on the use of mobile phones for democratic purpose. But we believe that with the rapid growth in the mobile phone industry, the next few years will see African politicians, governments, political parties and NGOs employ some of the strategies highlighted above. A number of innovations have already started taking root in a cross section of countries in Africa. In the following two sections, we highlight two mobile phone technologies that have been used and continue to be used in for civic participation in the electoral process.

a) Frontline

FrontlineSMS is an 'enabling' technology that allows SMS management in the field, through PC software linked to a mobile phone via a cable. There is no reliance on the internet for connectivity[FrontlineSMS.2008]. FrontlineSMS, which is available for free to NGOs, allows the creation and management of SMS and a contact list as well as engagement of a large number of people in various activities such as surveys and debates. FrontlineSMS has been rapidly adopted within the democratic cycles in Africa for monitoring of elections and informing the public. For instance, it was used in Nigeria, when it held its elections in April 2007. Although termed "below standard" by many of the international observers; one of the success stories was on the use of mobile phones to monitor an election in the expansive West African country [BBC, 2007b]. Using the FrontlineSMS system, the Network of Mobile Election Monitors (NMEM), a group of civilian volunteers, used SMS to send feedback on their observations to a central computer hub. The collected text messages were then passed on to other monitoring groups and authorities including

the European and African Union elections observers who passed a "below standard" verdict on the elections. This means that the SMS service did contribute to validating the elections as well as reaching the verdict passed on the elections.

b) Ushahidi

Ushahidi which means "testimony" in Swahili, was born from the post-election violence that exploded across Kenya earlier in 2008 [Ushahidi, 2008]. The web based project was used to map incidents of violence and peace efforts throughout the country based on reports submitted via the web and mobile phone (SMS and email) and displayed on their portal – *ushahidi.com*. Ushahidi has been recognized as an innovative mash up and a demonstration of citizen participation and is now being used to support similar efforts of civic participation in parts of Asia and the Middle East. At the time of writing this dissertation, the organization had embarked on developing Ushahidi 2.0; this will be a mobile version of their web portal, which could be used by local people to report and participate in governance issues.

Another use of mobile phones that is less positive comes from Kenya. Kenya, one of the two sites of this project, held her elections in Dec 2007. Mobile phones, as observed by the author of this dissertation, were used in many positive purposes, for example: the Media Focus on Africa (MFoA) had set up an SMS based application to quiz leaders on their election agenda; the Electoral Commission of Kenya (ECK) had set up an application to validate voter status; media houses collected and gave feedback on debates and talk shows through SMS on interactive TV and Radio programs. However, the less positive side of SMS communication was also seen; SMSs were used to spread fallacies and propaganda in the wake of the contested election results. Due to a mass media blackout at the time, the mobile phone was the only medium through which to get news. Many people [Goldstein. 2008] including the author[2] of this dissertation who was in Kenya at the time of the election conducting this study, believe that the SMS did indeed have a part in fuelling the violence that claimed 1600 lives and left 600,000 displaced. This is evident by a shutdown of bulk SMS applications, such as the Frontline system discussed above, as well as a warning sent out to all mobile phone subscribers that read:

[2] We discuss more on the reflexive role of the author in the next chapter.

"The Ministry of Internal Security urges you to please desist from sending or forwarding any SMS that may cause public unrest. This may lead to your prosecution."

This message sent by the government indicates that they did acknowledge the power of the SMS and in extension the mobile phone.

The above examples, although representing different sides of the SMS debate, demonstrate the power of the mobile phone to build democracies or break them. However, in this work we will just consider the positive power of the mobile in building democracies in Africa.

2.2.2 Discussion

The previous section has demonstrated that the mobile phone has become a favourite of many African people, a fact which the development sector, governments and numerous NGOs have recognized. As noted in section 2.2.1, the success of the mobile phone is hinged on its ability to transform, increment or increase productivity in daily tasks of personal and trade communication. Additionally, in as far as democratic engagement is concerned, the mobile phone has the ability to seamlessly connect with existing political and citizenry engagement strategies such as radios, the television and internet (see section 1.2.3.2.1 and section 2.2.1.3); as well as act on its own to deliver the much needed voter education. This shows that mobile phones are powerful tools in not only development activities – bridging the digital divide, but they are vital for democratic participation [Stein. 2006].

2.2.2.1 Why Mobiles?

Based on some of the highlighted literature above, in this section, we rationalize just why we opted to use mobile phones as the primary technology in this project.

Ease of Network Expansion: as they do not rely on cabling, mobile phone networks have rapidly grown; a World Bank reports indicates that these networks have a 90% footprint across the developing world including Africa [InfoDev. 2007]. The rapid expansion of networks has seen an increase in mobile phone presence as the only form of technology even in some of the remotest parts of the continent [Kalba. 2008, James, et al. 2007].

Cost and Access: Closely related to ease of network expansion is the ease of access. Mobiles phones and mobile networks are now easily available across the continent.

There is instant connection, which only needs a SIM cars and a mobile phone on a pre-paid plan. Further, due to the competition amongst the players, the cost of communication has reduced. Mobile handset manufacturers have been enhancing some of the features to create cheap and relevant handsets for the African consumer. According to the wireless federation[3], South Africa's MTN would, by the end of 2008, have introduced low cost mobile phones which will cost between $12-$15 [Wireless Federation, 2008].

Ownership and Multiple Use: In spite of reported cases of information surveillance, monitoring and interception, the mobile phone is largely a personal item [Leenes, et al. 2005, Donner. 2005]. Due to its flexibility and mobility, the mobile phone can take various roles without the users incurring extra cost. For instance, it can be used for both business and personal communication. Additionally, it supports media convergence; this means that the mobile phone can be used to capture, create and share information with various audiences. Currently, voice and text-messaging are the most popular uses of mobile phones. This means that, one can call to ask a question and confirm the answer through an SMS [Donner. 2007].

In as far as democracy and more specifically voter education is concerned, the mobile holds some of the key tenants that support democracy; these include:

Universality: as noted earlier, it is estimated that there are over 300 million mobile phone subscribers in Africa, a number that rises by the day. This allows us to make an assumption that if a piece of information were to be transmitted onto a mobile phone, it can be easily accessed by at least that many people. With a growth rate of over 50%, the mobile is the most ideal channel for information sharing, not only for present but also in any future strategies[Heeks. 2008].

Free Flow of Information: Mobile phones also support free flow of information, unlike the radio, the television and other forms of mass media where each piece of information is monitored and some censored by their respective owners. The high penetration level of mobile phone does not permit a blanket censorship on various streams of information sent to mobile phones.

Deliberation: The mobile has the ability to store data, such that it can be retrieved at another time for consumption. This ability to store and retrieve information allows

[3] http://wirelessfederation.com/news/13506-mtn-aims-to-introduce-low-price-mobile-handsets-in-africa/

the users to have time to deliberate on it at their leisure. This information can also be forwarded to a selected number of contacts who might or might not share the interest of the originator. This incremental sharing can result into viral spread of the information.

Seeing that mobile phone is already a prime candidate for democratic participation, we need to position some of its features in the context of this project. NGOs rely on ease of information transfer for voter education, depending on the cluster that a piece of information is targeted. To do this, we have to look deeper into the kinds of application that have been utilized for content transfer.

2.2.2.2 Mobile Media

In chapter one, we noted that the mobile phone has created a platform to support the convergence and synergy of various forms media such that audio, video and text formats can be accessed at the same time.

Based on the various examples presented earlier, we can conclude that mobile media is indeed palatable among African users regardless of IT literacy levels (as demonstrated by the illiterate farmers and fishermen, who can now access market information via their mobile phones); this is an advantage over PC based communication where users would not only need basic literacy, but they also need specialist computer literacy.

We noted that there are three ways in which mobile media is accessed and shared by the users:

On-Demand Information: This is where the users take the initiative to access information from a central server with pre-configured information through an SMS. The services that utilizing this such as Open Knowledge projects and Sokoni employ 'push and pull' strategies, where users can access a database by sending text messages containing key words to a central server, which in turn gives back the requested information. We termed this as 'on-demand' because the user is the one requesting a particular piece of information.

Mash-ups: In many of the instances that mobile phones are being used for participation, there is more than one technology that is in place. For instance in radio and television interactive programs and news cast, the SMS is being used to collect feedback, conduct surveys and show support to favorite candidates. In cases

such as Ushahidi and SNS, the mobile phone is being used to collect information and post it to a web portal, which in turn can be accessed through mobile phones or computers. Frontline on the other hand aggregates SMS contributions on a PC based database for analysis; it also is used to send bulk message to subscribers from a PC. This amalgamation of technologies to achieve a desired result is important when considering technologies for citizen participation.

Pre-Loaded: There are instances where the information is pre-loaded onto the mobile phones as in the case of M4Girls and SATELLife doctor PDAs, where the content is loaded into the handset and taken away for later access. This form of information access requires special software and higher storage capacity on the mobile and is best suited to situations where the information being accessed is uniform, as in case of a school curriculum and medical dictionaries.

These features in information access are vital for voter education; voters should have the liberty to ask for a particular piece of information as well as be able to contribute and store information. However, this brings out two sets of challenges that need to be put in mind if we are to use it citizen for participation:

Cost: Although the cost of communication has drastically reduced, the cost of on-demand access and the use of mobile internet, especially in multi-media formats, is relatively high for the continent. This cost can inhibit the access of information, especially if incurred by the voters, which does not result to any direct profit to the users as opposed to that of checking up markets.

Content : The other key issue that faces ICTs in Africa, and the developing world in general, is the availability of locally relevant content [Rahman. 2007]. This still shadows current initiatives, for instance in the case of Sokoni, the market information provided is for the major cities and not on the immediate towns in which the farmers live. Pre-loaded information could be tailored in such a way that suit its immediate community; however, it is not an ideal way of transmitting voter information as it does not guarantee universality and there is the need to constantly update the individual handsets. Finally, pre-loaded information requires custom software that takes up more memory space of an already limited amount in the mobile phone.

To be able to handle these challenges, and take full advantage of mobile phones' potential in voter education, as well as other development initiatives, there is a need to find a means through which to work around the challenges.

2.3 Way Forward

To be able to handle some of the challenges, this study adopted and extended the ideas and work of [Maunder. 2008, Maunder, et al. 2008] who proposed and developed a public information system designed for developing countries. This system, known as the Big Board (BB), combines mobile phones with large public displays, to provide a cost effective and easy to use community based information portal.

2.3.1 The Big Board

The Big Board is a public information system that supports interaction between public displays and mobile phones. The interaction technique allows mobile phone users to create and share contextualized media packages between their personal, Bluetooth[4] enabled camera phones, and situated public displays placed in shared locations [Maunder, et al. 2008, Maunder, et al. 2007].

2.3.1.1 System Overview

The Big Board system (BB) consists of four components, namely the display screen; a Bluetooth access point (BtAP); server machine and the client device (a Bluetooth enabled camera-phone).

The display shows a selection of media package cover images and allows a user to select and download the associated media packages. A media package (MP) stored in the computer is a collection of various media items, which may include: documents, photos, audio files, video clips and web pages that the system logically groups together via a Bluetooth address (for user generated packages) or title (for editorialized packages). These media items are optimized to be used on hand held devices such as the mobile phone. (See Figure 5 below).

There are two possible types of the displays: A high resolution digital screen and a low cost 'poster' version of the same.

[4] Bluetooth is a wireless communication protocol utilized for data transmission between multiple devices within short distances. Bluetooth utilizes a low cost, low power consuming light weight transceiver microchip enabling it to be embedded even to mobile phones with basic capability

The high resolution version is targeted at safe communities where content sharing is needed: one such area would be in office lobbies to large organization; this is also an ideal compliment to mobile workshops, where the display can ran parallel to the workshop. It can be put up during the duration of the workshop.

Due to the high cost of acquiring and buying the digital monitors, a stripped down version of the BB was created. The 'Poster' version, works in the same way as the monitor, but instead of the digital screens, the display is created by making screen shots of the digital content and printing out the content onto large pieces of papers. The 'poster version' has an added advantage in that it does not require any energy to run it. This ideal for settings where there is limited or no power supply or the risk associated in putting up an expensive monitor is high.

Figure 3: The BB display with an array of media pack cover images

2.3.1.2 Download Media Pack

In order to download a media pack the user has to first identifying a topic of interest, after which they are required to take a photo of the cover image shown on the BB display. Finally the user is required to send a photo to the system via Bluetooth through a standard OBEX5 services available on their mobile phone. The BB system accepts the photo and proceeds to perform image recognition on the photo. If the photo submitted by the user matches one of the cover images on the BB display, the BB will return the associated media package to the user's device. The user is able to accept or reject any of the returned media items.

[5] Object Exchange (OBEX) a service protocol inbuilt within most handheld devices that allows data transfer in the same way as HTTP allows internet connectivity. OBEX utilizes binary transmission for the exchange of information in reference to a particular request or an object in this case media packs item via a Bluetooth layer

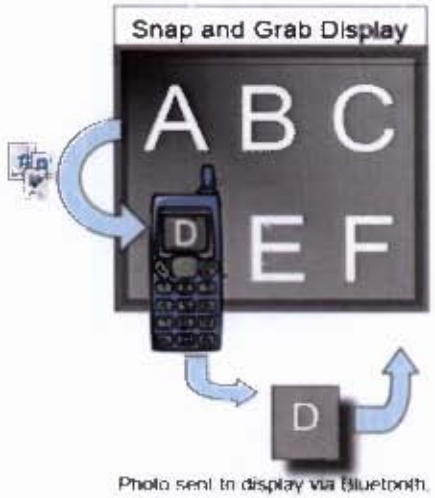


Figure 4: How the BB works

2.3.1.3 Upload

In order to upload content onto the BB system, a user is required to first send their V-Card to the BB via Bluetooth. BB processes the V-Card[6] and proceeds to create a new media package and blank cover image for the user. Next, the user is required to send a photo that will uniquely identify their Media Pack; after which they can submit a variety of media items (again via Bluetooth) to BB to be included in their newly created media package.

2.3.2 The Big Board and Voter Education

We already established in chapter one that mobile phones can be used in the dissemination of democratic purposes that includes voter education. However, the cost of accessing this information is footed by either the voter through the mobile service provider or the NGOs, as in the case of FrontlineSMS, or shared between the two as with Ushahidi. Additionally this media is mainly text-based, hence mainly aimed at persons with basic education to communicate in written language.

The Big Board eliminates the cost of connection incurred from voice calls, texting and media messaging. It eliminates the problems of ineffective and insufficient connectivity and bandwidth by utilizing Bluetooth. The public display allows and encourages peer learning among the users; it is menu based, where users can access information that they want without having to dig into all the content.

[6] A VCARD refers to digital file that contains the name and number of particular cellular device

The BB adopts those advantages of the mobile phone (ownership, ubiquity and multi-functionality) as well as those of mass storage provided by the server machine from which the media packs are accessed via the display. Further, the BB is a free medium that allows the voter to have access to information in various formats. It is ideal in rural areas where a majority of the illiterate voters reside as it can be used to disseminate audio and video files, in local languages, which the voter can then access and share with friends on their mobile phones. The poster version, which does not need a lot of power, can be set up even in areas where there is limited power.

In the context of voter education and democracy, in addition to universal coverage provided by the mobile phones, the display offers a transparent and accountable source of information. Further, it allows the user to go away with the pieces for further deliberation about the information which also forms key component of democracy building [Anttiroiko. 2003] . In addition, the openness of the BB increases the integrity of information in terms of the transparency through which it is presented; there is also free flow of information, the BB does not limit the amount of information one can access, and the users can choose from any piece of information made available on the BB.

The BB can work within existing voter education structures to better inform the public; one such application is installation of the poster version of the BB at voter registration centre – which are set up to serve many eligible voters – where voters can access voter information as they register or as they confirm their registration status. Other places that the BB can be set up are within community centers, chief's camp and the police stations, all of which are public access office, with high voter traffic within the electioneering season.

The SMS has the ability to spread virally; this is noted in the Spanish and Philippines elections in section 2.2.1.4; as well as the experience during the Kenyan elections noted in the same section. This means that once a message is downloaded by a user, it may be assumed that it might be shared among family and friends.

However, the BB has several drawbacks that prevent it from being expressly rolled out in many African villages. To begin with, the BB uses small computers, and although they do not require much energy, they nevertheless need a source of power and in this case it is electricity – a commodity that is limited in Africa. This poses a

challenge in the implementation of the BB where a source of power has to be established before it can be rolled out.

Even with the 'poster version' of the BB, there stills remains the need for infrastructure through which to print the posters. In addition, the poster version cannot be automatically updated; for new content to be available, a new poster has to be printed out. This presents an extra set cost for printing or transport if the printing equipments are not available locally.

We earlier had mentioned about the high rates of vandalism in and around the electioneering time; this poses a challenge in rolling out the BB in such violence prone areas as there is a risk of losing equipment (the screens and the computers) which are relatively expensive.

At this stage of the project, we are not aiming at solving all the challenges, but given the facts presented on the ubiquity of mobile phones compared to the resources already in used in voter education strategies, our aim is to assist the NGOs improve their reach, and where possible cut cost using the BB.

In the next chapter we discuss the method used during the course of this study.

3. METHODOLOGY

Given that the goal of this study was to find an insight into voter education in Africa, and develop a solution based on this understanding, we needed a methodology that incorporates both social and human elements in a given setting – in this case, voter education. Qualitative research is a methodology that allows the study of social and cultural phenomena. The key advantage of qualitative research over quantitative research within the context of our study was its emphasis in looking at people within specific social and cultural contexts [Strauss, et al. 1998]. This is information which would have largely been lost during the process of quantification and modeling of data done in a quantitative study. Additionally, qualitative research provides a flexible and explorative methodological means by which to implement and explore use of the BB and mobile phones in a new environment [Strauss, et al. 1998, Silverman, et al. 2000] .

3.1 Researcher Participants Relations

Qualitative research, unlike quantitative, depends on the firsthand account of a researcher or facilitator. This means that the integrity of the research highly depends on the objectivity of the researcher, research participants and their interaction with one another. These factors are measured against the how all parties take and interpret the various aspects of the research and one another [Russell, et al. 2002, Ahern. 1999, Hammersley, et al. 1997].

Like any other researcher, the author of this dissertation came into the project, with a bias and vested interest in the topic under scrutiny. In the next section we outline some key perspectives and experiences that might have affected the way the project was done and might have affected the way the results were interpreted.[Russell, et al. 2002, Barry, et al. 1999] note that this form of self examination is important as it allows the readers and the final consumers of this information understand the perspective from which the author is coming from. Additionally we highlight the reasons that lead us to choosing the three main organizations that we worked with. For the next section we take a reporting mode as it gives a first person account of the background and experience.

3.1.1 A personal Reflection

Having grown skeptical of politics and politicians due to the various elections irregularities experienced in my country since the beginning of multiparty politics in 1992, I had turned apolitical and even skipped voting when I turned 18-the legal voting age in Kenya. This was largely because I lacked the necessary information on the importance of voting, and the little that I came across, I ignored as rhetoric. On joining university I got involved in student governance, through which I learnt the importance of voting and participating in government matters. It was during my time at university that I enrolled as a volunteer for the United Nations Children's Fund (UNICEF) as a peer educator on matters ranging from HIV/AIDS to poverty eradication and governance. It is at this time that I came to understand how the government worked with various international agencies to pass information to the citizens and some of the challenges experienced in the process.

Upon graduation I started working with Center for Multiparty Democracy-Kenya (CMD) first as an intern then as a programmes coordinator. I joined CMD just after the 2005 Kenya Constitution referendum, and remainders of the material used for that referendum could be easily tracked down. Further, I was present during the evaluation of the voter education process that had just taken place; this gave me a feel of how the voter education process took place, and some of the things that needed to be put in place for it to be successful. In my time there I was in charge of researching, and preparing documents for public consumption. One such document was the communication plan for the 2007 general elections. Additionally, I liaised with the Electoral Commission of Kenya (ECK) and various media houses to collect and disseminate information. It is here that the idea of an ICT driven voter education process was born.

I left CMD early 2007 – to pursue this study – as CMD started to prepare for the elections that were to take place later in the year; I rejoined the organization later in the year as a researcher where I assisted in some of the voter education activities as I carried my research during the whole election process. I was present and assisted in various initiatives that were aimed at promoting peace after the post-elections violence broke-out. One of the organizations that I closely worked with while at CMD was the Media Focus on Africa (MFoA); we collaborated while writing the communication strategy for the 2007 elections, and the pre-voter education events that were to test some of the proposed strategies prior to the elections.

While at CMD I had started communicating with the Institute for Democracy in South Africa (IDASA) and worked on joint projects on democracy in Africa. When I came to South Africa, I was recommended by former employer to IDASA and I worked as a part time consultant to help them create CDs to be sent to the republic of Congo during the elections. Further, I assisted in archiving old recordings of voter education workshops on citizen participation and citizen journalism.

In addition to my official roles in CMD and IDASA, I have been a political activist since my college days, and I have witnessed how information is passed from the source to the public. During the year 2007 and well into 2008, I was a member of 3 electronic mailing lists, all of which were political in nature; made up of persons aged between 24 and 35 years, the mailing list were meant to encourage voter registration and mobilize this group that was highly apolitical to participate in electoral politics. It is in conversations carried out in this mailing list that I first saw how potentially harmful the SMS and E-Mail list could be. In one such discussion, the writer would type out a 160 Character text to be used for distribution, and the end of each email came with a plea "Please pass this to all Kenyans you know". In these discussions and face to face meetings, I came across numerous people who had received anonymous SMS and or had been forwarded one by a friend on the outcome of the just ended elections, requesting them to take action to protect their family or assets. Ushahidi (Section 2.3) took advantage of this passing of SMS to map out the post-election violence. Religious and other activist groups used similar means to call for calm and ask believers to pray; and the government used it to threaten censorship.

I was interested in the topic not only based on my professional background, but upon experiencing the post-election violence it became a personal challenge to see more people get involved in informed governance.

3.1.2 Research Setting and Participants

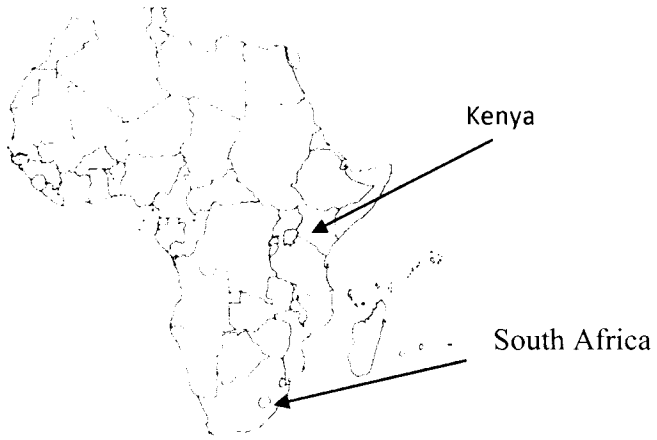
3.1.2.1 *The Project Setting*

This project was undertaken as a two country study within Kenya and South Africa; in particular we worked with these countries as they were stable democracies at the time we begun this study and have had a history of innovative mobile phone use. Furthermore, our research group is based in Cape Town, South Africa and hence had access to information and NGOs within this location. Kenya was instrumental as at

the onset of this study, it was gearing up for its general election and an opportune time to carry out our research.

In the following section we will give a brief description of the two countries in regards to population demographics, as well as its political landscape before we introduce the organizations that took part in this study.

Figure 5: Kenya and South Africa



3.1.2.1.1 Kenya

Kenya is the East African economic regional hub, with a population of just over 37 Million people, 60% of them live in rural areas, 50% live under the poverty line (under two dollars a day), 40% are less than 19 years and they have a life expectancy of 57 years at birth. Kenya has over 85% literacy; however, statistics on literacy indicates that more than eight million adults and youth are illiterate [CIA-b. 2008].

Kenya has been a democratic republic since its independence in 1963, with an elected president and members parliament. However, multiparty democracy was re-instated in 1992, which requires general elections to take place after every 5 years. The legal age that one can vote is eighteen years.

Kenya has a very liberal information and communication policy, with over 100 radio stations broadcasting in 12 of the largest language groups and has 80% penetration. Kenya has 300 thousand fixed line telephone users, 3 Million internet users, and 13 Million mobile phone users[CIA-b. 2008] .

We started this project as Kenya was preparing to go to its fourth elections since the re-emergence of multiparty politics in Kenya. The other elections although characterized by minor violence incidences, were mostly acceptable. However, in the

middle of this study, violence broke out during the Kenyan elections. This violence claimed 1600 lives and left over 600 thousand people homeless.

3.1.2.1.2 South Africa

South Africa is Africa's economic powerhouse with a population of just over 48 Million people. Like most of Africa, 60% of the population live in rural areas and 60% of the population live under the poverty line. South Africa's life expectancy at birth is 48 years, with 83% literacy levels. This statistic also comprises of persons under the age of 18 years who form a majority of the educated population.

South Africa is a democratic republic. Since 1994 – after the breakdown of the apartheid regime – elections take place every 4 years, where the voters elect a political party as the ruling party, and the party, through representatives, appoints the president. Each party depending on the number of votes garnered nominates members of parliament.

South Africa accounts for a majority of Africa's internet bandwidth usage with over 7 million internet users; it is almost at a saturation level in mobile phone usage with over 44Million users at the end of 2007 [CIA. 2008].

3.1.2.2 *Engaged Partners*

In order to employ qualitative research, we needed an environment and a group of people that were involved in the voter education process. The importance of such individuals also referred as human access points or allies, is immense as they already have an understanding of the process, and have established a rapport with end users with whom we may wish to communicate with during the course of the study [Chetty, et al. 2007, Medhi. 2007, Marsden. 2008a, Marsden. 2008b]. However, instead of using single individuals as access points, we used NGOs. Medhi [Medhi. 2007] notes the importance of using NGOs as access points; she says that due to their work in the community they already have established a rapport with and developed trust. Furthermore, NGOs have an accumulated experience and knowledge of the community. This leapfrogs the research process, as they can act as one-stop knowledge access point [Chetty, et al. 2007, Medhi. 2007].

Instead of using NGOs to access a community of voters, we made the NGOs participants in the research process, with the hope that our work with them will eventually trickle down to individual voters. There are various factors that led us to making this decision.

First, in as much as we would have wanted to work directly with the voters, through the NGOs, we realized this was going to be a challenging task. In order for this study to a truly scientific representative of voters and voter educations outcome, we would have been required to go through the various stages of demographic segmentation –a task that was challenging due to resources in time, money and human labour. The NGOs, through their previous work already had segmented the voters by demographics, and had developed strategies suited for each group of voters. Therefore, if we were to work with the NGOs this is something that we would not need to be concerned with.

Second, based on our experience working with NGOs, we know that they are instrumental in the voter education process. They provide alternative voter information to the public as well as vet material produced by the government to check integrity and authenticity as stipulated by the Electoral Act and the international community; this means that they know what information the voters require, so we did not have to go looking for them.

Thirdly, NGOs are heavily dependent on donor funding [Mercer. 2002, Fowler. 1992]. This means that, in as much as they had the best laid plans to reach out to as many voters as possible; they were limited by the available resources. They provided us with a focal point of access as both producer and consumer (when vetting) of voter information. Our aim therefore was to assist them cut down on cost and increase efficiency in their work.

Finally, the NGOs had proven mechanisms to monitor and evaluate the success and impact of any given strategy and material in a voter education exercise. This meant we did not have to come up with these strategies.

The NGOs therefore offered us space and information to conduct our research, develop and test our design, while we in turn developed a system that might possibly be of great use to them in achieving their goals. At the time of writing this dissertation, one of the NGOs was in the process of integrating the resultant system into their voter education strategy.

Initially we had identified five organizations that we could collaborate with during the course of this study. One of the organizations – a government agency – pulled out of the study due to the bureaucracy involved and the political nature of the project.

The other organization, South Africa Knowledge System (SAKS) which was involved in community education through pre-recorded CDs, fell through due to logistical purposes, as it was still a start-up and was in its prototyping stage of their products.

In Kenya we worked with the Centre for Multiparty Democracy-Kenya (CMD-K, www.cmd.or.ke) and Media Focus on Africa (MFoA, www.mediafocusonafrica.org); while in South Africa we worked with Institute for Democracy in South Africa (IDASA, www.idasa.org.za).

CMD-Kenya was founded by political parties in Kenya in partnership with the Netherland's government to promote the institutionalization of vibrant and democratic political parties capable of enhancing and perpetuating multiparty democracy in the country. Its key programs include encouraging citizen participation through media strategies. The organization has a dedicated media and resources department tasked with the role of informing the public on democratic issues. They mainly use main stream media, through paid up advertisement and broadcast slots.

MFoA is an NGO focusing on communication for social change. Working with various partners its vision is to have a well-informed society that communicates effectively and participates in decision making processes to promote national integration, good governance and social transformation in Africa.While its mission is,to strengthen the capacity for democracy and human development within societies in Africa through information exchange, sharing of knowledge and facilitation of dialogue, using the media.

IDASA is an independent public interest organization committed to promoting sustainable democracy based on active citizenship, democratic institutions, and social justice. IDASA has a dedicated office targeted at citizen participation through media. Media@IDASA, located in Cape Town, is responsible for producing its media – print, broadcast and electronic – as well as managing the organization's information and dissemination strategy.

3.2 Design Methodology

In order to introduce the BB into the voter education process, we followed the philosophy of pragmatic design [Marsden. 2008b]. This methodology encourages creation of technological solutions that do not require adding new technology or infrastructure to a situation. It creates solutions by leveraging the capacity of already existing technology.

This a methodology largely borrowed from the philosophical approaches of pragmatism first put forward by C.S Peirce, George Mead, William James and John Dewy [Scheffler. 1986]. This philosophical school of thought spans through social science and natural science by questioning the existence of 'rationale' and 'realism' [Cherryholmes. 1992, Zimmermann. 2006].

Because this is not a philosophical dissertation, and the subject matter is much more complex to be fully covered in the limited scope of this dissertation; we will not delve deep into it. Rather, we draw on two principles that are critical to the design this research: Self Reflection, and its Emphasis on human action/activities.

In the previous section we already covered a critical characteristic of pragmatism on self-evaluation and how it might have affected how this research was carried out. Pragmatism requires self-reflection, as the idea that we are "historically and socially situated" [Cherryholmes. 1992]. This principle, on reflection, can also be extended to all the participants of the research, as it is due to their existence, past experience and their work that the project is made possible. Therefore when interpreting or reading the activities they perform, we have it in mind that any move or decision made is based on the success or failures of past experience [Strauss, et al. 1998, Cherryholmes. 1992]. In particular, we are heavily reliant on the use of communication strategies and monitoring and evaluation techniques that are already in place, which have taken many years to formulate.

In the same way, we examined the current technological landscape, to see what is available and how it is being used. It is through this inquiry that we came to the conclusion that mobile phones can be a suitable tool in voter education. Further, we had to study the mobile phone as an existing technology, current trends in development and usage to see how this might affect the resultant design.

Second, and probably most important, the pragmatic way of thinking puts a lot of emphasis on human action and interaction in terms of values, aesthetics and preferences [Cherryholmes. 1992]. These principles we believe are the very foundation to successfully designing and implementing appropriate technology systems. Pragmatism in design allows for exploration of existing technological and human landscape to determine who the user is, what they do, how they do it and how technology might help them optimize their work. These are the same questions used in User Centered Design methods for system development.

3.2.1 User Centered Design

User Centered Design (UCD), also known as Human Centered Design (HCD) is a multi-disciplinary approach to systems design that puts the user of the system at the centre of development and focuses on making systems usable with the user as opposed to technology as the focus of the system [Preece, et al. 2002, Jones, et al. 2006]. Drawing from pragmatism, UCD is founded in the joint efforts of the final user and designer through the systems development cycle. There are advantages that come with jointly developing ideas and implementing these ideas with the final user of the system. Because the users were there from the beginning, more of their preferred features will be integrated; there will be limited chances of the product being rejected as they had been present in all or most part of the development process; the users will own the product as co-creators, and finally it is usable [Abras, et al. 2004, Gulliksen, et al. 2003, Jokela, et al. 2003].

Usability is a concept with different definitions amongst the various practitioners of UCD. Usability can refer to either a set of independent attributes that make a system desirable and relevant to the user or it can refer to all the attributes in totality [Jones, et al. 2006, Sharp, et al. 2007, Nielsen. 1994a].

Different authors have outlined different ways approaching and ensuring usability of a system, some which are more intensive than others [Gulliksen, et al. 2003, Karat, et al. 1996, Karat. 1997, Vredenburg, et al. 2002]. [Goldstein. 2008], outlines four principles that one should follow while carrying out UCD: empirical measurements, iterative design and an integrated design where all aspects of usability evolve together. But the key principle he points out that distinguishes UCD from other systems development approaches is the early and continual involvement of the users at key stages of the project. Empirical measurements and iterative design-using prototypes have also been pointed out by various studies as imperative for usability [Gulliksen, et al. 2003] .

Therefore in order to take care of these requirements, UCD has to go through various iterative phases of constant re-design and testing, while integrating user feedback. Different proponents of UCD have proposed different number stages in UCD. However, in order to have a functional framework, this project adopts the stages proposed by ISO 13407[Jokela, et al. 2003]:

- *Requirements gathering* - Understanding and specifying the context of use

- *Requirements specification* -Specifying the user and organizational requirements
- *Design* - Producing designs and prototypes
- *Evaluation* - Carrying out user-based assessment of the system

In order to go through these stages and ensure users involvement, UCD practitioners have developed techniques, as well as borrowed others from various fields [Gulliksen, et al. 2003]. There are numerous UCD techniques that can be used at each stage of the UCD process, while some are used throughout the process. Here, we only highlight those techniques that we applied in the course of this study, while mentioning some comparable techniques that can be used in similar instances or those that might fail. We draw mostly from techniques summarized by various authors in these four sources [Preece, et al. 2002, Jones, et al. 2006, Abras, et al. 2004, Gulliksen, et al. 2003, Sharp, et al. 2007] while citing additional relevant works.

3.2.1.1 *Contextual Design*

To extend UCD, we adopt Contextual design. Contextual design (CD) is a form of UCD that is targeted at organizational settings. This seemed an appropriate approach given that our users are primarily NGOs rather than individuals. Contextual design focuses on transforming users work in a cost effective manner [Wixon, et al. 1990]. This is the primary premise of this dissertation – to extend the NGOs work by optimizing voter education strategies at the lowest possible cost.

Finally CD makes it possible to design within a limited time period across sites and diverse users. It does this by purposing to understand: what that work is, what kind of technology would support and transform such work. It looks at how to anticipate and support the changes in work that a new technology might bring [Wixon, et al. 1990, Holtzblatt, et al. 1997, Beyer, et al. 1999].

Contextual design has borrowed research techniques from other fields including anthropology and psychology to ensure that they understand the user and the work place in context.

This project hence augments Contextual design with UCD design stages to co-design a system with the users.

It is important to note at this point that the word 'user' from this point forward will be referring to one of the NGOs or all of them unless otherwise mentioned. In each organization we worked with at least two members of their staff who would most likely be in direct contact with the system.

3.2.1.2 *Object Oriented Design*

In addition to main stream UCD principles and Contextual design techniques, we also augmented object oriented design (OOD). OOD allows figurative representation of tasks and activities in relation to the user and the system. It takes the collected data and groups it in terms of components and interactions. This helps solve a given problem or carry out a specific task [Jacobson, et al. 1992].

The advantage of using OOD in a user centric technology design is its capacity to abstract raw data and present the relationship between components, tasks, activities and their related characteristics in a diagrammatic format. This makes it easier for the users to visualize the flow of information throughout the system, without having to understand the technological jargon used by designers [Jacobson, et al. 1992].

3.2.1.3 *Activity Modelling*

Another addition to our design process was activity modeling. Activity modeling brings together aspects of usability into OOD and as a result can be termed a UCD technique in itself [Constantine, et al. 2003]. It is a systematic approach to organizing and representing the contextual aspects of a system; using abstraction, it helps synthesis qualitative data, capture and represent the most important activities in regards to the design. The output of an activity modeling exercise is an activity list and an activity map. An activity list identifies the relevant activities and their interrelationships, while the activity map presents these interrelationships diagrammatically. The activities can either be concurrent hence they can be synchronized (coordinated) or they can be consecutive hence they are interleaved or alternated. Activities are included in the model if they demonstrate an arguable impact on the design and final product [Constantine, et al. 2003, Memmel, et al. 2007].

3.2.1.4 *Table of Methods and Techniques*

The following table outlines the method and techniques used at the various stages throughout the project. The table is a summary of the coming sections as well as chapters 4, 5 and 6. The downside of using UCD techniques is that it is costly and

takes a lot of time. The project was based on two different sites discussed in the next chapter, spanning over three different organizations. This means that time used for each of UCD phase was not consecutive. For instance, we started our study with interviews and observation sessions at IDASA as we are based in the same city. A few months later upon receiving responses to the questionnaire we flew to Kenya to do some interviews and some more observations with CMD-Kenya, MFoA and the other relevant organization. In the same way, we developed our initial design with IDASA, and added and changed features upon consulting with CMD-Kenya and MFoA. The final prototype was developed while in Kenya, when integrating the comments from the two organizations. However, the final evaluation was done with IDASA as we could not afford to go Kenya for a third time. As you might imagine it took a lot of time and effort to collect, consolidate, analyze and represent data from the two sites with a limited amount of resources and time.

Table 1: Design Stages, Methodologies, and Techniques

Stage in Design Cycle	Techniques Used	Purpose	Users involved	Time Taken
Requirements gathering	Questioners document ethnography	Collecting data related to the needs and expectations of the users	CMD-K IDASA -MFoA ODM[7], ECK, PNU	Questioner via email (CMD, MFoA, ECK,PNU) Interviews conducted over a period of 3 weeks (CMD, IDASA)
Requirements specification	-Follow up interviews -Observation -Contextual Inquiry	Collect information related to the sequence of work and environment in which the system will be used	CMD-K, IDASA	2 weeks spent at CMD, 2 Weeks spent at IDASA 2 days spent at MFoA
Design	Data abstraction , Task and Activity list, Prototyping	Implement systems design ideas on an incremental basis	CMD-K, IDASA, MFoA	3 months
Evaluation	Heuristic Evaluation , walkthroughs scenarios, Constructive interaction	Collecting data on usability measured against given criteria Collect data relating to user satisfaction	MFoA, IDASA, CMD-K	3 Months

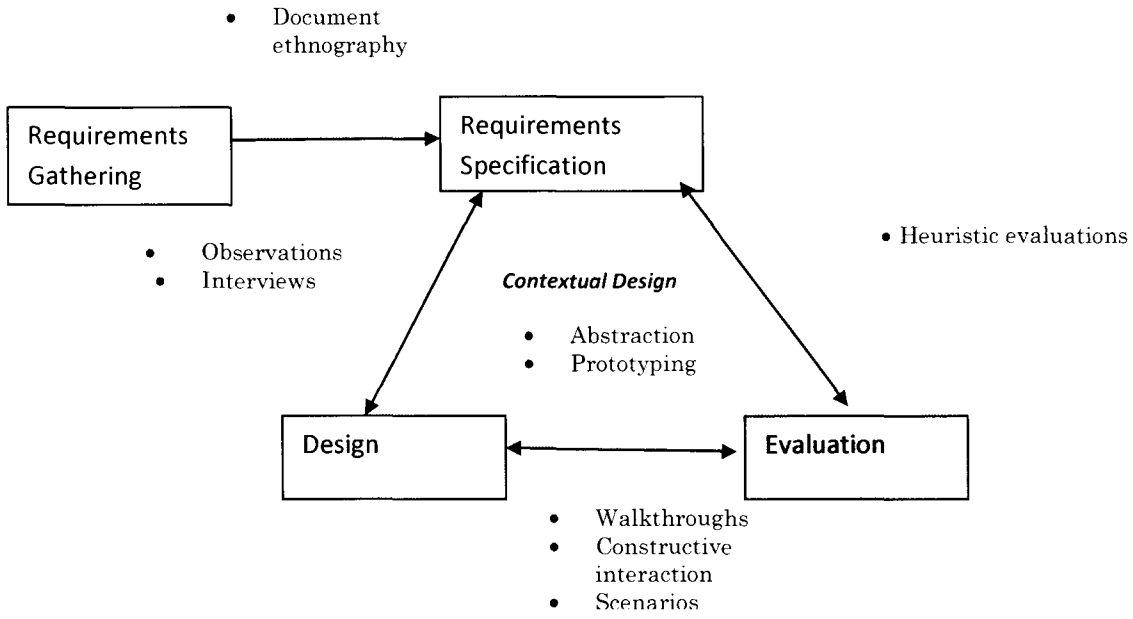
[7] Orange Democratic Party (ODM) and Party of National Unity (PNU) were the two leading political parties in Kenya's 2007 Elections: ECK: Electoral Commission of Kenya is the government body charged with voter education amongst other electoral duties.

3.3 The Design Process

The table shows that our design process maps onto that proposed by the ISO[Jokela, et al. 2003] ; that is, we begun by generating ideas for our systems, through a series of methods collected our system specifications, then designed and evaluated.

The following figure shows the interrelationship between the different stages and techniques. As illustrated in the figure the stages are iterative, and feed into each other. Therefore, even though we cover this and matching techniques as individual entities, as the design process progresses the stages and techniques are usually interwoven.

Figure 6: Relationship between Phases, Methods and Techniques



3.3.1 Requirements gathering

a) Document Ethnography

As a first step in achieving our aims we needed to ascertain that the mobile phone was a viable tool for voter education as well as develop an understanding of the voter education process from the NGO's perspective. In order to do this we needed to follow the voter education process from conceptualization of an idea until it was dispensed to the voters. This we did by sending out questionnaires, conducting interviews and also going through the resulting paper trail [Harper. 1998] .

On ascertaining that the NGOs who were going to be our users did in fact see the potential of the mobile phone in use for voter education, and that the existing

strategies could be tailored to use mobile phones, the next stage was to get the details of each of our users.

b) **Questionnaire**

An initial questionnaire was sent out to the NGOs to capture basic information and technical knowledge of the individuals that we were to work with. This information allowed us to plan our study such that it would suit the NGOs timetables and technical abilities. Silverman [Silverman, et al. 2000], states that questionnaires are an ideal way to introduce the subject matter to the users, and provides a means through which to capture an overview of the situation. There are generally two types of questionnaire determined by the types of questions contained in them, with close ended questionnaires leading a specific answer and open ended capturing general attitude. Since we needed specific demographic data as well as some the NGOs' attitudes in using new media for voter education, our questionnaire contained both sets of questions. Strauss [Strauss, et al. 1998] notes that this type of questionnaire is recommended in instances where the questionnaire is not being directly administered – we emailed this questionnaire to the user rather than having an interview, as it gave the user a leeway to answer the questions at their own disposal in a more reflective manner.

3.3.2 Requirements specification

a) **Contextual Inquiry**

Following this, we carried out rapid contextual inquiry by taking an 'apprentice mode' with the users under the communication officers in charge of the voter education process. The method takes an ethnographic approach to interview and field observation tailored towards technology design. It was first proposed by [Beyer, et al. 1995][Beyer, et al. 1999], andextended by [Holtzblatt, et al. 1997, Wixon, et al. 2002]. It allowed us to learn more about the user by observing through their daily routine and questioning them at regular intervals to ascertain part of our observations. This was especially important as we did not have enough time to understand the user fully through extensive observations and interviews needed in anthropological like ethnographic studies [Silverman, et al. 2000]. The apprenticeship, unlike other field study methods, where there is a distinct researcher/user role, is a collaborative effort with regular roles interchanged from time to time, this gave us a firsthand experience on how ideas are developed and

implemented. This aspect came in handy when we had to analyze the data collected for design as we reflected back on our apprentice role.

i. Observation

Observing the user in their natural setting as opposed to a controlled setting enabled us to examine circumstances that they were most comfortable working within, and how they preferred to perform certain tasks. It also enabled us understand how they handled the various interruptions that occurred as they worked and how they merged the various tasks into their daily routines. These were all important in informing our design with elements to capture each of this aspects for instance error handling during data capture, or pausing a certain process so as to attend to a seemingly urgent one [Sharp, et al. 2007, Smith. 1997].

ii. Interviews

We followed observations with unstructured interviews to clarify some of the data we had collected. We opted to use unstructured interviews instead of structured ones as they allowed the users to express themselves more freely within a not so formal setting [Sharp, et al. 2007, Smith. 1997]. This was also advantageous due to the time limit, we did not want to have to set up formal sitting; further, our users were busy and the interviews took place whenever the users were available or over a meal.

3.3.3 Design

As with any qualitative research process, contextual inquiry usually collects data in many formats from many quotas. To record and manage this data we used notebooks to make field notes on observations and interviews; as well as still photos to capture moments in the process of work.

a) Abstraction

Inevitably, as with many anthropological-like research, we collected data, some of which was not necessary for this particular project. Data abstraction is used in the analysis of data to reduce and factor out details so that one can focus on a few important concepts [Jacobson, et al. 1992, Gamma, et al. 1993]. By concentrating on the 'work' that we were aiming at enhancing – in this case voter education – we eliminated other activities and tasks that we might have observed but were not necessarily important for the success of voter education. For instance, this project

did not involve stakeholders other than the NGOs; however, we had talked to some consultants on how they collected, analyzed, organized and presented voter education material which was fed to NGOs for final input. Since we were just interested in the end product, we had to let go of some of the material on collection and analysis of voter education material.

b) Activity and Objects Analysis

After abstraction the next stage is to implement the final data list. In order to do this one has to group each piece of data either into entities known as objects in OOD or process also known as interactions. The outcome of object and activity analysis is the Activity list, an activity map and a use-case diagram [Memmel, et al. 2007, Constantine. 2006] .

Having collected and analyzed the requirements and specifications from the user, the next stage was to organize the remaining activities to enable design. As we discuss in the next chapter, voter education has major steps, research, demographic demarcations, and information creation and information dissemination. Our activity list therefore contained tasks carried out within information creation and dissemination. This means that we had to break down the process between the times the NGOs come up with a new idea on a new piece of voter education material to the moment the voter consumes. We discuss more on this in the design chapter.

c) Prototypes

A first step in seeing the system come to life was creating prototypes. Prototypes refer to 'limited representation of a design that allows the users to interact with it to explore its suitability' [Jones, et al. 2006, Sharp, et al. 2007]. We started off with a simple prototype made out of pencil and paper. We created a paper storyboard to show the various objects and interactions as represented by different user interfaces. The storyboard consisted of a series of sketches showing how a user might progress through a task using the new features of the BB. After several iterations, the storyboard evolved to integrate changes as the user relayed their feedback, cutting down on the time taken for development.

After we had gone through several iterations, we transferred this design to software that allowed the user to interact with the system in a realistic manner. This stage of the design first started off with partial functionality, which grew as the system

expanded. This is often referred to as a Rapid Application Design (RAD) [Jones, et al. 2006, Sharp, et al. 2007]. RAD has been made possible by the significant advances in software development environments. We used Microsoft's .Net framework, which has a What You See is What You Get (WYSIWYG) suite that allowed rapid generation and change of systems functionality and user interface features, even with the user was present.

We went through several iterations, adding user feedback until we had a 'final prototype'.

3.3.4 Evaluation

Through the design process, we employed several evaluation techniques to make sure that the users would find the system worthwhile.

a) Heuristic Evaluation

Heuristic evaluation is an expert approach to evaluating a system. It is guided by a set of design principles (heuristics) to find and handle usability problems in a design during the early stages in the development cycle [Jones, et al. 2006, Sharp, et al. 2007, Nielsen, et al. 1990, Nielsen. 1994]. Also known as predictive evaluation, it is a systematic process whereby a usability experts steps through tasks – in the absence of the real user – applying their knowledge of typical users, to go through the system. Their aim is to understand the general flow and feel of an application, and to identify roles of the different objects and their contribution to the whole usability experience. The most commonly used heuristics are those by [Nielsen. 1994a], who terms them as the rules of thumb in evaluation.

Although HE is a comprehensive process, it has generalized the definition of what a "typical user" might or might not want. Usually, opinions made from this type evaluation often overlook or trivialize requirements and concerns of real users [Nielsen. 1992]. Therefore, it is advised that HE be used in combination with other forms of evaluation.

b) Scenarios

Smith [Smith. 1997], describes scenarios as specific activities by an individual user interacting with an information system to perform a given task. They are used to determine how a system might be used in the real world. By mimicking an actual conditions or steps of systems, scenarios allow the evaluation the system within

concrete-real world- instances. This allowed us capture activities and attitudes towards performing various tasks. We used this feedback to tailor the system to suit the users [Jones, et al. 2006, Sharp, et al. 2007].

c) **Constructive interaction and Artifact Walkthroughs**

This allows the user to verbalize what they are thinking as they perform a task. Here two people work through a task simultaneously [Jones, et al. 2006, Sharp, et al. 2007]. There is a constant verbal feedback given as tasks are undertaken and questions asked when faced with a challenge. We used this method to measure the NGOs understanding and utilization of the BB and the resultant design.

Artifact walkthroughs is very similar to constructive interaction. However, in this case the researcher acts like an instructor going through all the possible actions on a system and the user later imitates the steps[Jones, et al. 2006, Sharp, et al. 2007].

In the following three chapters we go through each of the UCD phases, and detail how we used each of the techniques. Chapter 4 covers requirement gatherings and specifications; Chapter 5 covers the design and Chapter 6 covers evaluation.

4. REQUIREMENT GENERATION AND SPECIFICATION

4.1 Introduction

In the previous chapter we discussed the various methodologies utilized within the context of this study. In this chapter we discuss how these methodologies were applied to understand voter education as well in the introduction of BB into the voter education scenario.

4.2 Observations

4.2.1 Mobile Phones in NGO setting

At the beginning, we needed to ascertain that the mobile phone was a viable tool for voter education within this setting; using contextual inquiry and a range of ethnographic techniques we saught to determine its presence and the frequency of use.

Using data collected from a preliminary questionnaire, coupled with further probing and observations, we noted that all members of staff in all the three NGOs owned at least one mobile phone. The phones were used for communication both within and outside the office. Additionally, all the NGOs had subscribed to local mobile phone subscribers and had a GSM connection linked to their main phone exchange board. This was to lower on the cost incurred while making mobile phone calls from a fixed line and vice versa.

We also discovered that the frequency and use of short-message-service (SMS) was much higher than we had anticipated. Observations and interviews revealed that the SMS was the main form of communication when a large number of people were involved.

At CMD-Kenya, which was characterized by frequent meetings and involves lobbying and activism, they have a dedicated mobile phone hand-set to send and

receive SMS messages. At the time of this study were in the process of installing a PC based application for the same purpose. They used this service to communicate about a range of issues taking place within the organization itself and also within the Kenyan democratic circuit. In some instances, the SMS was used as a follow-up to a phone call, e-mail or posted items. According to this organization, the use of the SMS was as a form of reminder for action as the recipients would have the text within a matter of seconds, and where response was needed, it came back within the first 30 minutes. Another advantage stated in using the SMS, was the informal way in which a message would be communicated. This provided room to use various languages to reach the different audiences with same content.

An observation about the SMS that came as a surprise to us, was the storage of sent messages. This in particular raised curiosity as it is a practice not seen when dealing with personal content on personal mobile phones. According to an officer of CMD, the messages were stored as a form of precaution on two levels: authenticity of sender and of the content. In terms of authenticity, this being a political environment, the organization needed to have a record of all messages that originated from them, as a proof that they were sent by them. In terms of content, their needed to be a vetting on what message was sent and to whom it was sent; this was to allow for transparency and accountability.

At IDASA, they have been using the FrontlineSMS application discussed in section 2.2.1.4 as a means for community journalism. IDASA maintains a database of volunteers at a community level who observe and collect stories on the ground on various issues affecting the people around them. These volunteers send in their 'stories' thematically, which are later compiled into columns on IDASA's website or developed into policy documents to lobby the government on the issues that are affecting the people on the ground.

The MFoA, on the other hand, developed a voter education campaign using SMS. Using the on-demand concept discussed in section 2.2.1.4, they were able to supply information regarding issues around the elections ranging from the names of the vying candidates, to matters of integrity and leadership during the voting process. By the end of this study, MFoA did not have the actual figure of the number of participants who used this campaign, but based on a report from their auditors, it seemed to have been one of their most successful undertakings ever.

Although the SMS is currently being used successfully within NGOs, further probing reflected our fears that this service could only be used where there is a limited number of people to reach out to. The reason behind this is that the three NGOs we worked with are fully dependant on donor funding, and their programs and activities are only as scalable as the amount of money allocated to them. Hence, in the case of voter education which demands universal access to all voters, the use of SMS is a costly practice which is not viable, scalable nor sustainable. For instance a text message cost about 35 cents in South Africa: even if they are to aim at reaching only 10% of the population this will mean spending about Rand 1.68Million for a single SMS; this amount of money forms the majority of the budget of already cash strapped NGO. This means in instances such as the one used by MFoA, the voter was charged for every piece of information received, while the organization paid the mobile service providers money to route the messages to their servers. Therefore, although the exercise is said to have been successful, we believe it would have yielded much better results if the SMS was free. This applies to IDASA's FrontlineSMS application as well, if the journalist were not incurring extra cost by sending information, there would be a greater sense of what is actually happening at community levels.

Hence, although the mobile phone is actually in use in the democratic circle, its potential has not been fully utilized due to cost. This, therefore, motivated the introduction of BB to see if it could address some of these concerns.

4.2.2 Understanding Voter Education

In order to understand what is entailed in voter education and how it is currently carried out, we started off our field study at IDASA, who have been actively been involved with voter education in several African countries for over 20 years. At this stage we again utilized critical inquiry to find out how they ensured that the message reached the widest number of voters.

We started off by a meeting with media@Idasa, the communication component of IDASA that is also involved in compiling and producing voter education material. This initial meeting was to familiarize ourselves with the office structure and ascertain who we will be working with. Following this we started working with the officers in charge of voter information dissemination by observing them every afternoon in an in-situ position for s period of two weeks. At the beginning of the study, we started off with the communications manager who was in charge with all

electronic based transmission including the running of IDASA's internet portal. She played an important role in helping us understand where they got all the information that they posted on their website, as well as how they supplemented the website services in other areas in Africa where internet was not accessible yet. However, this communication manager had to go for maternity leave hence, we switched to working with the overall manager in charge of media@idasa, whose responsibility was to vet all material that produced by the department as well as public relationship of the organization. The switch allowed us to view the different ways in which they carried out their work; whilst one was totally dependant on the computer for her daily schedule, we noticed that our second user depended on writing notes on a notebook, both for her personal use and also when she was brainstorming for the organizational purpose. Both this observations were important as they allowed us to incorporate both working patterns in a compromised design.

Through a series of interviews we discovered that IDASA get their voter information through internal and external research and through community journalism mentioned earlier. In internal research, IDASA has hired consultants and analysts who research and report on various aspects of democracy and in the case of an election they research on the various issues affecting both the government and the voters and state of the democracy in general. Based on these research reports, the communication team tailor material to either lobby government or encourage increased participation by appealing to the general public to participate in the voting process. IDASA's material is also fed by external research from the government and other NGOs involved in democratic issues. In terms of the government, IDASA monitors the kinds of information that is produced by the government and challenges the aspects of it that they feel will not be beneficial to public good.

In terms of disseminating the information, IDASA use both direct and broadcast forms of information dissemination but mostly they combined the two forms of information dissemination. For instance, they disseminate the information directly through workshops, where they train people who are in turn expected to train others within their communities. These workshops are recorded and transcribed and stored on CDs which were later shipped to other areas with similar voter profile for future use. An example of using this combined means of transmission was on the community journalism, which IDASA views as a means of encouraging participation amongst the grassroots people. In the training sessions, community members were

taught how to compile stories concerning their community and how to lobby local authority through these stories for better service delivery. This training was transcribed and recorded (audio) which later on was made into presentation based CDs that were to be distributed within the community. Another means of disseminating information was through brochures and information pamphlets; at the time of our study, IDASA had just finished a campaign on budgeting where they produced material with different messages to convince the public to get involved in the budget making process at local government levels. The messages on the pamphlets were simple and appeared in four of the eleven South African languages – IsiXhosa, IsiZulu, Afrikaans and English.

They also used the internet to disseminate their information; however, the information disseminated over the internet was highly specialized and was not targeted to the normal voters. They used two main means on the internet channels: a monthly electronic magazine called Democracy in Action that is sent via email, which basically was to inform the readers on what was happening on the democratic circles including messages that motivated increased participation in the democratic process. They also have an website www.e-politics.org.za which is mirrored on www.idasa.org.za which acted as a one stop shop for all information in regards to democracy within the continent. These sites had a combined monthly hit of 90,000, most whom were repeat visitors.

The key means of disseminating information was through community based radio stations which took close 50% of their communication budget; they liked the radio as it had the widest reach within Africa, and transmission could be done remotely where there was security risk involved. For instance, during the Zimbabwe crisis, they partnered with a British based charity to prepare and transmit democracy and voter education messages through satellite-based community radios that broadcasted from South Africa.

4.2.3 Big Board and Voter Education: Pilot Study

Figure 7: The BB during the pilot study

At the end of this phase

of the study, we introduced the BB to the IDASA team, and carried out several demonstrations within our laboratories so as to familiarize them on how it worked. This was with an aim of seeing the viability of the BB to compliment other voter education channels that were already in use. After the team had comfortably been able to use the BB, we needed to test the BB on a larger scale, with democratic messages.

This opportunity was presented by IDASAs 20th Anniversary, where we ran a one day study. The anniversary was a public function with an attendance of about 300 guest attracted from both the public and private sector, who were highly interested in democratic information; additionally there were other people at the venue who were supporting staff mainly working as the security and service personnel for the establishment.

The BB was placed at the lobby, with eight media packages describing IDASA's view of the South African democratic transition; we had audio recording of former president Nelson Mandela and Tambo Mbeki; additionally, we had text on IDASA's struggle for the liberation of South Africa; and a video on how HIV/AIDS is affecting democracy in the country.

4.2.3.1 Pilot Study Results

From this pilot study we discovered that BB could be an acceptable tool in dissemination of democratic material. Our initial fear that the mobile phone specification – a camera phone with Bluetooth – would leave out some of the poorer users was put to rest when a group of seven people made up of security guards, and cleaners based at the venue of the meeting produced their mobile phones which had the necessary functionality to have access to the BB. The key observations included:

a) Peer learning became automatic in this group as the person who we first taught to use BB brought in some more people and explained to them the process of accessing the media while recommending his favourite through their local language. This made the use of the BB feasible without expert intervention.
b) The other observation made at this stage of the study is the viral effect of the BB's content; we noted that on getting some media from the BB some people sent the information to others, not on location, through messaging services. For instance, we observed as one of the cleaners, messaged an audio recording of Nelson Mandela through to a contact.

c) The other observation was that the BB was attractive to persons from different backgrounds; for instance the security guards who could hardly communicate in English were able to understand the instruction on accessing the information. The BB instruction, although in English were also represented by images that demonstrated the various stages of the media transmission from the BB to the phone.

d) Additionally we noted, there were two access behaviors: the group of illiterate users were more interested with the video, audio and pictures much more than the text, which was purely in English. While the group of more educated people was more interested in topical issues rather than the cover images (which attracted the other group) and carefully browsed the titles of the images before they downloaded the content of their interest.

e) Audio and video clips proved to be more popular than the text material for both groups.

We followed the observations with informal interviews with the user about the viability of the BB, for circulation of voter education. The response was largely positive with many the interviewees pointing out ease of use of the BB and openness in accessing the content as the greatest advantage to the BB screen.

The challenges of the BB among the less educated users was ease of understanding the instruction, but when we explained that it worked like the Bluetooth transfer from one phone to another, which they were familiar with, they bought into the idea.

The other challenges included the amount of time it took to access and download the larger files, this proved to be more problematic especially among our more educated users who had other places to rush to, as opposed to the premises staff who had time to hang around until the MP was fully downloaded.

Security of content, user device and user identity was raised. Due to the fact anyone could post onto the BB at this stage, some of the participants commented that it will be ideal for democracy; however there must be a way to moderate content that is posted. As the BB relied on Bluetooth connectivity, it does not store particulars and identities of the users, unless they want to post something, in which case the BB will only store their V-card that enables it to link content posted from a certain mobile device. An issue that was out of our hand was the security of the phones in terms of spread of malicious programs such as viruses and malwares. Many of the more

knowledgeable users wanted a guarantee that the MP did not contain viruses that will ruin their phones. We tried to re-assure them that our content was virus proof, but we could not guarantee on the content coming from other contributors and users.

4.3 BB as a Voter Education Strategy

After ascertaining that indeed the BB could be used for voter education purpose, the next stage of the study was to go into an actual voter education environment. In order to do this we partnered with CMD-Kenya who were involved in voter education during the 2007 Kenyan general election. As noted earlier, Kenya holds its general election every five years to elect a president and 210 members of parliament.

We structured our study such that we had ample time to observe the relevant offices at work, and also create time for follow up interviews. Apart from the officers in CMD-Kenya we also interviewed parliamentary candidates, political party officials and some officers from the Electoral Commission of Kenya (ECK) who contributed to the overall understanding to what entails voter education as they were the main contributors to the process.

Through observations and sitting through some of the planning meetings and follow up interviews, we were able to go through the development cycle of a voter education intervention.

At the end of this phase study we had learnt that a voter education strategy is composed of three elements: *the message*, *the audience* and *the medium*. It is in correctly mapping and matching these three elements that a voter education can have a chance to be successful. In the following section we outline each of these elements as per our findings, which we supplemented by further readings on voter education.

4.3.1 The Message

The most important thing in any voter education process is the message. A message is used to refer to the underlying theme behind a particular piece of information that is broadcasted to the voter. This in turn is composed of various thematic areas for distribution to the voters. For instance, responsible leadership was a central theme in Kenya's 2007 general election; the information around it was on electing servant leaders, accountability and transparency. The thematic areas are determined by several factors including the source of the information, and type of the election.

4.3.2 The Audience

Before any message is launched, population segmentation has to be done. This is done by considering demographics which includes factors such as age, gender, literacy levels, geographical location and first language of communication. Other factors considered are special needs groups such as those with disabilities, the aged, women and geographical[8] marginalized groups.

Age and Gender: Different age groups are catered for by different forms of messages. For instance, a message targeting the youth will cater for their needs as new voters, while at the same time give them "their right for an adrenaline rush". While that targeted towards women is aimed at appealing to their feminine needs of equality, representation and safety. The messages can be tailored to target the aged and the men in the same manner.

Location and Content: The location of the voter is a key determinant of the kind of voter education message that is going to be deployed. Messages in urban areas are tailored to suit them, while the ones for the rural areas were created to match with their needs. Usually content aimed at rural areas, is tailored to suit that context, while that for urban areas looks into issues that affect urban living. For instance rural areas might have messages on improved trade of farm products while urban areas might have messages on better infrastructure.

Literacy and Culture: Due to high levels of cultural diversity and literacy levels, the effectiveness of a message presentation in one area might not give the same result in another area. The message needs to be tailored to a given population and usually takes into account cultural heritage.

4.3.3 The Media

Based on the final out and structure of the message, an appropriate outlet is selected. The outlet's appropriateness is determined by the audience, and the range of coverage. As noted earlier the radio is the most widely used of media as it covers a large part of the population and can be found both at a nation and community level.

4.4 Re-Design Implications

Upon understanding what voter education entailed, it was important that the BB was able to meet the given specification for voter education; therefore the next phase

[8] These are people whose immediate location is usually ignored in other forms of information dissemination.

of our study was to engage the various officers involved in voter education to tailor the BB to meet their specific needs using various UCD techniques. This included a an artifact walkthrough to familiarize the userswith concept of the BB and see where it will fit into their daily routine.

During the preliminary introduction of the BB to the NGOs one of the greatest concerns was the manner through which content was submitted to the BB. The BB as it currently stands, did not allow for third parties to seed initial media for download and was totally dependent on content provided via mobile phones. Additionally, in the course of evaluating the BB for use in voter education, some of the fears and concerns relayed dealt with the security, integrity and credibility of the information being put up on the BB. All the NGOs felt that if the BB was going to be associated with them they needed to have control over its content. As McLuhan [McLuhan.1998] states, the medium is the message, where the medium (technology or otherwise) is an extension to 'ourselves'. Here the BB and its content will automatically be associated with the NGOs. Control meant that despite being able to produce and upload media packs from their mobile phones, they needed to systematically determine, edit and present the messages in a way that it will cause the biggest impact without losing credibility.

The level of material manipulation needed to create a credible message would not be amply done through a mobile phone alone. Additionally, there was a consensus among the NGOs that the ability to upload information by individual voters (who were not part of the NGO) should be eliminated

"...You need to know that before our message goes out there[to the voter] it has gone through various processes [to optimize it] for it to make an impact..." (MFoA representative, 2008)

"...What people see up there [the BB], they will associate with us,... we do not want to be blamed for misleading the country... How will the people know what information is from us, if anyone can put up their own bit up there, [using their mobile phones]..." (IDASA representative, 2007)

"... How do we trust someone will not go and put something up there[the BB] that was not meant to be there...Politics is a dirty game, some people will do anything [to

get ahead]...have you not heard of people being 'misquoted[9]'..." (CMD representative, 2007)

Following this observation, we needed to develop an alternative means through which the NGOs could create, manipulate and submit media packs to the BB in manner that they would have the desired impact on the voters. Additionally we needed to inhibit the ability of harmful material getting onto the BB board, by eliminating the 'upload' function of the BB.

The inhibition of the upload function was the easier part of the task, as it only demanded disabling of that function on the BB. An alternative means of generating media packs was the demanding part of the redesign task, as we needed to first establish how the NGOs approached the creation of a message and how they packaged this messages to suit each of the different segments of the voters.

From our observation, we noted that messages were created based on background research on the state of the country, the current leadership and pertinent issues concerning the voters. The messages were short and precise, tailored to meet a given segment of voters; they were presented graphically, in audio or video form.

The NGOs, after doing most of the research work and summarizing of these materials, outsourced the bulk of the creative and presentation work to advertising firms. The media and creative designers from these firms would then work hand in hand with the NGOs to develop the material into a message. Depending on the targeted voter group, the message would then be transformed into a form that is most palatable. The final versions went through a validation process by the NGOs before being released to the media houses.

Given that part of our aim in using the BB as a voter education tool was to empower the NGOs by giving them control over the disseminated material as well aslower the cost incurred while in the process of voter education, the alternative solution needed to be something that would be easily used by the NGO's staff within the context of their work, using the available resources.

[9] 'being misquoted' is a term used by politicians to refute statements – usually highly documented and criticized by the media - that they might have given, to abscond themselves from public wrath

We noted that since most of the material and data was stored and manipulated within the NGOs and on personal computers (PC), the alternative media pack generation solution could be PC-based and be manipulated in much the same way as other applications that were used in the day to day running of the NGOs.

By using the PC, the material used in other media would easily recycled, eliminating the need for further creative work; this also meant that NGOs were able to develop the ideas and present them cost-effectively.

In the next chapter we discuss in detail the design to the upload solution that we called the media pack generator (MPG).

The following chapter describes the design of the MPG application and how it was integrated into BBs existing design.

5 DESIGN AND IMPLEMENTATION

5.1 Introduction

We have already seen that the BB can be used for the dissemination of voter education material; but in order for this to happen, the BB needed some adjustment so as to suit the NGOs' requirements. These adjustments were in the form of how multimedia material was generated and uploaded onto the BB. This needed to be done in a manner that would ensure their security and integrity of the information that the voters would consume.

To design this alternative media pack generator (MPG), we needed to first find out what task NGOs carried out on their PCs, and how they carried out this task. This understanding enabled us develop a design that matched the conceptual model of the persons who will be responsible for generating the media packs. Knowing the conceptual model of the user is important as it allows the designer to map common user tendencies onto the final design hence not interfering with routine [Jones, et al. 2006, Sharp, et al. 2007] .

Additionally, since the MPG was to be integrated into an already existing BB system, we needed to understand how the BB was constructed and how it works so as to create the MPG in a manner that is compatible with it.

The final design represented a mash-up of the two sets of requirement, the user's and the BBs, and undertook a user centered approach with iterative process to materialize the final MPG design.

5.2 Conceptual Design

The conceptual model of our user was developed as a result of observations that we made as the users carried out their day to day work as well as interviews and questionnaires.

5.2.1 Direct Manipulation

Based on the questionnaire replies and the observation sessions that we had with the various officers at work, we had noted that they were all familiar with Microsoft's Windows environment based applications. This is where they used the mouse and the keyboard to manipulate the various forms of data on their computer screens.

We used scenarios in relation to activities carried out within frequently used applications. The choice of the application was determined by how often it was used by the user in their day to day work; we identified the Microsoft Office suite as one of the most frequently used by the user. We also used Google search as it was the default search engine known to the user, and it supported the users work in their natural setting. We examined the process, steps and activities that went into performing a single task at a time; this was to ascertain what interaction modes they were most comfortable. The table below gives a summary of scenarios and activities that two of the users went through to perform the task.

Scenario	**Steps taken**	
	User One	**User two**
Create a PowerPoint presentation.	start-all programs-ms office-power point, chose a template, typed in the title of the presentation, browsed out to the desktop to find a document, previewed the presentation, edited text to fit, browsed out to the desktop again the logo; did not manage to add an audio file	Start – all programs-Ms Office-PowerPoint Used default template browsed out to the desktop to find a document, Typed in text Inserted image Inserted different formatted slides Unable to add audio clips.
Create a one paged graphical newsletter	start-all programs-ms office-desktop publisher, File-open- existing project. File-save as –new document, change name and title, browse desktop for document, copy content onto the columns of the template	Did not know how to use desk-top publishing application
Google-search – Word of choice	Desktop item- double click on internet explorer type www.google.co.ke- wait for page to load,	Start- Internet explorer-typed google (auto complete)- waited for page to load – typed 'women

	type 'developing a scorecard'; wait for results browse through results and click on most relevant, repeated the search with 'democracy scorecard'	and democracy' and browsed the results
send an email with an attachment	Open My Documents – Open folder -Open document , file- send- send as attachment, add email address, add text- send	Desktop- MS outlook- click on new – add email address (auto complete); click on attach file, browse to My Documents, find file folder attach document, add message and send

Table 2: Summary of Scenarios that the users went through

The result proved our earlier observations that the users were comfortable in working within the windows environment and could easily manipulate window based components such as menus, buttons and text areas to perform a task. They could easily use a mouse as a pointing device and the keyboard as an input device. Additionally the user easily navigated within computer folders and the internet using a web and file browser.

The resultant design would therefore be a Window's based application, with common Window's components and objects (icons, menu, buttons, text boxes and others), which employed direct manipulation, browsing and navigation as an interaction model.

5.3 The Big Board Analysis

Having established what the user preferred in terms of how the application looked and how it should be manipulated, the next stage was to ensure that we captured all the functionalities and elements that allowed the formation of a media pack within the BB as a system.

The first thing we need to do is to understand how the BB worked. In order to do this we adopted a form reverse object oriented design (OOD) approach, to understanding each of the tasks carried out by the BB system for a media pack to be created. This provided a means through which to deconstruct and visually present the various components of the BB and how they interacted with each for the generation and presentation of media packs.

The BB as a system was implemented as two different but interlinked components the BB display and the Media Pack; the BB contained information for structuring the content of the display, while the media pack contained information for organizing the content within the media pack.

5.3.1 The Big Board Analysis

The BB as described in chapter 2 is a public information system that provides a means of data exchange between a public display and mobile phones; the systems features and the interaction process between the display and the public display was discussed.

But in order to develop a PC based Media Pack Generator, the internal interaction between the system and the data had to be understood. This section gives a technical

description of the BB to be able to understand the functional requirement of the MPG in relation to compatibility with the BB.

The BB was implemented using a series of extended mark-up language (XML) and Electronic Data Interchange (EDI) standards. XML provides a file format for presenting data, a schema for describing data structure, and a mechanism for annotating semantic information, thereby supporting the creation of data viewing and manipulation application [Watkins, et al. 2003]. It allows the developers to specify a set of objects, elements and their attributes. EDI on the other hand provides a collection of standard message formats and an element dictionary as a simple way to exchange data via any electronic messaging service without human interruption [Sheldon. 2001]. The combination XML and EDI provides a standard through which applications can exchange data in such a way that it is easy to search, decode, manipulate, and display in a consistent way.

5.3.2 The Media Pack Analysis

A Media Pack is a collection of various media items, which include documents, photos, audio files, video clips and web pages that the system logically groups together. A media pack is characterized by:

Media Pack ID: Unique identification number which can be Bluetooth address (for hand-held device generated packages) or numbered (for editorialized packages).

Content: Media items optimized for hand held devices such as the mobile phone.

A cover image: This is used on the display of the BB to represent the media collection.

A title: This goes a long with the cover image on the BB display

5.3.3 Relationship between BB and a Media Pack

The BB is made of the Media Pack and its attributes. The figure below illustrates the relationship between the BB and the Media Pack and their attributes. These descriptions form the XML schema and the basis that generates the XML script to structure the data on the BB, and to generate a media pack.

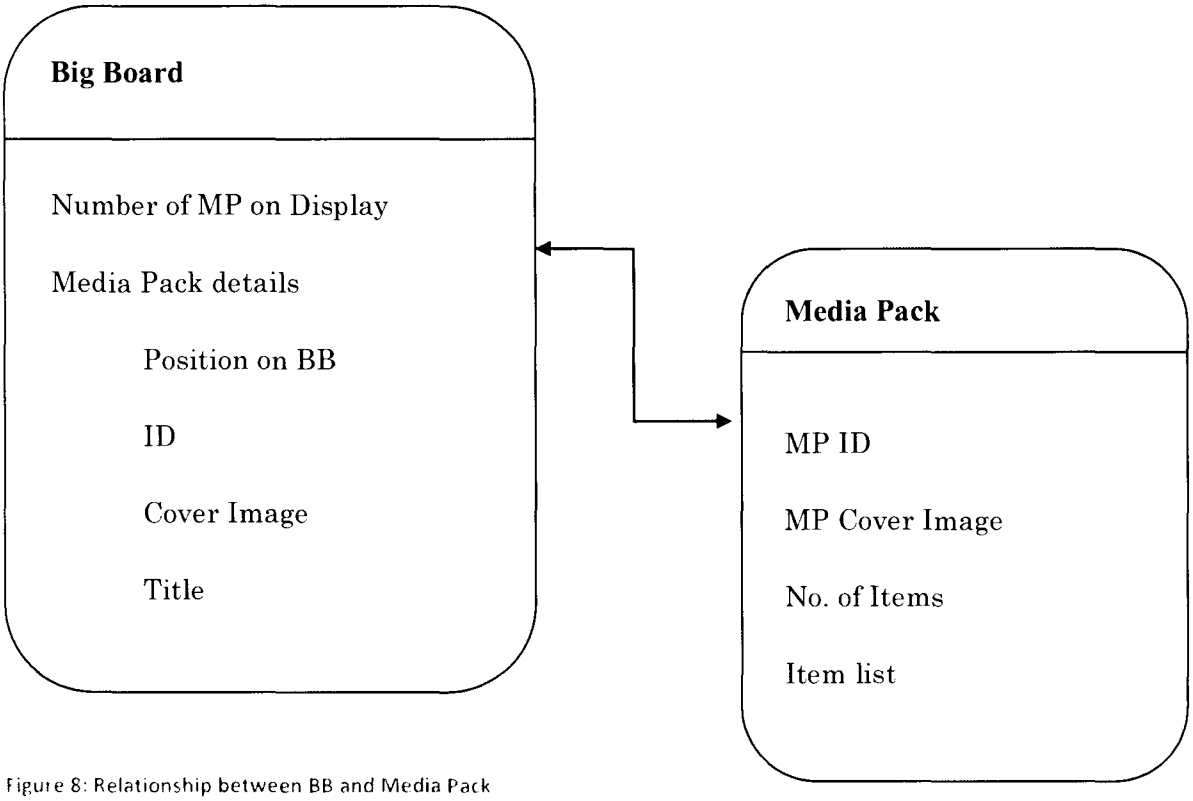


Figure 8: Relationship between BB and Media Pack

5.3.4 Process behind Media Pack Generation

To generate a media pack the XML/EDI standard is used to define the elements of the media pack. An EDI application known as the i_view is used to process the cover image into their pgm (portable gray map) equivalent, as well as assign them a unique key (ID). An XML schemer structures the media pack by specifying the number of data items which are in the media pack and listing them with their attributes (name and format -video, audio, text), the XML script generated from this schema is placed in the same directory with data items for ease of reference.

The second level of the script, formats the BB display by specifying the number of media packs that are to appear on the display, allocating positions to each of the media packs, indicates type of media on the media pack and an item count on each media pack.

MEDIA_PACK_XML

```
<BigBoard>
 <object>
 (Media Pack ID)
<id>8</id>
 (Media Pack Title)
  <title>IDASA 20th Anniversary</title>
  <textbody />
(Number of Items in the MP)
  <itemCount>3</itemCount>
     <media>
(List of Items in the MP)
        <item>paul_graham.jpg</item>
        <item>Annual Report.txt</item>
        <item>rslDASA.txt</item>
    </media>
   </object>
</BigBoard>
```

BIG BOARD_START_UP XML

```
<BigBoard>
Number of Media Packs on Display
  <editorialCount>8</editorialCount>
      <editorialList>
  Media Pack
             <object>
                    <id>13</id>
  Position on the BB  <spot>1</spot>
               Name  <title>IDASA</title>

  Folder        <directory>IDASA</directory>
  <media>
Cover Image<image>IDASA.jpg</image>
Pictures        <imageCount>0</imageCount>
Videos          <videoCount>1</videoCount>
Audio   <audioCount>0</audioCount>
Vcard  <vcardCount>1</vcardCount>
Webpage         <htmlCount>0</htmlCount>
Documents  <textCount>1</textCount>
    </media>
    </object
  ...
  ...
  </BigBoard>
```

Figure 9: Relation of BB and MP in code

5.4 Media Pack Generator Design

In order to end up with the most appropriate design for the MPG, we combined the user's conceptual model as well as the findings that resulted for the analysis on the BB system. First we had to draw a list of all activities that needed to be carried in order create a media pack to be generated. After coming up with this list based on activity modeling an aspect borrowed from OOD; we matched these activities to possible tasks that the users can perform, translating these into a physical design.

5.4.1 Activity Modeling

The activity analysis was first carried on the BB to identify a set of activities and functionalities that the MPG would have to support in order to achieve the goal of generating a media pack. We specifically picked the most tasks that contributed to the creation of the MPG.

5.4.1.1 MPGs Activity List

Working closely with the developer of BB, the following were the basic tasks that needed to be carried out to support compatibility between the envisioned application and the BB.

- Creation of a new media pack
    - ✓ Generate ID
    - ✓ Add cover image
    - ✓ Add Title
    - ✓ Add content
- Editing of existing media packs
    - ✓ Change title
    - ✓ Change cover image
    - ✓ Remove content
    - ✓ Add Content
    - ✓ Discard changes
- Delete entire media pack
- View contents of the entire media pack
- view all the available media packs
- Preview the big board.
    - Optimize PC based media formats to light weight hand-held device formats

This task list was adopted as the basic functional requirements of the MPG. They provided the boundaries and constrains to what the MPG should do.

5.4.1.2 MPGs Activity Map

The task list derived from this process formed the logical model which could be represented in an activity diagram in the form of an activity map. The activity diagram was relevant at this stage to visually map what needed to be done, without necessarily knowing how it was going to be done. After several iterations, the Figure 12 below illustrates the final activity diagram from the activity modeling of the MPG.

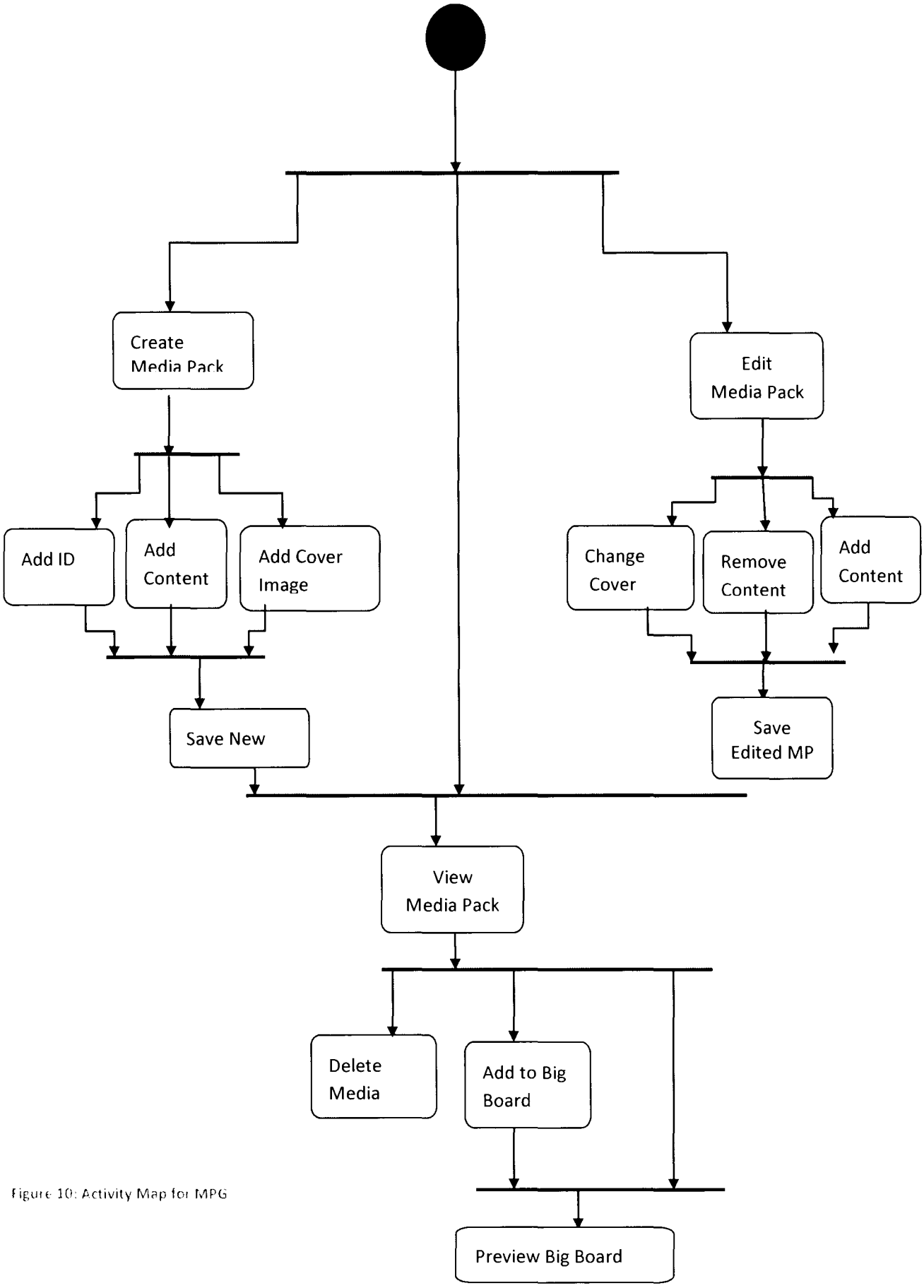


Figure 10: Activity Map for MPG

The activity list, and its accompanying activity map, demonstrated that the MPG interface had four critical elements: create media pack, view media pack, delete media pack and preview big board. Further probing of the tasks with the BB creator by applying artifact walkthroughs enabled the construction of delete media pack and preview media pack within view media pack: the argument made here was that one cannot delete a media pack which they have not selected. and selection meant viewing of the media pack. Additionally, conversion of media to mobile-friendlyformats could also be integrated within create and edit elements as they both introduced new media to the systems. The final conceptual design can be presented in the use case in the figure 13 below.

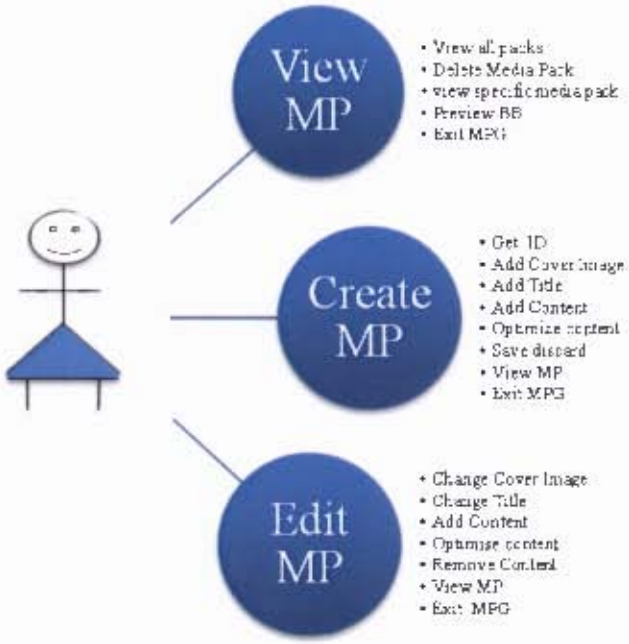


Figure 11: Use Case of the MPG

5.4.2 Physical Design

Having already established the tasks and user conceptual model, the next step was to transform this conceptual model into a physical design. In this instance the MPG was required to generate a media pack that would be accessed via a handheld device.

To enable a physical design of the ideas, an initial paper prototype was created based on storyboarding[Jones, et al. 2006, Sharp, et al. 2007]. This initial prototype was developed through consultation with the BB creator, while putting the users view

into considerations. The reason as to not involving the user here, was due to the technicality of making sure that the design will be compatible with the BB as a single system. Storyboarding is a form of low fidelity prototype that allows a fast generation of ideas with paper and pen, without incurring cost. It was used as a means to walk through all activities that are geared towards performing each of the tasks. This prototype assisted in visualizing the process that might be involved in the creation, editing or deleting of a media pack. At each level of interaction with the storyboard, various system features requirements were noted and 'placed' in the appropriate position within the envisioned application window, this included adding of buttons, text boxes, list views and file browsers. As a team of two people, we went through four iterations with each version building from the previous one over a two day period; the main concern as noted earlier was to make sure that the design captured all the functional requirements of the BB, while taking into account what the user needs. Figure 14 below shows part of the storyboard used in development of the MPG.

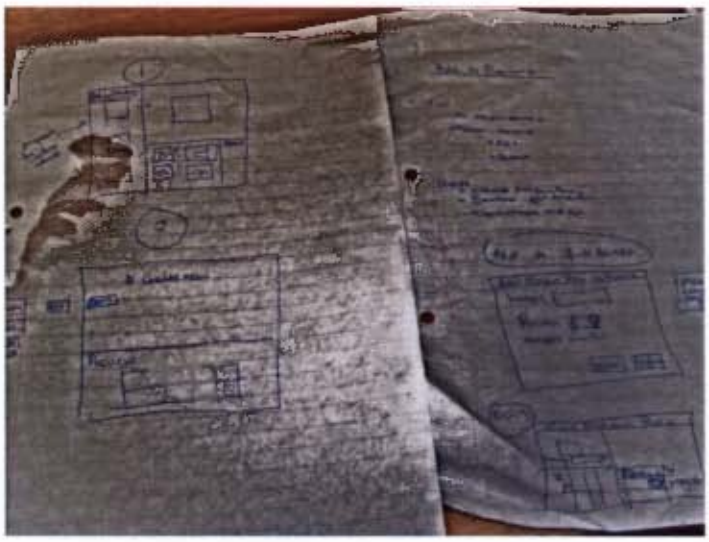


Figure 12: An example of the low-fidelity prototype used

At the end of this prototyping stage, we had established the three key major tasks with accompanying arrays that needed to be considered

Create Media Pack: Which would contain an ID generator to automatically assign an ID to a new media pack; a file browser to locate and add items from the computer; an image viewer to get the cover image; the save button which created directory and saved all MP items; browser buttons that automatically optimized media for use in hand held devices and discard button that reversed the creation of an MP.

Edit Media Pack: Which is a would be a functional duplicate of the Create Media Pack window, but instead of just adding items, it also implemented removing of items, changing of the title and the cover image.

The edit and create functions were made duplicate from a functional point of view as it captured the users conceptual model, where the editing and creation of documents was viewed as different functions.

View Media Pack: The final task was to view the content of the media pack as well as be able to view all the media packs available and preview the BB display content.

This task was purely for the management of the media packs and the content there in.

As noted earlier, the users were comfortable in using a windows application and were familiar with direct manipulation and browsing items from within their PC; hence, to accommodate these form of thinking and operations, each of the major task was transformed into a window, with navigation mechanism that would allow easy transition in between task.

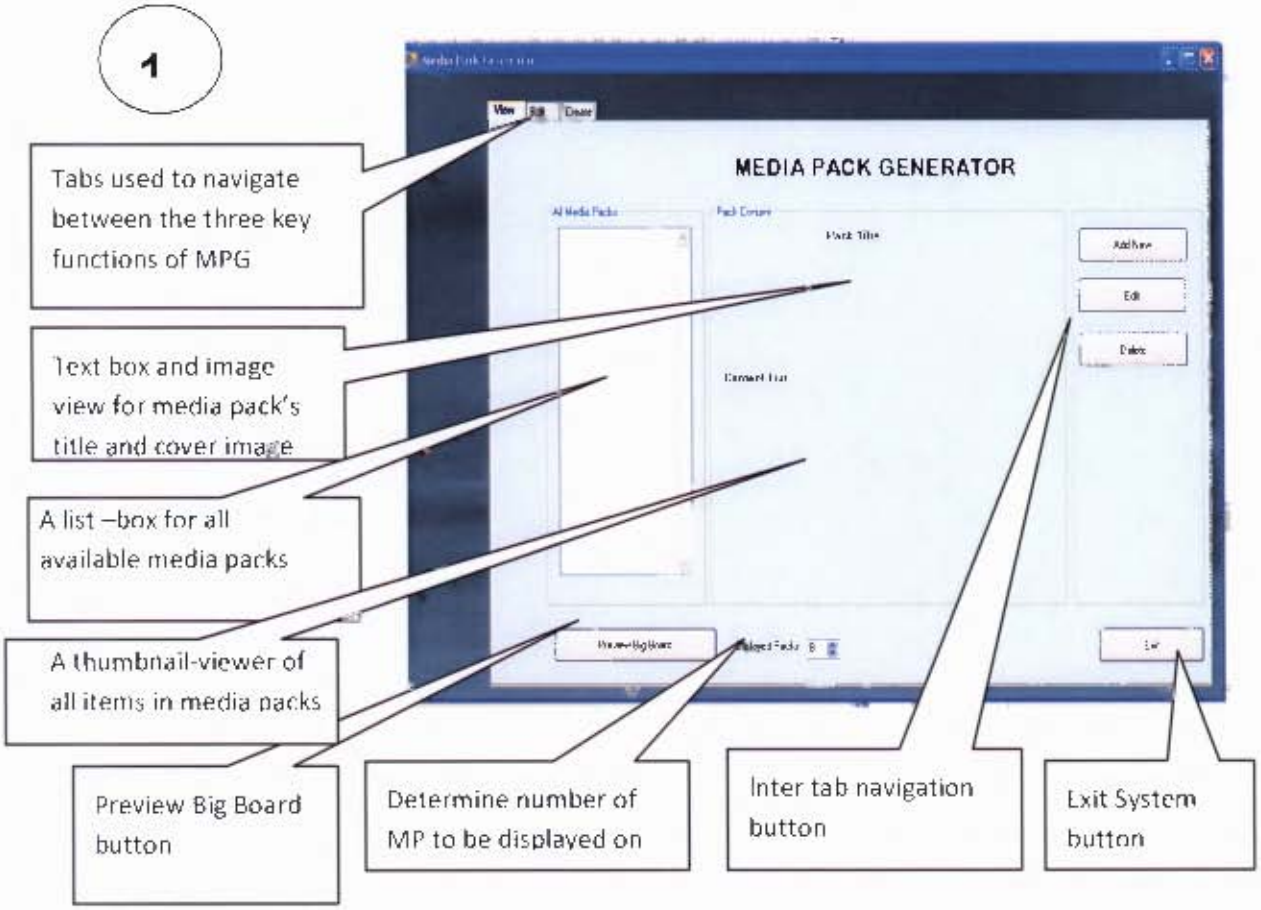
In the next section we briefly describe the objects and features of the initial high fidelity prototype.

5.4.2.1 Objects and Features

Having grouped the various tasks into groups according to how they related to each other, after several iterations and adjustment to the storyboard, these groupings resulted into having several windows that will represent the various activities needed for the creation of an MPG. We transferred this low-fidelity prototype onto a development environment supported by the Microsoft's .NET environment and used C-Sharp (C#) as the development tool. This form of prototyping allowed the users to interact directly with the 'live' system giving way for a rapid and successive generation and implementation of ideas.

The resulting design was a window-based tabbed application that partially met the functional requirement of the MPG (generation of a media pack on a PC that could be used by handheld devices). The tabs were the navigation mechanism needed for transition from one task to another.

The tabs were designed such that they performed each of the major tasks listed above (viewing the media pack, creating of a new media pack, and editing of existing pack



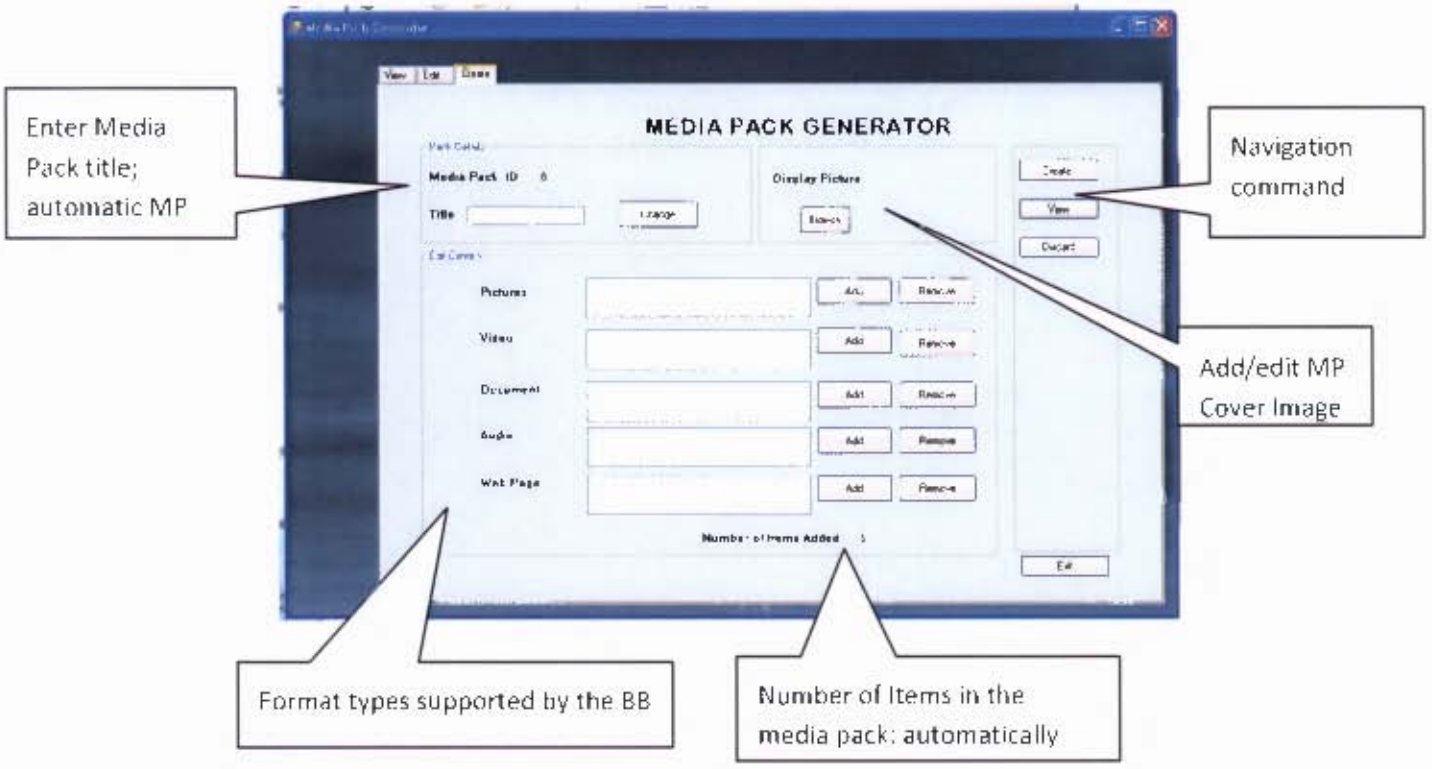


Figure 13: The initial prototype of the MPG

Each tab contained a set of activities so as to perform different tasks. However, the edit and create tabs had duplicate activities, but the resulting task was an updated version of a media pack in the case of the Edit tab, whilst the create tab created a new media pack. The Create and Edit tabs contained text boxes and file-browsing capabilities to allow the user locate particular pieces of data that they wanted on the BB; in addition there was a title text box that allowed the user to specify the media packs title and an image view that enabled the user to find and view the cover image of the media pack.

'View' was made the default start-up tab; this is because the 'View' tab gave an overview of the contents of the BB system as it shows a list of all the available media packs in a given directory; a thumbnail view of a specific media pack that had been chosen to be displayed onto the BB; and a button that would allow the user to preview the BB content and an exit button that gave the user freedom to leave the system. This high-fidelity prototype was the first to be exposed to a group of expert users.

All the tabs contained navigation buttons to exit the system completely or go back to the 'home' window, this was to provide the user with a means to reverse an action, or measure the effect of one they had already made, the 'home' page also allowed the user find their bearings within the application

5.4.2.2 Interaction Modes

As suggested earlier, the users were comfortable using a Windows environment. With a 'live' prototype the MPG utilized buttons and file browsers through which the user could instruct the application to perform a given task. The application used visual cues to alert the user of the results of their action; for instance, when they selected a media pack, it would be highlighted using a different background color to indicate selection.

In the next chapter, we will be looking at how the evaluated the use of the MPG for its usability and adoption into the voter education.

6 EVALUATION

6.1 Introduction

Evaluation is an iterative process that cuts across the different design activities to explore, assess, refine and validate requirements and features of the envisioned product [Preece, et al. 2002, Abras, et al. 2004].

Evaluation can be in the form of a laboratory study where the user is closely monitored under a controlled environment, or it can be a field study where the usage of the product in the user's natural environment [Preece, et al. 2002]. Additionally, evaluation can be performed by experts who imitate typical user (heuristic evaluation)or with the actual users (usability testing) that utilizes UCD techniques such as those discussed earlier [Preece, et al. 2002, Nielsen. 1992].

This study largely used the latter, where the user was involved at critical stages of the development process. However, we also did a heuristic evaluation as a complementary means to ascertain that our design was up to the acceptable standards.

The evaluation process was divided into three phases aimed at exploring, assessing and validating the MPG's requirements. The exploration phase was largely concerned with identifying and defining new requirements as the user interacted with the design. The second phase was concerned with interpreting these requirements into the design and the final phase involved validating the match between the requirements and the design.

We start by looking at the heuristic evaluation, where we present a combined report of the study; next we look at each of the three phases of evaluation, which were in the form of experiments carried out on prototypes.

6.2 Heuristic evaluation

6.2.1 MPG Heuristic Report

Here we used three different usability experts throughout the design process. The heuristic evaluation resulted into a number of major changes in design and usability alterations were made. The following report gives a summary of all the changes that

were done through heuristic recommendations, and will be mentioned during the usability iterations.

1) Elimination of tabbed navigation

a) It was identified that the tab function was irrelevant as it duplicated the functions of the navigation buttons.

2) **Addition of new objects**:

Several functions were not explicit for the user and required additional objects to give visual cues for the performed activity.

a) To make a selection of media packs that were to be viewed on the BB, two levels of highlighting were added. The first level highlighted all the media packs that were currently on the BB; while the second level highlighted the media pack under scrutiny. Two shades of blue were used to illustrate the differences.
b) Down and Up arrow icons were added alongside the list of all media-packs and were used to manipulate the position of a media pack in relation to its appearing on the BB.

3) **Button Re-naming**:

The buttons names were noted as being ambiguous and did not match with the natural mapping of the user:

a) The 'Add New' button in the 'View' window was not consistent with its purpose to navigate to 'create' window, hence was confusing to the user so it was renamed to 'Create'.
b) As the 'view' was the default window, all the 'View' buttons that navigated back to it were renamed 'home', indicating going back to first position.

4) **Re-organization of objects:**

To enable natural representation, objects were grouped by their associated activities; for instance the command buttons were grouped under their related manipulative action, while the navigation buttons were grouped together. Each set of buttons was place distinctively apart from the other and housed in a panel.

a) Home Window

i. The 'create', 'edit' and 'delete' buttons on the home window were grouped and placed under the list of all media-packs as their functions were associated in the manipulation of the media pack list (add a new one, edit or delete an existing pack).

ii. This group of objects (the list view and buttons) was place on the left hand edge of the home window, as they were the first actions expected from the use. (The user is assumed to perform their task from left to right, with priority being placed on the leftmost activities.)

iii. The 'Preview Big Board' button and 'Displayed Packs' picker were moved to the top right hand position of the home window, as they were assumed to be the last actions that the user needs to perform.

iv. The middle section of the home window was left for the manipulation MP content.

b) Create and Edit windows

i. Due to the similarity of functions of these two tasks 'creating a media pack' and 'editing a media', it was advised that their objects have identical positions in the two different windows.

ii. The 'save' and 'discard' buttons were grouped together with the items meant for manipulation of objects (file browser and text boxes) and were placed at the left most corner to allow them to be visible to the user.

iii. The 'Home' button was placed at the right-bottom corner of the windows to allow for a reversal of an unwanted action and to distinguish it from other item manipulation buttons.

6.3 Usability testing

Usability testing was used to measure the attainment of usability goals – effectiveness, efficiency, learnability, memorability – as well as enhance user experience by working with the real users [Preece, et al. 2002, Nielsen. 1992]. The users in this case were the communications persons from the three NGOs which we introduced earlier. To be able to carry the evaluation we employed various ethnographic techniques including observations, scenarios, constructive interaction and artifact walkthroughs. These techniques allowed the user to interact directly with the prototype, using real life cases of creation, deleting and viewing media packs. Constructive interaction was especially important as it allowed for training of the user on some of the functionalities of the MPG whilst also having close

observations on how they were carrying out the various tasks. Scenarios were created to see whether the functionality of the MPG matched the users expectations.

6.3.1 Prototype I: Exploration

The first prototype that was presented to the user was with improvements made on the initial 'live' version after the recommendations made from the HE; its goal was to explore the usage so as to find further requirements from the user. The user was exposed to the design, and given a systematic walk-through the process of creating and editing a new media pack. After several attempts the user was able to create a single content media pack and find and edit an existing media pack and view its contents.

Figure 14: MPG, "View" window

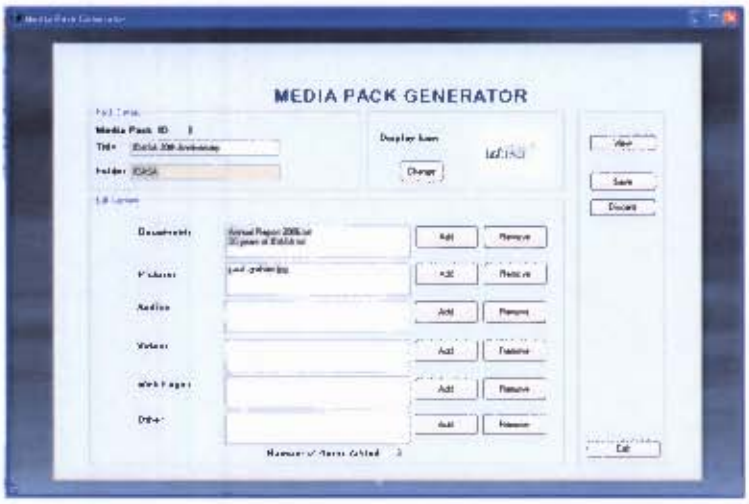


Figure 15: MPG "Edit" and "Create" window

6.3.1.1 Observations

Affordance: The thumbnails in the MP content list invited the user to click on them expecting it to open the actual file on clicking. This is a requirement that had not been identified earlier, but was important for the users to validate the files before it uploaded onto the BB.

"*...you know when you are working with different versions of the same document you might erroneously pick an incomplete version instead of the other...a last minute check helps me know that this is the right document...I do it even on Outlook.*" (IDASA representative, 2008)

It was implemented by making the thumbnails execute the 'open' command that links to the file's location.

Natural Cues: The numbering on the list of all media packs was confusing to the user, as it did not explicitly indicate what the numbering was for; it did not match with what the user was accustomed to, where highlighted text always indicated selection. The list view was re-implemented to highlight all the Media Packs that were viable for BB display.

User Experience: To create a compatible video clip, the user needed to use third party software to convert the video to a format compatible with mobile devices. This process was tiring and cumbersome and the users did not the embrace using the MPG if it meant interacting with this other software. There recommendation was for the conversion of the media pack to be done automatically within the MPG.

Figure 16: Message requiring media format conversion

Based on the recommendation, a media convertor was implemented using FFMPEG – an open-source application that compresses the size of the videos, by reducing their resolution. The convertor was embedded with the 'add' button of the 'get video'

textbox; on activation it would give feedback to the user of the progress of the conversion process

Consistency: The browse buttons for adding the display picture on the 'create' and 'edit' windows were not consistent with the 'Add' and 'Remove' buttons for adding and editing content within the same windows. The browse button was renamed to 'Add' which when later presented to the user was explicit.

6.3.2 Prototype II: Assessing

The second iteration was more intensive in terms of time taken with the user and the functional tests carried. This stageas it aimed at implicitly assessing the MPG's objects and functionality to check whether they measured up to the systems requirements. The prototype at this stage was fully functional and suggestions made from the first round of testing with the users were also implemented and subjected to further heuristic scrutiny to ascertain that the adjustments did not produce heuristic complications.

This stage of the prototype introduced a new user (the creative director of MFoA) who had not been present at the previous development stages of the BB, but had been used in requirements identification through questioners sent out to them at the beginning of the study.

The initial step of this stage of prototyping was to send the new users a video clip of how the BB operated, as they were not familiar with the concept. After this we had three testing sessions over a period of a week within CMD-Kenya and MFoA all carried out separately. The first session was for familiarization purposes and it involved the communications teams from these organizations. We first demonstrated how the BB worked to supplement the knowledge gained from the video clip. It also allowed the users to try out using the BB for themselves and discuss the various applications it can used in a democratic communication process.

Figure 17: User trying out the BB, running on laptop

The second session involved testing the MPG usage. This was mainly a one on one session with the communication persons from each of the organizations. Having been satisfied on how the BB worked the evaluation on the MPG was carried out using constructive interaction with the user, where the researcher and the user collaboratively performed a task, identifying the problem areas that the users might encounter.

6.3.2.1 Observations

Conceptual Mapping: The scrutiny of this prototype went to considering the inter-relationship and association in view of the larger role of the MPG as a component in a public information system. The user – a journalism and communications major – pointed out that the most frequently used type of data on mobile phones for mass communication was text based, followed by pictures, audio, video where web pages were the least used. They also pointed out that the tasks were most likely to be performed from left to right, an observation that was confirmed by the usability experts.

Therefore, to cater for this mental model, the content list was to re-organized to match the user's expectations.

Running the MPG as any other application from the user's computer desktop, was an important observations pointed out within all the three organizations.

The BB preview needed to match the what will appear on the display and easily manipulated to appeal to the voters as perceived by the officers.

There was also an issue with language, where we assured the users that they could customize the BB display to match their audiences language.

6.3.3 Prototype III : Validation

This was the final prototype whose goal was to validate of the system against the user and systems requirement. This means that it was to check whether the implemented design met the objectives of the MPG, if it gave relevant feedback, performed error handling and be used to perform the all task that had initially been listed.

At this stage of the study we needed users who had been involved in the study from the beginning, who had an understanding of the requirements for the MPG. Due to distance this stage of the prototype testing was carried out after ten weeks from the initial 'live' prototype and four weeks after the testing on the second prototype was carried out.

This part of the study was carried out using a combined methodology of scenarios and constructive interaction. The user who had been part of the development process from the beginning was the first to be exposed to the changes that had taken place in the last iteration. This was to make sure they bought into the adjustments that had made by the other two organizations.

Figure 18: A prototyping session

Error Handling

The first error handling mechanism to be tested was on navigation from the edit window to the default window; earlier versions of the MPG had allowed this transition to take place without prompting the user to save or discard the adjustments made to the MP. It had resulted to loss of data which went unnoticed. The error handling implementation at this point was executed when the 'home' and 'exit' buttons were clicked.

Figure 19: Example of an error message

The second error handling tool that was tested required the user to save the current status of the MPG before exiting the system; what this meant is the user had the option starting from an empty directory or building their media pack and the BB from an existing list of media packs.

Figure 20: Message requesting appropriate action

Memorability

The next part of this testing was to measure memorability in performing the task; two familiar scenarios were drawn where the user was to carry out this tasks on their own.

Scenario one: *Create a media pack that contains a text document files, a picture, a video clip, and a logo of your organization.*

After the execution of the application, the user started by locating an image that would serve as the cover image and titled it 'idasa media', they located two documents that were related to their organization that had been stored into the computer. However, they were unable to locate their organization's logo as they were unfamiliar with its location on the experiment computer. We later executed this

program onto their personal computers where they were able to access the different files.

Summary of Actions taken:

Home →
Create → Display Icon (clicked on Add→ browsed for the image in the default My pictures folder)
Pack details → Title (keyed in title)→
Add Content
Documents→ add→ browse my documents directory→ IDASA journalism→ add documents)- was repeated twice .
Pictures→ add→ My Pictures → add picture.
Clicked save
Clicked Home
Review content

Figure 21: The "View" window showing thumbnails of media pack content

Scenario two: *Using the displayed Media Pack, please edit its content by removing the existing documents and changing its cover image.*

A previously created media pack was added onto the users working space, and the user was meant edit its content; the goal here was to measure flexibility of the system as the users' expertise of using the application increased as well as memorability.

Summary of Actions taken

Home →Selected media pack

Clicked on Edit → Display Icon (clicked on change → browsed for the image in the default My pictures folder→added new cover image)

Edit Content

Documents→selected a document→ clicked on remove – error handling pop-up 'do you want to remove this item'- clicked on yes.

Documents → browse my documents directory→ IDASA journalism→ add documents).

Pictures→ add→ My Pictures → add picture.

Clicked save, Clicked Home, Review content

6.3.3.1 Observations

The underlying intention of carrying out constructive interaction before the scenario study was it acted as a training session as well as an experimental session. It allowed the user to know the steps they needed to take to perform any of the tasks that had been listed. It was noted that the user did remember most of the steps that they were to take to perform certain tasks from the previous usability session, despite the tabbed navigation being eliminated. The user also commented on the simplicity of the application which enables quick and pleasurable task processing. The user pointed out that the explicit re-use of media pack content was important when re-broadcasting the message after repackaging it to suit a given segment of voters. Carrying out the study within the users environment allowed us to integrate the MPG within the users overall schedule and environment.

6.4 Discussion

The role of evaluation in this study was not primarily to ensure that the MPG was usable, although that was a large component. The key role of evaluation was to ensure that the MPG was in a state that could be adopted into the NGO's daily routine in the voter education process, which in turn will be able to ensure that BB is adopted as complementary voter education an extension to the wide use of mobile phones.

The criteria by which we measured how the MPG was able to adopted and how easily the users could utilize BB and the MPG into their routine of creation and dissemination of the voter education material. This was obviously determined by

how conversant they were in using the BB and the MPG, and further how convincing this system was in use with mobile phones.

As noted in an earlier discussion, the BB had been accepted as a possible voter education tool within the organizations and upon the introduction of the MPG, the users learnt how to create and upload media from their PCs; which implies that the MPG did enhance the viability of the BB for voter education by eliminating some of the misgiving shown initially.

The actually utility of the BB and its success in voter education could only be determined in an actual voter education exercise, through the monitoring and evaluation techniques employed by the NGOs.

7 DISCUSSION AND CONCLUSION

7.1 Introduction

This research was aimed at looking at how mobile phones can be used for voter education in Africa, by delivering material in multimedia formats to the voters' handsets in a cost-effective manner.

Through a field study, we noted that there are various channels on which voter education is performed, with the radio being the most popular of them all; we also discovered that voter education is a complex process involving demographic data in the design and dissemination of material. Additionally, apart from the logistical challenges mentioned above, voter education was also faced with other challenges synonymous to Africa as a continent; these include illiteracy, dilapidated telecommunication infrastructure, poverty and violence.

However, despite all the complexity and challenges, voter education offers an opportunity for the use of mobile phones as a means of disseminating useful information.

In the next section we re-cap the research questions, illustrating how we went about answering each one of the. We also discuss our thoughts on the contribution of this work in the larger ICT4D sphere.

7.2 Research Questions

In order to answer our research questions, a combination of document ethnography, field study, a pilot study and experiments was carried out in a naturalistic environment prior, during and after a voter education process. We revisit the research questions in an effort to see if we answered them based on our research success criteria.

We wanted to find out is the mobile phone a viable solution for voter education process?

An initial literature survey showed that voter education was primarily the responsibility of electoral management bodies. However, Non-Governmental Organizations were also involved as an alternative source of voter information and they also acted as vetting agencies for information provided by the state run electoral management bodies.

Hence, our focus shifted from empowering the individual voter; rather, we opted for empowering the NGOs, who not only had an understanding of how the voter education exercise took place, but they also had the capacity to monitor and evaluate the success of such an exercise through their normal mechanism and at a scalable rate.

A questionnaire sent out to the three NGOs that we were working with indicated that all the members of staff owned a mobile phone. Further observation indicated that mobile phones were largely in use in the NGOs for day to day communication, with both IDASA and CMD-Kenya having installed specialized SMS applications through which they could send bulk text to a large group of people. Additionally, based on the literature survey, we noted that mobile phones were already in use, in an ad hoc manner, in several past general elections across the continent. Most notable was the Nigerian elections, where mobile phones were used to monitor the elections. Based on this evidence, and a discussion with the NGOs, the potential of using mobile phones for voter education was very high.

However, despite the immense potential of the mobile phones for use in voter education, there still remained the question of cost and content. In terms of cost, the NGOs heavily relied on donor funding to implement their programs including voter education; these limited funds had be to budgeted for such that it had maximum impact; hence, if they were to use the normal form of communication such as voice and text messaging, this would not be sustainable as cost incurred from mobile service providers were prohibitively high. In terms of content, we noted that voter education material was tailored to meet needs of particular demographic groups. However, since one would not determine which mobile phone number was located in a certain area or belonged to such a person, bulk messages were never tailored but were rather made for general consumption.

To overcome this limitation, we adopted the Big Board, a public address system that would provide media to voters on their mobile phones via a Bluetooth connection

which is free and available in most handsets. The BB has two main advantages; the content provided can be tailored to meet the needs of a given community and secondly the content was provided with no cost incurred by the voters, and just a minimal cost incurred by the NGOs. The BB also qualified as a democratic tool due to its openness and transparency, as well as free flow of information. The BB hence a provided a means through which mobile phones could be used as possible voter educations tools, in a manner that was acceptable within the NGO.

However, as the BB was not created for use in democratic purposes, as well as voter education, the existing version left room for tampering with information, as well as not directly supporting third party contribution of content. This challenge is tackled within our second research question.

Is it possible to develop a technology that was compatible with mobile phones and which also met the met the requirements of a successful voter education tool in an African context?

Having adopted the BB as the mediating tool between the NGO's content and the voter's mobile phone, we needed to tailor it such that it met their specifications and needs.

Through a document ethnography, interviews and observations we followed the sequence voter education material takes before it is disseminated to the voters. Starting with the theme of the election, various messages are developed to support this theme. Each message is tailored to meet the needs of a specific demographic grouping; these groupings also determine the type of media that the message will be disseminated through.

Having established this sequence of events, the next stage was to determine the capacity of the NGOs in terms of technology; here we were able to establish that the staff members charged with voter education were conversant with Windows based applications.

Hence to tackle the question of integrity of content and inclusivity of third parties to contribute to the BB, we created a Windows based application that would allow the NGOs to create and upload content that was relevant to a given community and which was also appealing to the voters. Here our partnering NGOs mainly emphasized the advantage of using audio and video versus text as it tackled their

biggest challenge of illiteracy as a majority of their target audience had limited amount of education – the message could be recorded in their local language and uploaded.

We took a user centered approach to the design and the development of the uploading tool which we called the Media Pack Generator (MPG) – as it put together different types of media into a package which it later uploaded onto the BB display. This approach engaged the NGOs in contributing to the design so as it would fit into their daily routine; the final application can be launched from an icon on the user's desktop. The media pack generator provided a means through which the NGO staff could create and disseminate mobile media by themselves and within their premises.

In comparison with other forms of tools for voter education, the mobile does indeed fair well due to its ubiquity; however, due to cost and content, this potential could not be fully exploited. The BB offers an ideal middle ground that allows content to be transmitted even to the remotest villages, which cutting down on the cost of connection from mobile service providers.

However, this is not to say that the BB can replace other forms of voter education, as each of them plays a different and important role in voter education. Despite the BB having the disadvantage of needing electricity and could be costly; it does represent a complementary option that is cost effective to the various NGOs working towards empowering the voter and which in turn may result towards democratic development.

The aim of this study was to ensure that the NGOs capacity to reach out to as many voters as possible was enhanced. NGOs have had the experience to carry out this exercise and had their own mechanism to check a certain is successful in delivering the information; hence, we incorporated them to evaluate the impact of the BB upon a scalable rollout.

As key premise to this study we wanted to see how the NGOs could use the BB in an actual voter education exercise. In order to do this we propose an implementation of the 'poster' version of the BB alongside voter registration booths and to run concurrently with the electioneering season.

By answering the research questions we were able to successfully meet two of our success criterions (a and c below). However, although we can arguably say that we

met success criterion (b) due to the fact the NGO bought into the idea of BB usage for voter education; we did not perform any study of the BB alongside other voter education tools with the real voter to check on preference and their acceptance, thus this can be said to be a partial success.

a) The acceptance of mobile phone as a possible voter education tool within the NGO would have increased.
b) The mobile phone enabled voter education system is viewed as complementary means for voter education.
c) The staff at the NGOs would create and disseminate mobile media without our assistance.

7.3 Lessons Learnt

During the course of the study we came across various situations that enriched our research experience. These are situations that we drew various lessons of which we hope to build upon in further research activities.

i. *Importance of partnerships*

At the very beginning of the study, we discovered that we will be unable to develop a convincing case in the use of mobile phones as voter education tools, without the assistance of experts in this area; the partnership with the NGOs played a crucial role in the final findings of this study as well as foundation for future studies. The NGOs provided their expert opinion on the use of mobile phones and the BB for voter education as well as set a pace in which to evaluate and monitor the success, sustainability and scalability of this particular project through their regular monitoring and evaluation techniques which is an essential factor when considering ICT4D projects.

ii. *Communicate! Communicate! Communicate!*

At the beginning of the study and during the feasibility study, we had identified five partnership organizations – CMD-Kenya, MFoA, IDASA, Cape Gateway and South Africa Knowledge System (SAKS) that we would have worked with in the course of this project. However, as the work become more intensive we lost communication with two of this organizations – Capegateway and SAKS; mainly because as we zeroed into voter education away from other development dynamics. Although these organisations were outside the scope of the study, they would have been of use

during user testing periods as they handled similar information and material as voter education, cutting the cost on travel, and increasing interaction times with the BB.

Additionally MFoA joined the project through a referral from CMD-K midway through the research process as an organization actively involved in voter education process; and continuous communication enabled us to use them as a key partner organization during the design and testing process

iii. *Users Stretch the truth, use many data collection techniques!*

We initially used questionnaires to collect basic information about our intended users, this was because our key users were located in a different country. These questionnaires required the user to list their competency in various ICT tools available in their immediate environment; this was to help in planning the ethnographic study, on analysis of the answers from this stage and the observations that we made in the field. We noted that users tended to stretch their actual expertise; for instance when using the desk-top publisher all the users had indicated that they knew had to use with a reasonable level expertise, but it turned out that only one of the user could actually use the application which would have jeopardized our study had we depended on questionnaires alone.

iv. *All the team members matter*

Although during the initial stages of the study we were involved in observing all the persons in the voter education process; in the development and testing of the MPG and the BB we concentrated on the team leaders who were the communication officers. In the last user testing done in Kenya, we introduced the BB and the MPG to the communications teams in the two partner organisations. We had not expected any form of resistance at this point since the head of the team had already bought into the idea of using the BB for voter education; but at one of the organisations there were differing sentiments within the team and their head; there was apathy in terms of the viability and applicability of the BB: *"...this idea is brilliant, but using mobile phones for VE is futuristic in Africa, and the BB will only be a reality in 2030..."*[10]

[10] The identity of the interviewee withheld for the sake of further relations in future research.

Another was in terms of cost of running the BB, in comparison to the other tools already in place"...how much will this cost us...?" all these were matters that we thought had been tackled during the initial briefing sessions with the team leaders, and additional clarification through continuous communication via email. From these sentiments and observation we noted the importance of an all-inclusive process from the beginning to the end where not only the main 'actors' are involved, but also the other contributors need to know what is happening.

v. *Keep It Simple, it works!*

During each of the user testing stages we were forced to ignore some recommendations from the user which, if implemented, would have made understanding the MPG impossible in the VE context; it would have been too complex to use. At the end the user appreciated the simplicity of the MPG both visually and in terms of functionality.

7.4 Future Work

As noted in section 6.2, the evaluation process was done in the premises of the partnering organizations. One of the things noted was constant interruptions during the media pack creation process by people and activities that needed the user attention. This distracted them from a continuous work-flow. Although we did put error handling mechanism in place to prevent loss of data, an additional feature in future work would be an auto-save mechanism, where the application saved its most current state if left idle for more than a few minutes.

Another observation made late in the development process, but one worth noting as a basis to future work, was the need for remote manipulation of the BB; the final demonstration with the communication teams noted that most of their audiences (the voters) were located in far-flung remote areas. Therefore, if the BB was to be effective, the content should be created and uploaded in their offices but accessed in the remote areas as was the case of the other communication channels. This indicated that the MPG, if integrated with the BB system, would have to be an online application that would enable the manipulation of the BB from a remote location. This was an important observation which if it had been made earlier in the development process would have been implemented, but due to time constrains, it has created an opportunity for future work.

7.5 Big Boards Technology Road Map

Technology Road Mapping (TRM) is a form of technology planning that allows the identification of technologies as well as the skills required to properly utilize the technologies for the future [Bray, et al. 1997]. TRM is done both at industrial or organizational level with focus on:Forecasting the development and commercialization of a new or emerging technology; looking at the competitive position of an organization with respect to that technology; estimating how the emerging technology and the organization's competitive position will develop.

In the case of the BB in supporting voter education in Africa, it is should be clear from the beginning that both contributing technologies – the mobile phone and the BB system – are evolving and should be going through several changes as other supporting technologies advance. To start with, various mobile phone manufacturers are designing handsets that support the various challenges encountered in Africa, such as lack of or limited power supply, where long-life batteries are increasingly being launched into the market; and hash weather conditions and environmental sustainability, manufacturers are using all weather materials which is also recyclable [Donner. 2008]. With this being the case, we expect that mobile phones will make great strides towards accommodating use in the developing world in scenarios such as voter education.

The BB as it was used during the course of this study was still in a prototype stage, and has been going through various changes to maximise its use in the developing world environment. As mentioned, one such development is the use of the low-end BB version that has been proposed to use less energy by elimination of the monitor screen and replacing it with paper-based poster and hidden computer. Additionally recommendations include replacing the computers with 'server' mobile phones which can be used in much the same way to store the MP of the BB; this will be eliminating the challenge of lack of power source as well as cost and security of equipments.

Therefore, in the future, NGO's could install low-end (poster based) BB, which will be powered by mobile phones, even in the remotest locations. Media Packs created on PCs from a central location – the NGO's head offices – could be sent through multimedia message services (MMS) onto the phone on regular basis from the NGOs; these media packs in turn are accessed by the voters. A local person could be trained on how to charge the phone every few days using locally available energy sources. By combining services already provided by the service providers and utilising local skills

– to cut down on cost of travel and connectivity – the NGOs could easily maximise on the benefits provided by mobile phones, both in disseminating the information as well as storage. This is something that can be easily replicated over several locations, and can be used to supplement the other sources of voter education.

7.6 Contribution

In section 1.2, we noted that one the UN has *termed democracy as a pre-requisite to development* in Africa and the rest of the developing and emerging economies. While ICTs, and mobile phones specifically, have been seen as the tool that would catapult these economies to the 21st century, there is very little work that has been recorded to the effect of the use of ICTs to promote democracy in Africa. Most accounts of use of mobiles in democratic use are ad hoc experiments that arise from trial and error of several eager citizens. The ICT4D community, both in academia and the industry, are yet to take account of these uses which are largely found as news articles in investigative journalism journals and columns.

This work sought to prove the need for pragmatism in ICT4D, when choosing areas to get involved. Theorist and philosophers of the pragmatic school of thought state that facts are more important than emotions [Scheffler. 1986]. In this case, it is fact as the UN says that without a functional democracy, very little or no development can be experienced; hence, although so much effort and resources have been pumped into many ICT4D projects that seek humanitarian elevation, they may not succeed with a background of a collapsed form of governance. This is not to say that these humanitarian projects are not important; but there needs to be an emphasis on empowering this world's poor people to put in place governments that will be able to sustain and protect all other development efforts.

The last contribution also stems out from our previous discussions; we have noted the crucial role that development agencies and NGOs play in the overall development process, they have knowledge, capacity and access to communities where many ICT4D projects are being targeted. We believe, if as technologist we do not have the capacity to create a large impact onto the community as the NGOs, we should then strive to empower them to perform their work. In the case of voter education, we as technologist did not have the capacity or the resources to reach out to the several million voters which is a requirement for voter education, but the NGOs that we worked with have been working at this kind of projects for many

years and had the capacity to maximize the impact caused by any new technology. Hence, had we worked alone, we would have ended up not being able to conclusively say that mobile phones and the BB can be successfully used for a voter education exercise, neither would have been able to prove the viability of such projects for future work.

Therefore, by combining the technical expertise of technologist and social expertise of the NGOs, in an ICT driven development project, one can arguably conclude that, ICT indeed can go a long way in bringing Africa and the developing world up to speed in terms of ICT development.

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APPENDICIES

Fair Partnerships – Working With NGOs

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Abstract. This paper highlights how Non-Governmental Organizations (NGOs) can be utilized during the design of Information Communication Technologies for Development (ICT4D). We use the design process of a voter education system as a case study, which incorporated three NGOs from two African countries. Of key interest to us are the ways in which we can avoid exploiting these NGOs and make sure the ICT intervention meets their goals, as well as those of the researchers

Keywords: Public Display, ICT4D, Participatory Design, Contextual Design, Mobile Phones, Africa, developing world, NGOs

1 Introduction

Some of the challenges facing the design of technology relevant for developing community include: understanding the users in their context; opportunity identification; determining design requirements as well as evaluating the impact caused by the resulting technology. These are mainly caused by differences between the researcher (mostly coming from a developed context) and the community of interest; the differences can be in terms of language, culture, attitudes and locality (where designers and users are separated geographically during some stages in the design process). These disconnects have had costly effects in ICT4D projects, with close to 70% of all initiated projects failing within the first few years of conception [1]. Hence there is a need for an alternative means to approach the design of ICT4D.

Non-Governmental Organizations (NGOs) are an instrumental and integral part in Africa's development agenda; they exist as non-profit citizen groups, organized on a local, national or international level. NGOs have enjoyed high levels of trust and acceptance in developing communities, and are now used to provide information, analysis and expertise about these communities. They also help with the implementation of government projects and monitoring of agreements and policies. Using an NGO for community liaison is therefore an attractive prospect for ICT researchers wishing to create technologies for developing world communities, and reports of such partnerships are common, e.g. [2]. However, instead of using the NGO

just as a liaison element in development projects, with roles limited to 'access point' or 'contact', we believe that it is important for these NGOs to be incorporated in a more integral role both in the development and evaluation processes for the project as they will remain in the community long after the technologist or researchers have left. We believe this type of evaluation mechanism is absolutely critical in working with an NGO as it will allow them to measure in their own terms any improvements the ICT intervention has made and determine what needs to be done to afford more impact.

In the rest of this paper we will report on working with three NGOs in the domain of voter education in Africa as part of a project to create new forms of multimedia voter education material. Voter education (VE) is a term used to refer to the process of disseminating materials and programmes designed to inform the electorate about the specifics and mechanics of the voting process for a particular election and aimed to enlighten them or convince them to participate in the election.

Three NGOs participated in this study, all of whom are involved in democracy and governance issues in Africa; specifically Kenya and South Africa. In Kenya we worked with the Centre for Multiparty Democracy-Kenya and Media Focus on Africa. In South Africa we worked with the Institute for Democracy in South Africa.

2 Methodologies

Before the design process could begin, we needed to understand the voter education process from the NGO's perspective and context, as well as conduct document ethnography where we followed the voter information development process. We first sent out an initial questionnaire to the NGOs whose aims were to capture basic demographic information as well as the technical competency of their staff. This information allowed us to plan our study such that it would suit the NGO's schedules and technical abilities. Thereafter, we carried out a contextual inquiry study, where we took an 'apprentice mode' within the communication office that is in charge of the voter education process.

A contextual inquiry allows the designer to learn more about the user by observing them in their daily routine; this is especially important in circumstances where the designer has little or no understanding of the user's domain. We therefore observed the NGO staff as they carried out their day to day tasks throughout the voter education

process in addition other tasks within their mandate. We followed these observations with unstructured interviews to clarify some of the observations that were made but were not explicit. This triangulation of techniques allowed us to capture information that we had missed previously and clarify observations made and inquire deeply into given actions.

We made notes for both the observation sessions as well as the interviews and digital photos were also taken of some the key moments.

3 Findings

The study found that voter education is a very complex but deliberate process that went beyond the mere dissemination of voter information material. We noted that each piece of information – the message – was tailored towards a particular segment of voters according to their demographic data. Voter education messages were disseminated either directly through face to face encounters (such as workshops), door to door visits or through broadcast media including print media, television, and radio. The radio was the dominant media, taking over 50% of the total VE budget dues to its wide spread use in both these countries.

NGOs monitored the impact of the VE process through a fortnightly survey, whose result determined whether a message achieved its intent, whether it should continue running or if it should be changed for a different segment of voters or moved to a different media.

During the study, we introduced the Big Board (BB)[2]as complimentary media for voter education that allowed sharing of multimedia using large public displays and mobiles phones via Bluetooth transfer. Using a participatory design approach, we designed a PC based application, that would allow the NGO staff to create, manipulate and upload media onto the BB, that will then be accessed by voters on their mobile phones. This media could be adjusted and cycled to fit the various voters needs, through a simple drag and drop interface (a technique familiar to the NGO staff). The application, as envisioned by the NGO would facilitate in cutting down on operational cost incurred from outsourced services but still enable a widespread reach via mobile phones with the assumed viral spread of the messages. Through various iterations,

observations and task based analysis we ensured that the NGO staff could comfortably use this application to upload media onto the BB.

The cooperation with NGOs during the study not only ensured that we could develop appropriate solutions for information dissemination by providing us with an understanding of the voters and voter education processes; but their ability to measure the envisoned impact (through their standard monitoring tools) allowed them and us to have the confidence that they could evaluate the effectiveness of the BB system during a voter education process.

4 Discussion

This is a research that, if we had attempted to do on our own, would certainly have led to failure. We discovered that voter education turned out to be more complex than we had initially envisioned, where demographics, illiteracy, trust and integrity are critical aspects that are largely opaque to the outsider. Furthermore, we did not have the capacity in terms of staff and funding to properly explore these issues to a point where we could make a contribution.

So, once again we see the value of having a 'human-access point' into the community [4]. We could leverage their deep understanding of the people and their needs to help create solutions in developing community settings. What is less clear, however, is what the NGO gets out of their collaboration with us. If we are not to be accused of propagating imperialism in Africa once more (this time in the form of culture or technology) then joint research of this nature must be an equal partnership. From our experience we propose that this equality should not be in the form of task-sharing (it is pointless for the NGO to learn how to write software, just as it would be for us to learn all the laws relating to the conduct of elections). Instead, we recommend that each party have in place a meaningful evaluation method that can be applied at the end intervention. In this way, we believe that the research partnership can be kept 'honest' as there is a clear understand of what constitutes success for each party.

5 Conclusion

Ostensibly, this research is about the creation of a voter education system in Africa. A wider learning in the field of HCI4D (for the lack of a better term) is the way in which NGOs should be engaged in this type of research partnership. Many papers report on the data and advantages of working with established NGOs and human-access points ([4] for example) but do not report on

how the NGO feels about the intervention. However, in at least one case we are aware of, an NGO partner was unhappy at the intervention.

Our experience suggests that these problems can be avoided by making sure the NGO has an evaluation method in place that can inform them of the impact of your intervention in their domain. In fact, we would argue that such a partnership must not be entered into until such evaluation methods exist. By this token, we can ensure equal benefit to both the research community and the NGO.

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QUESTIONNAIRE

ICT'S FOR DEMOCRACY BUILDING IN AFRICA

Adopting Mobile Phones for Voter Education in Kenya

By

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Questioner

Summary of Project

Africa is said to lug behind in the development radar with problems ranging from chronic poverty and hunger , to HIV/AIDS , as all efforts are being put to quicken Africa's pace in development , Democracy has been pointed as one of the key contributors to development. But for democracy to exist there has to be an informed voter.

Voter education is important as it offers the voter with *a pool of information that they will use to vet and make decisions on whom to vote in at the various levels of leadership.*

This project examines different ways in which voter education is done, and examines the sources, content, components and value of the message. By working with various stakeholders dealing with voter education it establishes means by which voter education has always been done. In studying the various ICT's at the disposals of the voter education practitioners, it also looks at what ICT's are available and how they are used in voter education. After examining the requirements for an effective voter education campaign, mobile phones will be used as a new carrier of the information and their effectiveness will be tested to parallel some of the conventional media.

The Questioner

Thank you so much for taking part in this study. This questioner is for academic purposes only, and your personal information will be treated with uttermost confidentiality, and will only be given out to a third party with your permission. Your feedback will be highly appreciated, but feel free to stop at anytime in the course of answering.

With Regards

Shikoh

1. What is Democracy?

2. What is the role of Democracy in development in Africa?

3. How would you define Voter Education?

4. What is the role of Voter education in building Democracy?

5. As a Democracy practitioner what are the ways that Voter education is carried out?

6. In the ways that you have mentioned what are the greatest limitation that cut across them?

7. In the list which is the most effective methods? (*Please explain your answer)*

Findings from initial study on voter education campaign show that materials on voter education carry different messages depending on the source and the media its being carried through;

8. How do you determine what message should be carried in a given media?

9. Who collects and compiles this information? How do you determine the relevance of a piece of information to the voter?

10. What information, communication technology (ICT) tools are you familiar with ? (Internet , Computer Packages , Software's ...) *please indicate level of competence and frequency of use* (1 being excellent/frequent , and 5 being little Knowledge at all/ rarely)

11. In the just concluded General election what ICT's are you aware of were used in the Voter Education / Campaign process. (*Please give short examples*)

12. What are of the above ways did you use in your capacity?

13. Are you aware of the mobile phone penetrations in Kenya? (*Please explain your answer)*

14. Would mobiles phones be an ideal carrier of Voter Education Campaigns? Please give as much information as possible.

15. What are some of the media would you suggest to be transmitted through mobile phones?

16. Please give us any other information that you believe would be of assistance to our study.

Thank you for participating in this study, please fill in the following details as you would like them to appear in the documentation of this study. (*We need this information for our reference purpose but please indicate whether we should include this in the documentation that might be distributed to third parties)*

Name .....Document (Yes).....(NO).....

Designation ..... Document (Yes).....